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THE DETAILED COMPOSITION OF FECES, SWEAT, AND URINE: AN ANNOTATED BIBLIOGRAPHY

Compiled by
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SPECIAL BIBLIOGRAPHY
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ABSTRACT

The increased importance of closed-cycle life support systems has produced a need for accumulating information on by-products of human metabolism. This publication consists of 598 references covering the composition of feces, sweat, and urine. Topics which are discussed include methods of analysis; the constancy at which the formed or waste products are created; and the relative influence exerted thereon by diet, climate, body activity, and stress.

Most of the references were published between January 1957 and June 1962. The references are alphabetically arranged according to the first author. A subject index is included.

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TABLE OF CONTENTS

Abstract ................................ iii
Table of Contents ........................ v
References ............................... 1
Subject Index ............................ 171
1. Abul-Fadl, M. A. M.
   Determination of β-glucuronidase activity in urine.

   Specificity of glucose oxidase test for urine glucose.

3. Adams, R., Johnson, R. E. and Sargent, F.
   Osmotic pressure (freezing point) of human sweat in relation to its chemical composition.

   Forearm sweat collected from men performing exercise in moist heat was hypotonic to serum in total osmolarity, Na and Cl; about isotonic in urea, ketone bodies and creatinine; and hypertonic in K, NH₃, lactate and H. Because the measured osmolarity was > the sum of the osmotic effects of measured constituents in most specimens, an 'unmeasured osmol' in sweat was postulated. This and total osmolarity decreased with increasing rate of sweating. Total sweat is composed of 2 kinds, one predominating at low sweating rates and the other at high.

4. Adler, M. and Gutman, A. B.
   Uridine isomer (5-ribosyluracil) in human urine.

   A substance isolated from human urine by anion exchange absorption and paper chromatography corresponded in u. v. absorption spectrum and chromatographic mobilities with 5-ribosyluracil. In a normal male, excretion was 18 mg./24 hr., and in a gouty male, 41 mg./24 hr. day, both subjects being on a diet free from foods rich in nucleic acids and excluding tea and coffee. An endogenous origin of the uridine isomer is considered likely.

5. Albert, A. and Silver, L.
   Recovery of human pituitary gonadotrophin from dilute urine.

   The recovery is impaired if the urine is diluted with water so that the specific gravity is comparable to that obtained when the urine output is 51./day. Recovery becomes
normal if NaCl is added to the diluted urine to bring it to a specific gravity of 1.025.


7. Albrecht, A. M. and Broquist, H. P.

8. Allison, A. C., Blumberg, B. S. and Gartler, S. M.

The results show higher excretion rates of β-amino-isobutyric acid by the Eskimo and Indian populations studied compared with those of the Whites, but the results are not sufficient to allow any conclusions regarding the origin of the Athabascan or Eskimo groups.

9. Alperovich, B. D.
Lipoids in urine precipitates. LABOR. DELO No. 5:9 (In Russian)

The presence of drops of lipoids in the urine in association with considerable albuminuria may indicate the presence of lipoid nephrosis.

10. Ammon, R. and Ney, K. -H.
(In German)

The urinary arylsulphatase of women is higher than that of men, but shows greater
variations. The activity is highest between the ages 20–30. The enzyme was purified by acetone precipitation.

THE DETERMINATION OF CREATINE IN BIOLOGIC FLUIDS. School of Aviation Medicine, Randolph Air Force Base, Tex.
Rept. no. 57-87, May 1957, 6p. (In cooperation with U. of Texas). ASTIA AD-143 024.

A method for the determination of creatine in urine and in plasma is described which makes use of ion-exchange columns for the reduction in concentration of (a) the inhibitors of the diacetyl reaction, (b) arginine, and (c) creatinine to levels which do not affect the diacetyl reaction. Chromatographic methods for the separation of creatine and creatinine are described. Creatine is developed by the diacetyl reaction (Barritt modification), and creatinine by the alkaline picrate reaction.


In rhesus monkeys, excretion of 5-HIAA rose to 5–30 times the normal value after ingestion of 50–150 g. banana. Iproniazid (to inhibit the amineoxidases which convert 5HT to 5-HIAA) given i.p. results were obtained in 2 children fed banana. These increases in 5-HIAA excretion after banana feeding are of the order observed in patients with carcinoid tumour and could lead to erroneous diagnosis.
13. Angielski, S.
(In Polish)

The amino acid composition of diurnal urine mono- and di-zygotic twins, aged between 2.5 and 5 years was investigated by paper chromatography. Quantitative determinations covered total and α-amino nitrogen, and amino acids, before and after desalting on Dowex 50. In spite of some differences with time, the results show similarity in amino acid content in the urine of monozygotic twins. The similarity is much smaller in the case of dizygotic twins.

Influence of drugs on excretion of amino acids in urine. SCHWEIZ. MED. WSCHR. 6:147–149 (1957). (In German)

A paper chromatographic method for the determination of amino acids in human urine is described. The findings in normal urine are reported, including the occurrence of an unknown amino acid RF 0.75 (80 percent aq. phenol). Administration of 100 mg. of synthetic L-ascorbic acid increases the excretion of essential and non-essential amino acids. An extract from potatoes and carrots, although containing vitamin C produced by diminution in the excretion of amino acids.

15. Armstrong, M. O. and Shaw, K. N. F.

The above compound has been identified as one of the major phenolic acids present in most samples of human urine. The amount excreted daily by adults ranges from 2–150 mg., with most individuals excreting about 10 mg. Both m-hydroxyphenylhydracrylic acid and m-hydroxyhippuric acid originate, for the most part, from materials in the diet.
Indole acids of human urine. Paper chromatography of indole acids. J. BIOL. CHEM.

The behaviour of 38 indoles, mainly acids, during 2-dimensional paper chromatography, is described. The chromatographic properties of 38 compounds which are presumed to contain an indole nucleus and which have been detected in normal and pathological human urines are described; 10 of these are tentatively identified. The following have not been previously reported in urine: indolylacetylglutamic acid, acetyltryptophan, indol-3-ylcarboxylic acid, indolylacrylic acid, indolylacetamide, and indolylglycollic acid. The possible significance of the presence of these and other substances in urine is discussed briefly.

17. Armstrong, M. O. and Shaw, K. N. F.
Occurrence of (−)β-m-hydroxyphenylhydracrylic acid in human urine. J. BIOL. CHEM.

The above compound has been identified as one of the major phenolic acids present in most samples of human urine. The amount excreted daily by adults ranges from 2–150 mg., with most individuals excreting about 10 mg. Both m-hydroxyphenylhydracrylic acid and m-hydroxyhippuric acid originate, for the most part, from materials in the diet.

18. Arroyo, J.
Synoptic picture of the cells in urinary sediments. MED. REV. MEX. 40:147–151, 10 Apr 1960. (In Spanish)

19. Arroyo, J.
Description in outline form of the crystals in urinary sediments. MED. REV. MEX.

20. Arroyo, J.
21. Arroyo, J.


A fluorimetric method is described for the determination of aldosterone cortisol and corticosterone in human urine. The average value for the 24 hour urinary excretion of aldosterone and cortisol by normal humans are 11 μg. (31 cases) and 35 μg. (24 cases), respectively. The values found in various pathological conditions vary considerably from these average values.

23. Bahadur, K. and Chandra, V.
Decomposition of urea by urease.
ENZYMEOLOGIA 21:1-12, 1 Sep 1959.
(In English)

24. Bakalov, D.
Is an amphoteric reaction with urine possible?
(In Bulgarian)

Microbiological assay of folic acid in serum and urine. BULL. CALCUTTA SCH. TROP. MED. 4:65–66 (1956). (In English)

Folic acid was estimated by microbiological assay using Streptococcus faecalis R as test organism. Treatment of the serum folic acid conjugates with chicken pancreas extract to release the free folic acid was a satisfactory procedure. Urinary folic acid was already mostly in the free form. The method measures folic and folinic acids together.

27. Barac, G. and Quadens, O.

Proof that the Beer-Lambert law is followed in colorimetric estimation of azotriiodothyronines in pure solutions of plasma or urine is given. Maximum absorption of a pure solution in water is at 500 μ. In the presence of plasma or urine it drops to 430 μ. The change is due to pH. Between pH 5.8–7.4 maximum absorption is at 430 μ. and at 9 the maximum is at 500 μ.


Six normal male subjects actively hyperventilated and 6 inhaled CO2 for approximately 30 minutes. In respiratory alkalosis H was retained by the kidney HCO3 and K output was increased. Urine pH rose and titratable acidity, NH4 and PO4 excretion fell. Changes observed during respiratory acidosis were opposite to those seen in alkalosis.

29. Barker, E. S., Elkinton, J. R. and Clark, J. K.
30. Barlow, J. J. and Kellie, A. E.
Quantitative method for chromatographic separation of 17-oxo steroid sulphates from 17-oxo steroid glucuronides: with observations on behaviour of conjugated corticosteroids on same system.

Extracts of urine containing the steroid conjugates were chromatographed by absorption on a column of neutral alumina. Steroid SO₄ and glucuronides were retained during subsequent elution with ethanol which removed solid matter. 17-oxo steroid SO₄ were eluted with aqueous 50 percent (v/v) ethanol and the 17-oxo and 17-oxogenic steroid glucuronides were removed by treatment with M-acetate, buffer, pH 5. The recovery of steroid conjugates from the column was practically quantitative and no evidence of molecular rearrangement could be found.


An apparatus is described which collects sweat quantitatively from the arm and permits regulation of skin temperature independently of ambient conditions. Rates of excretion of Na, K, C, "apparent" creatinine and urea from the arm enclosed in the apparatus were the same as for the unenclosed arm.

32. Bassir, O.

The urine concentration in a group of well-fed (29) students has been compared with that of 14 manual workers of similar age range (22-28 years) living on low animal-protein indigenous diets, following a dose of 15 g. urea. The mean of both groups was well below the normal values for Europeans. The well-fed group was also inefficient in their renal clearance of fasting blood urea.

Sweat was collected simultaneously from both arms, one being enclosed in a polyethylene bag. Wearing the vapor barrier decreased K excretion but increased true and "apparent" creatinine, NA and CI excretion were not affected. Increase in local skin temperature increased Na, K, CI creatine and urea excretion. Increased relative humidity decreased Na, CI, K and urea excretion but did not influence creatinine. The effect of the polyethylene bag can be related to the effect on skin temperature and relative humidity.

34. Baulieu, E. E., Weinman, S. H. and Jayle, M. F.
(In French)

A method is described for the identification and estimation of neutral 17-KS, based on selective hydrolysis using TCA-dioxan and a purified β-glucuronidase, followed by paper chromatography.

35. Bauld, W. S.

A method is described for the extraction, separation, and purification of oestriol, oestrone, and oestradiol-17β in human urine. It involves acid hydrolysis, extraction with ether, separation of oestriol from oestrone and oestradiol-17β by partition between benzene and water, purification of the oestriol by saponification and column partition chromatography, and separation and purification of oestrone and oestradiol-17β by column partition chromatography and saponification. Each fraction is determined separately by an improved Kober reaction.
36. Baum, H., Dodgson, K. S. and Spencer, D.
Assay of arylsulphatases A and B in human urine.

37. Beale, R. N. and Croft, D.
Sensitive method for colorimetric determination

This direct colorimetric method depends on the magenta color developed when diacetyl-
monoxime and phenylanthranilic acid react with urea. Chloride ions were used to
sensitize the reaction, and manganous ions stabilised the color to light and time.
Phosphate enables the reaction to be reproduced to within ± 10 percent, even at urea
levels of only 40 mg. percent. The method is rapid and suitable for routine analysis.
The mechanism of color formation is discussed.

38. Berger, H.
Estimation of urinary amino acids and its
clinical significance. SCHWEIZ. MED. WSCHR.
86:711-714, 729-732 (1956). (In German)

The technique of paper chromatographic determination of amino acids in urine is
described. Rp-values for 38 amino acids in two solvents are given and a two dimen-
sional chromatogram is illustrated. The physiology and pathology of amino aciduria
are discussed, including the congenital disorders of metabolism.

39. Berlyne, G. M.
Urinary hyaluronidase. NATURE 185:389-390
(1960).

There is no relationship between hyaluronidase output (units/min.) and urine flow
(ml./min.).

40. Bernhard, E.
On the evaluation of positive reducing pheno-
mena in the urine. A suggestion. PRAXIS
49:558-561, 2 Jan 1960. (In German)

The abstracts are arranged alphabetically by the surname of the senior authors. The spelling of author's names is that which appeared in the original source. Each reference is listed as follows: author(s) title, journal, year, and abstract. In the case of articles from foreign literature, the title appears in the foreign language along with a translation and an abstract in English. In many instances the abstracts are those of the author(s). A subject index, keyed to the authors' names and to page numbers, will be found at the end of the Bibliography. After the listing of a particular subject, authors' names are presented with the year of their publications, and this is followed by the page number in the Bibliography where the abstract may be found. For example: Amylase, alcohol, Bang, I., 1911, p. 20. Finally, this compilation is not intended as a textbook on saliva, but is a guide to the existing literature in this extremely important and growing area of biologic research. The coverage of the literature is complete through 1957, with additional coverage of only specific journals such as the Journal of Dental Research, and Oral Surgery, Oral Medicine, and Oral Pathology, through 1958. 2500 references.

42. Bischoff, F. and Torres, A.
Fluorimetric determination of urinary adrenaline.

The modifications described eliminate the non-specific blank obtained in other methods and the results at rest are similar to those obtained by bioassay.

43. Blane, G. F.

The mean daily 17-KS excretion for a group of colored Jamaicans was not significantly different from that of Europeans living under the same conditions. Mean 17-ketogenic steroid excretion was significantly lower in the Jamaicans.
44. Blegen, E., Bygren, T., and A. Vogt

Experiments are described, the results of which are in complete disagreement with the findings of workers who have claimed that urea loading promotes the tubular secretion of urea. 18 clearance experiments were made with 5 dogs, with a total of 87 clearance periods in one series; in another series i.v. urea loads were administered and studies made in 76 clearance periods. In no case was urea clearance > creatinine clearance.

45. Bloxsom, A.
Electrical conductivities of normal sweat and that of patients with fibrocystic disease. ARCH. DIS. CHILDH. 34:420-421 (1959).

Conductivities of sweat, expressed relative to standard NaCl solutions, parallel the concentration of electrolytes present and their determination constitutes a quick, simple and inexpensive error-free procedure that can be used in the study of fibrocystic disease of the pancreas.

46. Blum, W.

47. Boeri, E. and Rippa, M.
Effect of urea on flavocytochrome \textbf{b}_2.

3M urea produced a reversible inactivation; higher urea concentrations inactivated irreversibly. Chromatography of the urea-treated enzyme on a Ca triphosphate column showed that the enzyme molecules split into a polynucleotide, a flavin fraction and a haemoprotein. Some properties of these were examined.

The renal clearance of androsterone in man has been shown to be much greater than that of dehydroepiandrosterone. This explains the preponderance of the latter in human plasma on the basis of renal factors rather than on the basis of an inordinately high production of this steroid. The rapid renal clearance of androsterone, on the other hand, accounts for its greater concentration in human urine and indicates that its overall production is greater than that of dehydroepiandrosterone in man. The renal excretion of androsterone is inversely proportional to the raised blood levels produced by its administration, and is inhibited by probenecid; androsterone is thus eliminated by tubular excretion rather than glomerular filtration. It is unlikely that dehydroepiandrosterone is reabsorbed by the renal tubules after significant glomerular filtration since its urinary excretion is not enhanced by probenecid. The renal clearance of \( \beta \)-cortolone was also determined.

49. Bonner, R. H.
THE EFFECTS OF STRESS ON UROPESIN EXCRETION. Aero Medical Lab., Wright Air Development Center, Wright Air Force Base, Ohio. WADC Tech. note no. 57-427, Dec 1957, 11p. ASTIA AD-142 256.

The effect was investigated of various forms of stress, as encountered in certain AF operational situations, on uropepsin excretion in urine. Twenty-three subjects were tested under conditions of prolonged positive G, crew confinement, exposure to high temperature-high altitude, and visual and auditory deprivation. Volumes, specific gravities, and collection times were recorded for the urine samples taken from the crew. The assay method of M. L. Anson (J. Gen. Physiol. 22:79, 1938) was used with some modification. The order of adding reagents was shown to be significant in developing color to reflect the degree of uropepsin excretion. An attempt was made to determine which proteolytic enzyme was being measured. The greatest activity was observed at pH 1.5 which is optimum for pepsin, indicating that pepsin was the enzyme being measured. The results showed that uropepsin excretion increased before the application of specific simulated flight stresses and decreased during the application of specific simulated flight stress. Deprivation of visual and auditory stimuli did not produce any significant change in uropepsin excretion from pretest levels.
50. Borell, S.

Values for urinary dehydroepiandrosterone, determined by measuring the Pettenkofer-reacting material in ketonic extracts of urine after hydrolysis by the 2-phase solvolysis procedure of Burstein and Lieberman, agreed well with those determined by the chromatographic method of Fotherby. The same results were also obtained in the ketonic extracts of urines prepared by the author's procedure. The latter method is easier than the chromatographic techniques and shorter than the solvolysis method, and is recommended as a useful procedure for the routine, clinical determination of dehydroepiandrosterone excretion.

51. Borth, R., Linder, A. and Riondel, A.
Urinary excretion of 17-hydroxycorticosteriods and 17-ketosteriods in healthy subjects in relation to sex, age, body weight and height. ACTA ENDOCR. (Copenhagen) 25:33–44 (1957). (In English)

Urinary 17-hydroxycorticosteriods and 17-ketosteriods were determined in 172 healthy male and female subjects of all age groups up to 90 years. By multiple regression analysis of 150 of the data, excretion levels were shown to be correlated with the 1st, 2nd and 3rd powers of age, and with body weight and height. The effects of these factors were the same in both sexes, but they differed for the 2 steroid fractions. These latter differences are described. Graphs of expected normal excretion were constructed for subjects of average body weight and height.

52. Bowness, J. M.
Chromatography on alumina of 17-ketosteroid material from each of the [above] six ethnic groups. AUST. J. EXP. BIOL. MED. SCI. 35:417–420 (1957).

The differences between the ethnic groups in relative amounts of the 8 fractions produced by alumina chromatography in no case paralleled the differences found in 17-ketosteroid excretion. The relative proportions of the fractions were roughly the same in each group.
53. Boyce, W. H. and Sulkin, N. M.
Biocolloids of urine in health and in calculous
disease. III. The mucoprotein matrix of
urinary calculi. J. CLIN. INVEST. 35:1067–1079
(1956).

The microscopic structure and histochemical properties of the matrix recovered from
676 calcigenous stones after decalcification with chelating agents is described.

54. Boyce, W. H. and King, J. S.
Total nondialysable solids of human urine. IV.
Electrophoretic property of RS-1 sub.fraction.

The RS-1 fraction (non-ultrafiltrable fraction of human urine solution in veronal buffer
pH 8.6) is analysed electrophoretically at pH 8.6 and 4.5. Three subfractions prepared
by Cohn's method 10 using low temperature low concentration of ethanol and of Zn
acetate were also analysed. These fractions (Cohn I, II and III, IV and V, and Fraction
VI) and their crude precursor have protein components all with isoelectric points below
pH 4.5. The majority, if not all, have their counterparts in blood plasma.

55. Boyce, W. H., King, J. S., Jr. and Fielden, M. L.
Total nondialysable solids (TNDS) in human urine.
IX. Immunochemical studies of the R-1 "uromucoid"
fraction. J. CLIN. INVEST. 40:1453–1465,

56. Braude, A. I., Siemienksi, J. and Jacobs, J.
Protoplast formation in human urine. TRANS.

Skin temperature, mouth temperature and sweat rate were measured on nude resting subjects at ambient temperatures of 36° and 40° over a wide range of humidity. The quantities were little affected by humidity below a critical level above which all changed markedly with humidity. The critical humidity level was consistent with predictions based on the physical processes of heat exchange from wet skin. Effective temperature did not appear to provide a satisfactory measure of environments of equal heat stress, but the 4 hour 'Sweat Rate Index' was in good agreement with the observations.

58. Breener, D. F. and Kerslake, D. M.

59. Breener, D. F. and Kerslake, D. M.

60. Brodsky, W. A. and Carrasquer, G.
Hyaluronidase activity of human urines from different age groups. PEDITRICIA 12:58–60 (1957). (In Russian)

During diuresis exceeding 1 ml./min./m² body surface the urine of healthy subjects is practically without hyaluronidase activity. At lower urine flow rates hyaluronidase activities increase in direct proportion. At 0.08 ml./min./m² a maximum activity of 30 relative units per 0.5 ml. urine is attained. Urines of children up to the age of 2 months have increased stable hyaluronidase activity for urine outputs above 1 ml./min./m². With lower urine flows this activity decreases proportionately and ceases completely at a diuresis 0.2 ml./min./m². Gradual decreases in hyaluronidase activity occur in urines of children from 2–6 months. These depend on the degree of diuresis and are intermediate between those of newborn and older subjects at rates of flow greater than 1 ml./min./m². In children older than 6 months the curve relating urine hyaluronidase activity and diuresis becomes characteristic of the age group.

62. Brooksbank, B. W. L. and Salokangas, A.  
Fractional analysis of urinary neutral 17-KS in relation to age. ACTA ENDOCR. (Copenhagen) 30:231–241 (1959). (In English)

The change in the proportion of the 17-KS with the onset of old age is a fall in the ratio of output of 11-deoxy-17-KS to 11-oxy-17KS. It is more marked than has been reported by most workers. Some fractional analyses in younger subjects are given for comparison. Components of unknown identity were seen on chromatograms.


The method described by Brown for the estimation of oestrone, oestradiol-17β and oestriol in urine has been critically investigated. All checks on specificity so far carried out have confirmed that the method is specific for these oestrogens. The method gives recoveries of 70–95 percent. For oestrogen levels between 0.0 and 40.0 μg./24 hr. the fiducial ranges and percent errors of determinations, the limits of sensitivity and the precision of the method have been calculated. A number of substances which may occur in urine and which interfere in the method are listed.
64. Brown, J. B., Bulbrook, R. D. and Greenwood, F. C.
Estimation of oestriol, oestrone and oestradiol-17β
in human urine. II. Additional purification. J.
ENDOCR. 16:49-56 (1957).

A modification of a method for estimating urinary oestrogens is described and its accuracy confirmed; it gives practically the same results as the original method for most urine specimens. In a large series of comparisons, however, small but significant differences are found in the amounts of oestrone and oestriol measured by the two methods. Interference caused by administration of certain drugs or by the secretion of large amounts of neutral steroids is reduced or abolished by using the modified method. The amounts of impurities in the final urine extracts are reduced by approximately 50 percent.

65. Brown, J. H. U. and Asher, H.
Influence of urine volume on output of corticoids
by normal human subjects. PROC. SOC. EXP.

The influence of urine volume on excretion of corticoids was determined in normal human subjects. There was a direct correlation between steroid output and urine volume, whether measurements were made on a long time basis, (day by day) or a short time basis (min. by min.). Subjects tested under water and salt loads and with ADH also showed the same positive correlation. As a corollary, clearance of steroids was measured, and found to be 1 ml./min. for free corticoids, and 4 ml./min. for bound corticoids.

66. Brown, M. E.
Measurements of specific gravity of urine by means
of a single gradient column. AMER. J. CLIN. PATH.

A drop technique, based on the use of specific gravity gradients in a single graduated cylinder, was modified for measuring specific gravity of small volumes of urine.

Kynurenine and kynurenic acid were the chief urinary metabolites of tryptophan in the dog, rat, and man. N-Methyl-2-pyridone-5-carboxamide was an important metabolite of tryptophan in man but not in the other species. Xanthurenic acid was an important metabolite in the rat and man but not in the dog or cat. 4-Qinolone and its N-methyl derivative could not be detected in the urine. Quinaldic acid or some chemically similar compound was excreted in increased amounts after the administration of tryptophan to man and the dog.

Tryptophan metabolism in human subjects. II.

The urinary excretion of 10 tryptophan metabolites by young women was very low when the tryptophan intake was 25 mg./day. With increasing dietary tryptophan supplements, the excretion of N-methyl-2-pyridone-5-carboxamide remained low until the blood pyridine nucleotide levels were restored. The excretion of the other tryptophan metabolites followed more closely the tryptophan intake.

69. Bulbrook, R. D., Greenwood, F. C. and Williams, P. C.

The oestrone, oestradiol-17β, and oestriol, determined chemically, agreed satisfactorily with the oestrogen content of the phenolic fraction of the rest of the urine, assayed biologically, in 10 of 11 samples of normal urine.
The hypothesis is put forward that sweat is produced from a precursor fluid with the same sodium concentration as interstitial fluid and that the sweat glands, during its passage through them, retain an amount of sodium which is constant and independent of the sweat rate, provided the latter is sufficiently high.

Deductions from this hypothesis are shown to hold good when the sweat sodium is greater than about 50 mEq./l.; below this concentration sweat behaves as if sodium retention were less than maximal.

Sweat potassium concentration is independent of sweat rate.

Sweat potassium falls during acclimatization to a concentration just under 2 mEq./l. greater than serum potassium.

Urea was measured simultaneously in arm-bag sweat and blood of six men. The sweat/blood urea ratio was always > 1 but decreased towards 1 as the sweat rate increased. Urea may be regarded as a tracer for water reabsorption from the sweat and it is concluded that the amount of water reabsorbed was independent of the sweat rate. The amount of water reabsorbed is proportional to the osmotic pressure difference between blood and sweat multiplied by the sweat rate.

A reducing substance, suspected to be allotetrahydrocortisol [II], was found on chromatograms of several hundred urine extracts with an Rf value just greater than that of 3α:11β:17α:21-tetrahydroxy-5β-pregnan-20-one[II]. After careful oxidation, and acetylation, the following derivatives were identified on chromatograms: the diacetate of I, the diacetate and 3-acetate of 11-dehydro-(I), 3α:11β-dihydroxy-5α-androstan-17-one

70. Bulmer, M. G. and Forwell, G. D.

71. Bulmer, M. G.

72. Bush, I. E. and Willoughby, M.
and its acetate, 3a-hydroxy-5a-androstan-11:17-dione, 5a-androstan-3:11:17-trione. The spectra in H₂SO₄ of I, II, and the urinary material were identical. In 14 normal subjects excretion rates were measured and the means were I, 0.8, II 2.0, 11-dehydro-(II) 3.4 mg./24 hr. respectively. Similar proportions were found in various cases of hyperadrenalism but slight alterations in the proportions occurred during treatment with cortisone and ACTH. I appears to be a normal metabolite of hydrocortisone in man, and its discovery modifies some of the conclusions of Dorfman on the reduction of steroid 4-en-3-ones in man.

73. Butler, E. J. and Newman, G. E.

Methods by which contamination of specimens can be avoided are discussed. The normal blood levels were found to be 66.2–84.9 µg. per ml. and the 24 hr. urine value 3.9–29.6 µg. per 24 hr.

74. Butt, W. R., Kornel, L. and Morris, R.
Comparison of routine methods of determining 17-hydroxy-corticosteroids in urine. ACTA ENDOCR. (Copenhagen) 26:65–74 (1957). (In English)

There was good agreement between the rises in urinary output of Porter-Silber chromogens, 17-oxogenic steroids, and 17-hydroxycorticosteroids determined by standard and modified methods in 5 patients treated with ACTH.

75. Butt, W. R. and Round, B. P.

Gonadotrophins were extracted from urine by absorption on kaolin and their behavior on ion exchange materials examined. Anionic resins in a borate form, and diethylaminoethyl cellulose removed inactive material from these extracts with no loss of gonadotrophic activity. It is recommended that these methods be introduced into the routine kaolin extraction procedure instead of the method employing tricalcium phosphate, the use of which may cause losses of active material.
76. Butt, W. R., Crooke, A. C. and Cunningham, F. J.

Assays were performed for total gonadotrophins and FSH after benzoic acid-tungstic acid urinary extraction methods. Approximately 1.5 times as much material could be extracted. The potency was increased but no contaminating oestrogens could be detected. Results for 24 hr. excretion in terms of human menopausal gonadotrophin 20A are reported for both male and female subjects.

77. Cahill, G. F., Jr., Pawan, G. L. and Chalmers, T. M.

78. Carnazzo, A.
On the reactions to ambient hyperthermia. IV. Behavior of urinary 17-ketosteroids and total corticoids in subjects exposed to hyperthermic trauma. (Sulle reazioni all'ipertermia ambientale. IV. Comportamento dei 17-chetosteroidi e dei corticoidi totali urinari in soggetti sottoposti a trauma ipertermico.) – BOLLETINO DELLA SOCIETA ITALIANA DI BIOLOGIA SPERIMENTALE (Napoli) 29:1554-1556 Jul–Aug 1953. (In Italian)

Urinary levels of 17-ketosteroids in 8 subjects exposed to heat (43°–45°C.) were determined at 24 and 48 hours following exposure and found to be not significantly altered. Under the same conditions, 5 subjects exhibited an increased level of total urinary corticoids. This increase occurred 24 hours after exposure and the levels returned to normal shortly thereafter.

22

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Among the cells seen in a sediment of urine, a non-nucleated, acidophilic, amorphous structure is normally present to the extent of 1-20 percent. Striking variations in numbers are consistently observed in several pathological conditions. They appear in great numbers in ovarian dysgenesis and after therapeutic oophorectomy, indicating that their presence is an index of ovarian deficiency. In the absence of functioning ovaries the adrenals produce an estrogenic substance capable of supporting partial development of the urethral epithelium. Without this support, the urethral cells are shed in a semi-degenerate state, without nuclei, but they do not revert to the wholly atrophic condition that is seen when the adrenal is also inactivated. The changes in the level of the non-nucleated cells represent a significant compensatory mechanism of the adrenal in ovarian-deficient states.

No significant changes in the excretion of water, chloride, total mols, or creatinine were observed in 6 of 7 subjects tilted in a 12° head-down position during a period in the diurnal rhythm when urinary volume was stable or decreasing. It is considered unlikely that changes in venous pressure in the kidneys or head are responsible for these changes in salt and water excretion.

82. Cavina, G. and Tentori, L.

The 17-KS are finally fractionated in two zones corresponding to sulphates and glucuronides respectively.


A substance is present in the urine of healthy people who have been fasting, which, on injection into mice, increases the total amount of fat in the liver, mobilizes fat from the fat depots, appears to increase the total metabolic turnover of fat in the animals, and causes weight loss without depressing appetite when given over a period of time, the loss being in the form of body-fat and water. The active material has been partially purified by paper chromatography. This substance cannot be detected in the urine of non-fasting subjects.

84. Chalmers, T. M., Pawan, G. L. and Kekwick, A.

85. Chamblin, A., Jr.

Hammarsten and alcohol–iodine tests for bile in the urine and the Forrest test for phenothiazines in urine were performed on 32 urines. The Forrest test is positive on urines of all patients receiving more than 75 mg. of phenothiazine therapy, doubtful as
dosages of 40–75 mg. and negative in dosages less than 40 mg. The alcohol-iodine test is negative in patients receiving phenothiazine and therefore constitutes an adequate screening method for patients developing jaundice as a complication of phenothiazine therapy. This test is technically less difficult than serum bilirubins. In addition, it is technically less difficult than the Hammarsten test and is equally adequate.

86. Chase, A. M. and Krotkov, M. S.

Two different commercial preparations of yeast invertase suffered immediate and reversible inactivation by urea at pH 4.6 and 26°. Concentrations for 50 percent inactivation was 0.6M compared with previously reported 1.5M for Cypridina luciferase. Urea concentration was < required to affect physical properties.

87. Chu, T. C. and Chu, E. Ju-Hiva

Porphyrins are esterified with methanol-H2SO4 solution, the esters separated on a Hyflo Super-Cell column and determined by optical density at 500 mμ. Calibration data for esters of coproporphyrin I and uroporphyrin I are given.

88. Claeys, A. and Demeester, G.
(In French)

Using the reagents according to Rivoire's method for the determination of 17-OHCS a linear relationship between the optical density of butyl tetrahydrocortisone and pure cortisone was obtained; the absorption curves for butyl extracts of urine and standard solution were similar; 17-OHCS values were considerably higher than those obtained with the Porter and Silber reagents.
Claeys, E.
Estimation of urinary 17-OHCS by method of
Reddy Jenkins and Thorn. ANN. ENDOCR.

Direct estimations done without previous evaporation give false results unless the acid
blanks and Porter-Silber blanks are equal. Large quantities of n-butanol are required
for the purification procedure of Longwell, and if not available, it is advisable to use
the evaporation technique of Forsham which is independent of degree of purity of
attraction solvent. The presence of a typical urinary pigments which interfere with
colorimetric readings make it important to avoid further errors due to extraction solvents.

Clarke, J. T., Eliane, and Shwachman, H.
Components of sweat. Cytric fibrosis of the
pancreas compared with controls. AMER.

Clarke, S. H.
Investigation into methods of collection of urine
for culture from men and women. BRIT. MED.

Clotten, R. and Clotten, A.
High voltage paper-electrophoretic determination
of xanthurenic acid in urine. Z. GES. EXP. MED.

A method is described for the determination in urine of xanthurenic acid (4, 8-dihydro-
oxyquinoline-2-carbonic acid). The acid is separated electrophoretically and stained
specifically by application of a FeNH₄(SO₄)₂ solution. After elution at pH 7.8, the con-
centration of the Fe complex is determined at 620 mµ. Determination of xanthurenic
acid is of value in clinical conditions associated with vitamin B₆ deficiency when ex-
cretion is increased probably as the result of an abnormal tryptophan metabolism.

3 : 5-Dinitrobenzoic acid is proposed as a colorimetric reagent for determination of 17-ketosteroids in urine. The reagent does not, under proper conditions, react with nonketonic fractions. Interference from urinary chromogens is negligible at 550 mµ, the wavelength of maximum absorption. For urine extracts the method gives results 18 percent lower than the Nathanson-Wilson method and 8 percent higher than the Callow method.

94. Colacicco, G. and Dawson, C. R.

95. Collins, K. J.

96. Coulthard, A. J. and Waugh, D. A.


Urine is directly treated with ion exchange resin and the subsequent eluate used for assay with Neurospora crassa. Permutit 50 over which the urine is first passed is washed with distilled water the eluate and washings neutralized with NH₄OH and concentrated by evaporation. After filtration of this first extract to remove ammonium ureate crystals formed on cooling, the solution is passed over Deacidite 300, the column is washed with water again and the total eluate again evaporated to dryness. Microbiological assay is carried out by the method of W. Schöpfer, et al., Rev. Int. Vitaminol., 1948, 20, 121. Normal subjects of different sexes and ages on a normal diet excreted 12 – 56 mg. mesoinositol/1. of urine.
98. Cox, R. I.

A paper chromatographic method is described for the determination of the above compounds. The steroids, all of which contain a propylene glycol type of side chain, are oxidized by periodic acid and the acetaldehyde formed is determined by a specific color reaction.

99. Crawford, T. B. B. and Law, W.

The amines are absorbed on Amberlite IRC-50, eluted with acid and estimated by a fluorimetric method. Recoveries of 82 percent ± 6 percent were obtained in 51 experiments in which the amines (3–5,000 μg.) were added to urine.

100. Crepy, O., Meslin, F. and Jayle, M. F.
Estimation of urinary pregnandiol. BULL. SOC. CHIM. BIOL. (Paris) 38:505–534 (1956). (In French)

A method for rapid estimation on small amounts of urine (100 ml.) is described. Pregnanediol glucuronide hydrolysis with Helix pomatia juice glucuronidase, followed by alcohol-ether extraction gives an extract with comparatively few impurities. Precipitation by the Astwood and Jones process (J. Biol. Chem., 1941, 137, 397) eliminates the greater part of these. Application of Allen's correcting equation to Talbot's colorimetric reaction (ibid., 1943, 151, 607) makes it possible to increase the specificity of the measurement for pregnanediol. From the ratio of corrected readings/actual readings it is possible to ascertain the purity of the Talbot precipitate. When the ratio is 0.9 : 1 the pregnanediol is almost pure. Ratio of 0.8 : 0.9 the purity is satisfactory and below this the purity is not great and the measurement is only of qualitative value. Recovery of pregnanediol added to urine is approximately 80–90 percent.

28

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101. Crepy, O., Jayle, M. F. and Meslin, F.  

102. Crosby, W. H. and Furth, F. W.  

103. Custance, C. and Laflame, R.  

Questions related to the validity and practical usefulness of sweating rate curves using the technique of measurement described in this report are considered. Some important refinements of the instrument, including a greatly improved humidity sensing element, and more exact methods of monitoring the system are described. A new formula for evaluating clothing heat load is proposed. This formula has been derived from the results of a number of tests using a single subject and a graded series of clothing systems (gym shorts, socks and shoes; Army trousers, socks and boots, but no shirt; battle dress: battle dress and coveralls over). The wet bulb temperature is correlated with the sweating mean level for each run, the two measurements being the variables.

104. Darke, S. J.  

106. Diao, E. K. and Johnston, F. A.

Feces dry weight is determined over 112 days in respect of 9 young women on a constant diet. The range of expulsion time is 26-3/4 to 36-1/2 hr. in 6 subjects with feces of normal consistency. In 3 of the 9 subjects, feces dry weight is significantly increased during the menstrual period.


108. Diczfalusy, E.
Chemical determination of oestrogens in urine.
(In English)

Isolations studies as well as experiments using radioactive oestradiol-17β administered to human volunteers indicate that in addition to the previously known oestrogens, other metabolites of the principal oestrogen are also present in human urine. Six or perhaps seven oestrogens were detected in human urine, but no method yet exists for their separate determination. The methods available for oestrogen determination are discussed critically.

Mucopolysaccharide of normal human urine.
CLIN. CHIM. ACTA 1:519–524 (1956).

Acid mucopolysaccharide, precipitated from normal human urine by cetyltrimethylammonium bromide was purified after digestion with trypsin and papain to yield a homogeneous material. In composition and properties the urinary mucopolysaccharide was identical with chondroitin-sulphate from bovine nasal septa.
110. Dikstein, S. and Bergmann, F.
Determination of xanthines and uric acids in urine. J. BIOL. CHEM. 230:203-211 (1958)

The purines are absorbed on a cation exchange resin, such as Dowex 50, which has been loaded with Hg. The purines and Hg are then eluted with 3 N Cl and after removal of Hg as HgS the purines are determined by paper chromatography as described for their determination in plasma.

111. DiPerri, T., Ravenni, G. and Rubegni, M.
Aldosterone in urine. G. BIOCHIM. 7:101-114 (1958). (In English)

A method for the determination of aldosterone in urine is described. Urinary extracts are prepared by extraction with CHCl3 and purified in 2 paper chromatography systems. The reaction of eluted aldosterone with Tetrazolium Blue gives a colored compound which is estimated spectrophotometrically.

112. Dirscherl, W. and Schmidtmann, W.
(In German)

113. Dobson, L.
ASTIA AD-253 118.

As a result of profuse sweating, marked morphologic changes occur in the human eccrine sweat gland. These changes are dependent on salt intake and probably related to the process of acclimatization. Salt intake does not affect the sweat rate nor the rate of excretion of potassium or urea in sweat. The rate of sodium excretion in sweat is increased in salt-loaded subjects. The mechanism of sweat gland fatigue is still unexplained but is unrelated to morphologic changes in the eccrine gland, to poral occlusion or to neurohumoral block. The structure and function of the sweat gland in systemic diseases especially cystic fibrosis of the pancreas and hypothyroidism is being investigated.
114. Dodgson, K. S. and Spencer, B. 
Occurrence of arylsulphatases A and B in human 
urine. CLIN. CHIM. ACTA 1:478-480 (1956). 
(In English)

Two arylsulphatases were shown to be present in normal cell-free urine after paper 
electrophoresis of the urinary protein concentrate on paper which has been treated 
with cetylpyridinium bromide. The electrophoretic mobilities of the 2 enzymes were 
identical with those of arylsulphatases A and B from human liver and other tissues.

115. Dodgson, K. S. and Spencer, B. 
Sulphatases. XV. Arylsulphatases of human 
serum and urine. BIOCHEM. J. 65:668-673 
(1957).

Human serum and urine have little arylsulphatase activity towards K p-acetylphenyl- 
and K p-nitrophenyl-sulphate. The activity which urine sometimes shows is due to 
cellular debris and bacteria. Both serum and urine exhibit appreciable arylsulphatase 
activity towards nitro-catechol sulphate. This activity is only partly due to cellular 
debris. Two enzymes, which correspond to arylsulphatases A and B of human tissues 
are responsible for most of the activity of urine.

116. Doe, R. P., Flink, E. B. and Goodsell, M. G. 
Relationship of diurnal variation in 17- 
hydroxycorticosteroid levels in blood and urine 
to eosinophils and electrolyte excretion. J. 
CLIN. ENDOCR. 16:196-206 (1956).

A diurnal variation was found in the eosinophil count, in the level of plasma 17- 
hydroxycorticoids and in urinary 17-hydroxycorticoid, Na, and K variations in the 
plasma 17-hydroxycorticoid levels. Urinary K excretion was closely correlated with 
17-hydroxycorticosteroid excretion. Urinary Na excretion was not closely correlated 
with any of these variables in individual subjects, although it followed the same trend 
as K excretion when group figures were used.
117. Donath, W. F.
Simple portable apparatus for the semi-quantitative
determination of the coproporphyrin content in urine.
ARHIV. HIG. RADA 7:77-84 (1956).

A simple portable instrument for rapid semi-quantitative determination of urinary coproporphyrin is described. The instrument is suitable for use in screening an industrial population exposed to Pb. The method is essentially the comparison of the fluorescence of the porphyrin as developed in ether and glacial acetic acid, with that of a series of paper strips of graded degree of fluorescence. Technique and reliability are discussed.

118. Doyle, A. E. and Merrill, J. M.

The renal function changes in 18 patients stated to be in heart failure, were qualitatively similar to those previously reported in normals when tilted to the passive erect posture. Excretion of K, but not of Na, closely follows postural glomerular filtration rate [GFR] changes; changes in water excretion closely follow the GFR and renal plasma flow, but not the filtration fraction. There was no correlation between the rate of Na excretion and the level of GFR in these experiments.

119. Dresel, E. I. B., Rimington, C. and Tooth, B. E.
Determination of urinary uroporphyrin by a direct extraction method. SCAND. J. CLIN. LAB. INVEST. 8:73-78. (In English)

Technique and levels of recovery are given.

120. Drujan, B. D., et al.

Details of uniform procedures for routine determination of adrenaline, noradrenaline and dopamine in urine are given. Normal values for 24 hr. excretions were: adrenaline, 16.4 µg. ± 1.1; noradrenaline, 54.9 µg. ± 3.2; dopamine, 198.8 µg. ± 36.2.
121. Dubovsky, J.
[Acidity test. I. Titrable acidity of urine]
(In Czechoslovakian)

122. Dubovsky, J.
(In Czechoslovakian)

123. Dubowski, K. M.
Some practical simplifications of perspiration electrolyte analysis ("sweat test"). CLIN.

124. Dulce, H. J. and Hoppe-Seyler, Z.
Effects of salts and hydrophilic colloids on oxalate precipitation from normal urine.
(In German)

125. Dulce, H. J. and Hoppe-Seyler, Z.
Effect of urinary salts on oxalate precipitation.
(In German)

Salts interfere with Ca oxalate precipitation at concentrations in the normal urinary range. Urea, uronic acids and glucose have no effect.
126. Duner, H. and Pernow, B.
Urinary excretion of histamine in healthy human subjects. SCAND. J. CLIN. LAB. INVEST. 8:296–303 (1956). (In English)

Estimations of 25 samples from 17 subjects have produced values for free and conjugated histamine by day and by night.

127. Duner, H. and Pernow, B.
Determination of histamine in blood and urine by absorption on aberlite IRC-50. SCAND. J. CLIN. LAB. INVEST. 10:233–240 (1958). (In English)

Use of the techniques is described and normal resting values are given for blood. After oral promethazine the excretion of histamine in the urine was unchanged.

128. Duner, H. and Pernow, B.
Correlation between the occurrence of histamine in blood and urine. SCAN. J. CLIN. LAB. INVEST. 10:390–393 (1958). (In English)

When the free histamine excreted/24 hr. in the urine was plotted against the blood histamine level in 19 cases, the points lay about a straight line (coefficient of correlation = 0.88).

129. Duner, H., Liljedahl, S. O. and Pernow, B.

The urinary excretion of histamine, histidine and IMAA was studied in healthy and severely burned patients. IMAA is a normal constituent of human urine. In the cases of burn, the IMAA excretion was normal and the histamine excretion was increased. Administration of histamine and histidine gave a slight increase in the excretion of IMAA.
130. Du Toit, H.
STUDY OF CHEMICAL METHODS FOR QUANTITATIVE MEASUREMENTS OF CATECHOL AMINES. Massachusetts General Hospital, Boston.
Rept. on Biophysics of Acceleration. WADC Technical rept. no. 59-175, Apr 1959, 12p. (Contract AF 33(616)5003). ASTIA AD-220 081.

A method for the estimation of adrenaline and noradrenaline in urine is presented. This method employs an ion exchange resin, Amberlite XE-64, for purification. The simultaneous estimation of the two hormones is accomplished by a multiple filter technique of fluorometry. The selection of appropriate sets of filters is based on a careful study of the fluorescence spectra of the compounds concerned. The method has been subjected to careful scrutiny as to factors affecting reproducibility and precision of the measurements. Evidence is presented that a high degree of specificity has been attained.

131. Dyrenfurth, I. and Venning, E. H.
Preparation of urinary extracts for aldosterone assay: hydrolysis and extraction. ENDOCRINOLOGY 60:136–143 (1957).

The conditions of hydrolysis for the maximum recovery of aldosterone from urines have been studied. Mild acid hydrolysis was usually far more effective than \( \beta \)-glucuronidase hydrolysis. The degree of completeness appeared to be a function of time, temperature and the pH at which the urine was allowed to stand. At room temperature, the recovery was maximum at pH 1.5. Some destruction of the aldosterone occurred in the acid medium. The application of continuous extraction simultaneously with the acid hydrolysis led to higher yields.

132. Eberlein, W. R. and Bongiovanni, A. M.

A new method is described for the assay of urinary pregnanediol, employing enzymic hydrolysis of pregnanediol glucuronide, ascending paper chromatography, and spectrophotometry. Analysis of absorption spectra, recovery experiments, and replicate assays of urine for pregnanediol establish the sensitivity, specificity and reliability of the method, which was also shown to reflect changing ovarian function during the menstrual cycle.
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132. Eberlein, W. R. and Bongiovanni, A. M.

Paper chromatographic method for measurement of pregnanediol in urine. J. CLIN. ENDOCR.

A new method is described for the assay of urinary pregnanediol, employing enzymic hydrolysis of pregnanediol glucuronide, ascending paper chromatography, and spectrophotometry. Analysis of absorption spectra, recovery experiments, and replicate assays of urine for pregnanediol establish the sensitivity, specificity and reliability of the method, which was also shown to reflect changing ovarian function during the menstrual cycle.
138. Ellenbogen, L. and Williams, W. L.
Improved urinary excretion test for assay of
intrinsic factor. II. Sensitive counting technique.
PROC. SOC. EXP. BIOL., N. Y. 91:617–619
(1956).

139. Elmadjilan, F., Lamson, E. T. and Neri, R.
I. Nature of adrenaline and noradrenaline in
normal human urine. II. Excretion of adrenaline
and noradrenaline in human subjects. J. CLIN.

I. In addition to acid hydrolysis, the urine was incubated with β-glucuronidase and with
Mylase P as a source of phenolsulphatase. With acid hydrolysis, the highest values
of noradrenaline [NA] were obtained by boiling for 5 min. at pH 1.5. Definite loss of
NA and adrenaline activity was observed after boiling for periods of 15–30 min. NA
is conjugated to the extent of 60 percent whereas adrenaline is in all probability in the
free state. The conjugate of NA in normal urine appears to be the glucuronide and not
the SO.

II. Excretions of adrenaline and NA were determined in sleep and waking states, after
adrenaline or NA infusion into an adrenalectomised subject, after psychomotor stress
and after ACTH administration. Both adrenaline and NA are excreted to a greater ex-
tent during sleep. The values after infusion are given. The effects of psychomotor
stress were variable, but both adrenaline and NA excretions were increased. ACTH
produced a decrease in the excretion of NA but no change in adrenaline excretion.

140. Engel, L. L., Alexander, J. and Wheeler, M.
Urinary metabolites of administered 19-nortesto-

Two new 17-oxosteroids, 19-norandrosterone and 19-nor-4-cholestan-3-ol-17-one are
isolated from the urine of a postmenopausal woman with breast cancer after i.m. in-
jection of 19-nortestosterone. The increased excretion of oestrone after the injection
of 19-nortestosterone is of the same order of magnitude as after administration of
testosterone.
141. Epstein, F. H., Kleeman, C. R. and Hendrikx, A.

Normal young men were subjected to different degrees of hydration over a period of 3 days. Water deprivation increased, and forced drinking decreased, the maximum urinary concentration achieved after injections of pitressin.


The response to pitressin was measured in normal young men maintained on low and high protein diets for 3 days, and on men fed with urea. Feeding of protein or urea increased the renal response to pitressin in both normally and over-hydrated subjects.

143. Erdmann-Ochlecker, S. and Heinrich, H. C.
Microbiological determination of vitamin B₁₂ in serum and urine. CLIN. CHIM. ACTA 1:269-286 (1956). (In German)

The phytoflagellate Euglena gracilis var. saccharophila isol. T and chrysomonad Ochromonas malhamensis Pringsheim were used in the microbiological determination of vitamin B₁₂ in serum and urine. In chronic myeloid leukaemia the B₁₂ concentrations were 510-11,900 μg./ml., 2-50 times the normal values. In infectious leucocytosis the serum vitamin B₁₂ values were in the lower region of normal. After X-ray irradiation of the spleen in chronic myeloid leukaemia the vitamin B₁₂ level is much lower in the remission which follows the drop in leucocytes. With recurrence of the disease the serum vitamin B₁₂ again rises. Greatly increased vitamin B₁₂ levels were also found in acute leukaemia and polycythaemia. This rise is not seen in chronic lymphatic leukaemia.

144. Esipenko, B. E. and Laremenko, M. S.
Use of refractometric methods in determining the quantity of dry residues of saliva, bile and urine. FIZIO. ZH. (Kiev) 7:708-709, Sep-Oct 1961. (In Ukrainian)
145. Faarvang, H. J.
Excretion of trypsin inhibitor in urine of normal persons. ACTA ENDOCR.
(Copenhagen) 30:285–295 (1959). (In English)

The estimation, and properties, of the trypsin inhibitor are described. There is individual variation in its excretion, but a given individual excretes a level which is fairly constant for long periods. There is a diurnal rhythm which follows closely the rhythm of excretion of 17-KS. Factors other than adrenal cortical function may influence the excretion of the inhibitor in the urine.

146. Faarvang, H. J. and Knudsen, P. J.

147. Falet, R.
[A contribution to the study of the Donaggio reaction: a description of a micro-method]

The work of a number of investigators concerned with the mechanism of the Donaggio reaction (precipitation of thionine in the presence of ammonium molybdate in the urine) is reviewed. A fairly simple micro-method is described which can be manipulated with facility and speed to determine the degree of fatigue. The method lends itself well for determining fatigue in flyers.

149. Feller, P.
MODIFICATION OF THE TRIOHYDROXYINDOLE
METHOD FOR THE ESTIMATION OF EPINEPHRINE
AND NOREPINEPHRINE IN URINE. School of
Aviation Medicine, Brooks Air Force Base, Texas.
Rept. no. 60-71, Aug 1960, 7p. ASTIA AD-250 043.

A procedure developed from existing technics for the estimation of epinephrine and norepinephrine in urine has been described. The precision of the method, based on the average difference between twenty-eight sets of duplicate determinations, indicated a coefficient of variation of 8.0 percent (S.D., .058) for epinephrine and a coefficient of variation of 9.1 percent (S.D., 148) for norepinephrine. Essentially, quantitative recoveries resulted from the addition of a mixture of known amounts of epinephrine and norepinephrine to urine. In a series of 45 normal subjects, a mean of 1.5 (S. D., .82; range 0.1 to 3.7) and 0.6 (S. D., 28; range 0.2 to 1.4) gamma per hour was found for norepinephrine and epinephrine, respectively.

150. Finkelstein, M. and Cox, R. I.
Method for simultaneous estimation of pregnane-
3α : 17α : 20α-triol and pregnane-3α : 17α : 20α-
triol-11-one in urine. PROC. SOC. EXP. BIOL.,

These compounds are liberated from their conjugates by β-glucuronidase, hydrolysed and extracted from urine and then distinguished and estimated by paper chromatography and by the fluorescence colors which they develop on heating the paper strips moistened with 70 percent phosphoric acid for 10 min. at 87°. Increased excretion of pregnane-
3α : 17α : 20α-triol was found in patients with adrenal hyperplasia and with adrenal tumors. Pregnane 3α : 17α : 20α-triol-11-one was only detected in urine from patients with adrenal hyperplasia.

151. Fischl, J. and Pinto, N.
Rapid spot tests for routine urine analysis. CLIN.

Details of methods for performing routine urine analysis by spot tests are given for albumin, urobilinogen, glucose, bilirubin, acetone, and nitrate. Some of the tests can be used semi-quantitative. They are claimed to be quicker, cheaper, and just as accurate as more laborious methods.
152. Fischl, J. and Segal, S.

Cellulose sponge was used to collect the sweat; evaporation of sweat was minimised; elution was carried out in a fixed elution 1:100, so that the electrolyte concentration fell within a narrow range. A simple chemical method for C1 determination in a laboratory not equipped with a flame photometer is presented. Full experimental details are given.

153. Fiser-Herman, M. and Petrovacki, M.

Two other reducing substances besides homogentisic acid have been found in alkaptonuric urine. They were identified as the lactone and ethyl ester of homogentisic acid. These substances were extracted from normal urine and demonstrated by chromatography.

154. Flaschenträger, B., Seddik, Y. and Twefik, H.
Metal filter for the filtration of particles greater than 42μ from water and urine. NATURWISSENSCHAFTEN 44:234 (1957). (In German)

155. Floyer, M. A.

An approximate estimation of urinary catechol amines can be made by measuring the rise in blood pressure after direct i.v. injection of urine into an anaesthetised rat.
156. Foss, J. G. and Schellman, J. A.
Thermal transition of RNase in urea solutions.

Measurements of the optical rotation were used to study the process of denaturation produced by a combination of urea and of heat. As the concentration of urea increases the temperature of the transition from the folded form to the denatured form is reduced. The presence of urea does not affect the temperature dependence of the rotation of the denatured form. A more detailed analysis of the results shows that the denaturation induced by urea at low temperature may be partially reversed as the temperature is raised. A simple thermodynamic theory is proposed and the free energy and entropy changes of the transition are calculated.

157. Foster, K. G.

158. Fotherby, K., et al.

Two "blue tetrazolium" reducing substances, X and Y, were detected by paper chromatography in CHCl₃ extracts of human male urine which had been boiled at neutral pH for 1 hr.; they were not detected in extracts of unboiled urine. Treatment of X by acid at room temperature converted it into the more "polar" substance Xα, which was digitonin precipitable and gave a positive Pettenkofer test and which had the same RF values as Y. Xα (C₁₈H₁₂₂O₃) m.p. 177–181° (uncorrected); [α]D + 12° (ethanol) was isolated from male urine in yields of 5–15 mg./100 l. It yielded a diacetate (m.p. 166–168° (uncorrected); [α]D + 20° (ethanol), and took up 2 moles H₂ to yield 5α-androstane-3β : 16α : 17β-triol which was identified by mixed m.p. and i.r. spectra. Xα was therefore shown to be 3β : 16α-dihydroxyandrostan-5-en-17-one, and X is considered to be 6β : 16α-dihydroxy-3 : 5-cycloandrostan-17-one formed by hydrolysis at neutral pH from the 3-sulphate of 3β : 16α-dihydroxyandrostan-5-en-17-one present in urine. Evidence that the latter is a metabolic product of dehydroepiandrosterone was obtained.
8-55-62-2/SB-62-56

159. Fotherby, K.

Androst-5-ene-3β : 17β-diol, androst-5-ene-3β : 16β : 17β-triol and pregn-5-ene-3β : 17α : 20α-triol have been isolated from the urine of normal males which has been boiled for 2 hours at neutral pH. It is suggested that these steroids are present in urine as sulphates and the analogy between the metabolism of dehydroepiandrosterone and oestrene is discussed.

160. Fotherby, K.

The sulphate of this steroid is hydrolysed by heating urine without acidification at 100° for 6 hours.


Eighteen amino acids were determined in the urine of 12 young children and 2 older children by the method of Moore and Stein. A marked amino aciduria was present in premature infants and to some extent in full term infants. Taurine, glycine, and proline showed the largest changes. Four children of 1–3-1/2 months were given a synthetic diet in which the N was in the form of L-amino acids. Lysine and threonine excretion was increased and alanine and glutamic acid excretion was reduced.

162. Fox, H. M., et al.

The daily urinary excretion of 17-OHCS, uropepsin and creatinine of a male subject with a history of gastrointestinal haemorrhage was measured over 3 years.
163. Frahm, M., Fretwurst, E. and Soehring, K.

Paper chromatographic detection of several phenothiazine derivatives in urine. KLIN. WSCHR. 34:1259–1262 (1956). (In German)

Solvent systems for the separation of phenothiazine derivatives by paper chromatography are described, together with color reactions for chlorpromazine, promethazine and N-methylpiperidyl-3-methylphenothiazine. Detection of these substances in urine after their parenteral or enteral administration is described.

164. Frank, H. and Scheiffarth, F.

New method for the detection [and estimation] of inulin in plasma and urine. KLIN. WSCHR. 34:914–918 (1956). (In German)

A method is described for the estimation of inulin based on its hydrolysis by heating and the subsequent production of a blue color in the presence of phosphomolybdic acid. The conditions for estimation of inulin over the range of 5–40 mg./100 ml. are described. The reduction of phosphomolybdate by glucose is about 1/30th that of fructose and consequently the blank values in serum and urine are hardly affected. The technique may be used on a micro scale (0.2 ml. of serum).

165. Franklin, E. C.


Most of the γ-globulin of normal human urine, appeared to be 1/5–1/6 the size of serum γ-globulin, had s of approximately 1.6 and was antigenically closely related to serum 7S γ-globulin. Isotopic studies indicated derivation from serum γ-globulin fraction.
166. Frantz, A. G., Katz, F. H. and Jailer, J. W.

167. Frantz, G., Katz, H. and Jailer, W.

168. Franza, C. and Caturani, F.

169. Frascarelli, R, Lucidi, E. and Cozzali, G.

170. Fraser, R. and Harrison, M.
171. Freeman, S., Kanabrocki, E. L. and Inman, C. W.
Influence of diet and of exogenous glucuronolactone or glucuronate upon the urinary and serum glucuronic acid of adult human subjects. J. LAB. CLIN. MED. 47:583–591 (1956).

In normal subjects, glucuronic acid excretion was minimal at night; the dietary protein intake had little effect on the output. Ingestion of glucuronolactone produced a prompt increase in the serum level, but less than 20 percent was excreted in the urine even when massive doses were given. Moderate doses of Na glucuronate had no substantial effect on the serum concentration or excretion of glucuronic acid, but large doses increased the blood and urine contents. Infusion of glucuronolactone or Na or Ca glucuronate was followed by rapid urinary excretion of the substance administered, to the extent of 60–80 percent.

172. Froesch, E. R. and Renold, A. E.
Specific enzymic estimation of glucose in blood and urine using glucose oxidase. SCHWEIZ. MED. WSCHR. 86:1038 (1956). (In German)

A daily excretion of 16–132 mg. of glucose in the urine of normal subjects has been found (mean 72 mg./24 hr.). Acute administration of glucocorticoids produces a small but significant rise in urinary sugar excretion.

173. Fujita, T.

A simplification of the oxycellulose technique for the determination of ACTH in blood is described. In 5 out of 27 normal subjects there were detectable amounts of ACTH in 200 ml. samples of blood. The average value for the blood concentration of ACTH in normal subjects was found to be 1 milli I. U./1. The oxycellulose method was applied to urine: approximately 0.25 mill I. U. of ACTH was found per 24-hour specimen in normal subjects.
174. Fukushima, D. K. and Gallagher, T. F.
D-Homosteroids in extracts of human urine.

3α:17α-Dihydroxy-5pregnane-20-one, 3α:17α-Dihydroxy-17α α-methyl-D-
homoaetiocholane-17-one, and 3α:17α-Dihydroxy-17β-[methyl-D-homoaetiocholane-
17α-one, previously isolated from human urine, are shown to be artifacts of isolation
resulting from D-homo rearrangements of 3α:17α-Dihydroxy-5pregnane-20-one.

175. Funck-Bretano, J. L.
Urine examination. J. UROL NEPHROL.

Fractionation of non-dialysable carbohydrate-
protein complexes of male urine. ARCH.

177. Gaddum, J. H. and Horton, E. W.
Extraction of human urinary kinin (Substance Z)
and its relation to the plasma kinins. BRIT.

A method for the extraction of substance Z from human urine is described. Separation
of two oxytocic fractions from such extracts could not be confirmed. Substance Z
could not be distinguished from kallidin, bradykinin or glass activated kinin by parallel
quantitative assays, thus confirming that these 4 substances are very closely related.

178. Gaedtke, K. and Schreier, K.
Estimation of serotonin in urine. CLIN. CHIM.
ACTA 1:475–477 (1956). (In German)

A new method for estimating serotonin in urine is described. After acetylation, the
paper chromatogram is developed with xanthychol, and eluted, and then estimated
quantitatively.
179. Gallagher, T. F., et al.,

When extracts of urine from oophorectomised-adrenalectomised women who have had [16-14C] oestradiol-17β injected i. v. are analysed for oestrone, oestradiol, and oestriol by the methods of (a) reverse isotopic dilution, (b) determination of the radioactivity of the peak tubes after counter-current distribution, (c) the methods of Brown (Anal. Abstr., 1955, 3161) and of Brown, et al. (J. Endocrinol., 1957, 16, 49) which utilizes the Kober color reaction, and (d) determination of the radioactivity content of the separated oestrogen methyl ether fractions obtained by the method of Beer and Gallagher (Brit. Abstr. Med. Sci., 1956, 5550), there is satisfactory agreement between all the results.

180. Gartler, S. M.
Urinary β-aminoisobutyric acid excretion in man.
ARCH. BIOCHEM. 80:400-409 (1959).

Following the ingestion of 500 mg. thymine the additional urinary excretion of β-aminoisobutyric acid in 6 hours was similar in subject whose fasting urinary levels were widely different. After 50 mg. thymine, the high excretors showed a greater increase. The high excretors also showed a greater excretion of β-aminoisobutyric acid following 500 mg. dihydrothymine or 100 mg. β-ureidoisobutyric acid; both these substances were found in the urine in each case.

181. Gautier, E. and Kohli, P.

182. Gerlach, J. L. and Frazier, R. G.
Spectrophotometric determination of chloride in sweat and serum with diphenylcarbazone.

Cl combines with Hg after which excess of the latter form a violet colored complex with diphenylcarbazone. The absorption maximum is 500 mµ and Beer's law is obeyed at pH 3.2 in the range 0.240 µg. Cl/100 ml.
183. Ginetsinskii, A. G., Broitman, A. L and Ivanova, L. N.
Activity of hyaluronidase in human urine.

The activity of the enzyme was measured in the arbitrary units derived from the viscosity changes appearing in the urine due to the depolymerisation of the added hyaluronic acid. It was found in healthy persons and in dogs that were diuresis is increased the activity decreases and completely disappears when the rate of the urine excretion reaches the level of > 0.8 ml./min./sq. m. In the initial stage of the acute glomerulonephritis the relationship between the diuresis and the enzyme activity is similar to that found in normal conditions but the concentration of enzyme per unit of urine volume is increased. It was found that 50 units of activity are present in these cases when the rate of urine excretion is about 0.2 ml./min. (against 20 units in normal conditions). Even when excretion is of 1.6 ml./min. the urine shows 20 units of activity. One to two weeks later the activity of the enzyme drops, appears again at approximately 0.2 ml./min. and increases up to a maximum activity at the rate of urine excretion of approximately 0.8 ml./min. In amyloidosis the activity of the enzyme disappears. It is suggested that the enzyme is liberated from the nephrous epithelium. Extracts of dog kidney contain more of this enzyme than the seminal vesicles.

184. Gobel, P., Heni, F. and d'Addabbo, A.
Paper chromatographic separation and quantitative determination of 17-ketosteroids in urine.
HOPPE-SEYL. Z. 311:201-212 (1958). (In German)

A method is described suitable for routine work for the separation of androsterone, etiocholanone, dehydroepiandrosterone, 11-keto-androsterone, 11-ketoetiocholanone, 11-hydroxyandrosterone and 11-hydroxyetiocholanone. Paper chromatography with propylene glycol-acetone-methylcyclohexane is used. After development by alkaline dinitrobenzene the spots are evaluated by a scanning method.

185. Goldbarg, J. A. and Rutenburg, A. M.
Colorimetric determination of leucine aminopeptidase in urine and serum of normal subjects and patients with cancer and other diseases.
A new method is described and the kinetics of the enzyme and its assay in urine and serum in normal subjects and in patients with cancer and other diseases are presented. Urinary leucine aminopeptidase activity was increased in 46 percent of cancer patients before treatment and in most patients postoperatively. After operation for non-malignant disease, enzyme activity returned to normal within 30 days, but in cancer patients the return to normality was usually retarded. Changes in activity in pregnancy, in the postpartum period and in metastatic cancer are reported.

186. Goldstein, M., Friedhoff, A. J. and Simmons, C. 
Method for separation and estimation of catechol amines in urine. EXPERIMENTIA, BASEL 15:80-81 (1959). (In English)

187. Golub, O. J., Sobel, C. and Henry, R. J. 

The results indicate relatively good correlation between the Norymberski and Glenn-Nelson values and the clinical findings, but serious discrepancies were obtained with the Reddy method, especially in urines containing only small amounts of corticosteroids. Utilizing 3λ for reading with the latter procedure, although frequently altering the values, did not necessarily improve their agreement with those obtained by the other 2 methods or with the final diagnosis. Data are presented which indicate that the Glenn-Nelson technique leaves a significant percentage of the 17-OHCS in the residual urine following hydrolysis and extraction. The results indicate the advantage of the Norymberski procedure in the diagnosis of the adrenogential syndrome, a condition in which pregnanetriol is excreted in abnormal amounts and measured as a 17-ketogenic steroid.

188. Gomes, F. P. 

Bradykinin and a material isolatable from normal human urine appear identical in their actions on the isolated uterus of the rat. When separated by countercurrent distribution in butanol : acetic : water the two principles are shown to be different when the eluate is assayed on the uterus.
189. Gomes, F. D.
Oxytocic activity of rat and human urine.

Substances capable of contracting the uterus of the rat are extracted from rat urine and are present in 100–200 times the concentration of similar substances in human urine. The uterus shows a latent period in response to these substances that is longer than for human urine. The activity is due to a substance different from that in human urine and is thermo-stable and resistant to chymotrypsin.

190. Gontzea, I., Sutzescou, P. and Jantea, F.

Sweat was collected in nylon sleeves for 2–8 days in 63 subjects. N was 0.08–0.15 g./l. higher in sweat from arms and thighs than from the chest. N concentration fell from 0.45 g./l. at a sweating rate of 200–300 ml./hr. to 0.36 g./l. when the rate was 400–500 ml./hr.

Renal regulation of phosphorous excretion.

Four male patients with apparently normal P metabolism and renal function were studied during a metabolic balance regimen and then given oral P supplements. In all cases there was an increase in the level of serum P, filtered P and urinary P. By the end of the 2nd 24-hour period, P excretion had become stabilised. Similar but opposite responses followed withdrawal of the P supplements. Tubular reabsorption and filtration rate data are given. Parathyroid hormone appears to regulate renal function in response to sustained rather than transient variations in the dietary P load.

192. Gounelle, H. and Richet, F.

Variations in the amounts of pantothenic acid excreted during 24-hour periods are shown to be small. The average concentration of the material is approximately 3.5–5.5 μg./ml. In one case the level before a test dose of 100mg. pantothenol was 5.79 μg./ml. and
four hours after it was 181 μg./ml. while 6 hours 45 minutes after the dose it had fallen to 38.8 μg./ml. Within 12 hours the levels were back to normal. The amounts excreted after feeding were elevated by between 10–50 times the normal.

193. Gradwohl, R. B. H.


This chapter describes the compositions of stools, physical, chemical, etc.

The feces consist of the indigestible and undigested remnants of food, plus certain constituents such as material secreted by the intestinal wall, plus certain bacteria which may or may not belong to the group of normal intestinal flora. The food remnants, together with intestinal parasites and their eggs, are intimately mixed with bacteria and excretions from the intestinal mucose. Strassburger claimed feces ordinarily are one-third bacteria.

Usual amount of stool is 100 to 200 grams a day, dependent on diet, varying from 30 to 282 gms., average 102.8 gms.

On a mixed diet weighing 150 gm., individuals ought to pass 30–37 gm. fecal material. Vegetable and starchy diet increases amount while proteins decrease amount.

Stools never show more than a bare trace of chlorides.

Color of stools is due to presence of Hydrobilirubin from bile. Odor due to Indol and Skatol, from action of bacteria upon protein.

The most important products formed are: Indole (C₆H₄NHCH:CH), Skatol (C₉H₉N), Paracresol (CH₃C₆H₄OH), Para-oxyphenyl-propionic Acid, Para-oxyphenylacetic Acid, Volatile Fatty Acid, H₂S, CH₄, Methylmercaptan, H₂, CO₂, Peptones, Peptides, Ammonia, Amino Acids, some raw vegetables pass unchanged (radishes, cole slaw, pickles, onion, skins of fruits, nuts, berries), mucus, tissue remnants, epithelial cells, muscle fibers, connective tissues, crystals, phosphates (many named), detritus, fats, neutral, free fatty acids or soaps, starch granules, bacteria, great variety normally found. Normal discharge via stools 126 billion bacteria/day. Ancretions, limey (not in normal stools)

Fresh stools are neutral, or nearly so. They consist normally of 65–85 percent watery parts and 15–35 percent dry solids.
194. Grajnert, K.
Determination of 17-ketogenic steroids in urine.
POLSK. ARCH. MED. WEWN.

The method described circumvents the rather troublesome preparation of urine extracts, and is convenient in clinical use. The 17-KS content is calculated from the difference between 2 measurements performed before and after oxidation of sample with Na bismuthate. The method is a colorimetric one involving addition of m-dinitrobenzene.

Restricted water intake on urine nitrogen output in man on low-calorie diet devoid of protein. J.

The diet contained 1000 kcal./day. N output in urine was 9.4 g./day on water intake of 900 ml./day, 7.1 g./day on 1800 ml./day, and 5.8 g./day on water. N in faeces and sweat was virtually unchanged. There was an increase in blood urea N on the 5th day of 900 ml./day water. Men receiving limited water excreted more urine water than those on a liberal intake on the day of maximum dehydration. The increased output is interpreted as a response to the stress of dehydration.

196. Grant, G. H. and Everall, P. H.
Proteins of normal urine. J. CLIN. PATH.

The proteins of normal urine were concentrated by ultrafiltration and analysed by immuno-electrophoresis. Using rabbit anti-human-serum and anti-urine-colloids sera it was shown that urine contains 2 groups of proteins: (i) a group apparently identical with the plasma proteins except for β-lipoprotein and several other minor fractions; and (ii) proteins not demonstrable in blood presumably arising from the urinary tract; these included a mucoprotein described by Tamm and Horsfall (J. exp. Med., 1952, 95, 71).
197. Grant, G. H.
Proteins of normal urine. II. From urinary tract.

About 12 antigenic components, not detectable in normal serum, were found in normal urines by immunochemical methods. Antisera produced in rabbits against normal male or female urine colloids, normal human semen and Tamm–Horsfall mucoprotein were used in the analysis, which was by either gel diffusion or immunoelectrophoresis. The urinary Ag were thus classified according to origin from the kidneys, ureters and bladder, from the male genital tract and from the urethra in both sexes.


The steroids excreted by patients receiving oral prednisone and prednisolone were investigated. The two compounds present in largest amounts were isolated and identified as prednisone and prednisolone. The corresponding 20 β-alcohols were present in smaller amounts. Another compound has properties suggestive of pregna-1:4-dien-17α : 20α : 21-triol-3 : 11-dione. There is no evidence that prednisone and prednisolone are converted in the body to cortisol, cortisone, or their derivatives, and the investigations suggest that prednisone is metabolised in part by reduction of its 11-ketone group to an 11-hydroxy group and prednisolone by oxidation of its 11-OH group to an 11-ketone group. These two components are thus metabolically interconvertible. Reduction of the 20-ketone group can occur in both compounds.

199. Gregor, O. and Kalousek, F.

Proteolytic activity in urine remains stable for at least 3 days when the urine is stored at room temperature up to 14 days in a refrigerator and even for several hours in an incubator at 37°. Activation usually occurs after 1/2 hour, the maximum being reached in an hour, after which it remains constant.

200. Gries, F. A. and Gries, G.
(In German)

A critical analysis of factors affecting the estimation of total urinary bilirubin by the method of With (Hoppe-Seyl. Z. physiol. Chem., 1942, 275, 166).
201. Gries, F. A. and Gries, G.  
Selective quantitative determination of the direct reacting bilirubin in urine. KLIN. WSCHR.  
35:81-85 (1957). (In German)

Tubular secretion of urate in man.  

203. Hadfield, G. and Young, J. S.  

The urine of pre-menopausal women contained a biological active factor which stimulated growth and glandular differentiation in rudimentary mammae of weanling (24-day-old) male mice. Groups of 10 mice were used for each test and the number of "clubs" or end-bulbs in each gland counted. The technique used is fully described with sketches of the different stages of response and the effect of oestrone, prolactin, growth hormone, and gonadotrophin compared with that of urines.

204. Hagopian, M., Dorfman, R. and Gut, M.  

It is claimed that a simpler and more comprehensive analysis of catecholamines may be obtained by acetylating them directly in aqueous solutions before extraction and paper chromatography.
205. Hakim, A. A.
Heterogeneous nature of certain RNase.

Purified preparations were made of acid and alkaline RNase and of a combined RNase and its free form. Actions of these on yeast RNA and synthetic substrates are described, together with pH optima and heat stabilities. Elution from ion exchange resin columns showed that each RNase preparation contained many enzymically active components.

206. Hakim, A. A.
Polynucleotide phosphorylase from human sperm and urine. II. Activities on nucleotides and nucleic acids. BIOCHEM. Z. 331:229-238 (1959). (In English)

The isolation and purification of an enzyme from human sperm and urine is described. The enzyme catalyses the synthesis of highly polymerised RNA from ribonucleotides present in yeast RNA. Homogeneous polymers containing AMP, GMP, UMP, and cytidylic acid, and various heteropolymers of the 4 mononucleotides, are obtained by incubating the urine or the sperm enzyme with the corresponding 5-nucleotide di-phosphates.

207. Hakim, A. A.
Action of enzymes in presence of certain hormones. II. Urine deoxyribonucleases. CLIN. CHIM. ACTA 4:484-493 (1959). (In English)

The starting material is lyophilised dried urine powder. DNase were found in free (active) and combined (inactive) form. They also exist as an acid DNase, optimum pH activity at 4.6 requiring Mg for activation, and as neutral DNase, optimum pH 7.17, which does not require Mg for activity. Daily and monthly variation of the free and combined enzymes paralleled the variation of urinary oestrogenic hormones.
EXCRETION TRENDS IN MEN UNDERGOING DEACCLIMATIZATION TO HEAT. School of Aerospace Medicine, Brooks Air Force Base, Texas. Rept. no. 61-81, Jul 1961, 8p.

ASTIA AD-264 801.

The possibility that exercise or good physical condition influences the rate at which human beings deacclimate to heat was investigated. Twenty-one men were studied over a 10-week period during which daily peak temperatures declined from 95 to 54°F. (September to November). Two overnight (timed) urine specimens per subject per week were analyzed for Na, K, PO4, urea, uric acid, creatinine, and 17-hydroxy-corticosteroids. Five of the men exercised daily. 9 exercised twice each week, and 7 never exercised (exercise was defined as cross-country runs of 3 to 8 miles). Urine volume, uric acid excretion rate, the uric acid/creatinine ratio, urea excretion rate, and sodium excretion rate tended to remain at the initial (summer) level; these observations suggest that summertime adjustments are quite persistent. However, significant variation with time was found for creatinine, potassium, and 17-hydroxy-corticosteroid excretion rate as well as for the urea/creatinine, phosphate/creatinine, sodium/potassium, and 17-OHCS/creatinine ratios.

Studies on urinary gonadotrophins. III. Qualitative differences between those of young men and postmenopausal women. ACTA ENDOCR. (Copenhagen) 26:1–29 (1957). (In English)

The gonadotrophin was extracted by a chromatographic method (Johnsen, Acta endocr., Kbh., 1955, 20, 101). The amount of dry powder so produced was the same per liter of each type of urine, but the activity per liter of the woman's urine increasing the uterine weight in immature mice was 11 times greater than that per liter of the men's urine. The luteinising activity of the extract of men's urine per unit of uterus-stimulating activity was 2–3 times greater than that of the extract from the women's urine. The differences are not due to nonspecific augmentation nor to contamination with non-gonadotropic hormones.
Serum inorganic phosphorus levels in males and females at progressive ages with concomitant measurement of urinary ketosteroids and androgens in men. J. CLIN. ENDOCR. 16:463-472 (1956).

Serum inorganic phosphorus (SIP) levels are high until sexual maturity is reached, and in young adults an inverse relationship exists between gonadal secretions and SIP values. The extent of the influence of gonadal secretions on SIP concentrations decreases with age. SIP values are not correlated with urinary titres of ketosteroids or androgens.

Handler, P.


The factor was demonstrated in partially nephrectomised rats maintained in the normotensive state by feeding a low protein, normal salt diet, and in normotensive bilaterally nephrectomised rats. Excretion of the factor depends upon adequate protein nutrition, adrenocortical and renal function. Renal hypertension may be partly due to a failure to excrete this factor. The factor was partially purified.

H. Hanson and Fittkau, S.

(In German)

Peptides were separated from 83 liters of human urine using charcoal absorption, counter-current distribution paperchromatography and paper electrophoresis. 17 peptides were isolated and analysed. These contained 2-17 amino acid units each.

Harpst, H. C., et al.

(In English)
214. Harsing, L.
Mechanism of hypotonic urine excretion.
ACTA PHYSIOL. ACAD. SCI. 16:10 (1959)
(In German)

215. Hart, K. T.

Urinary metabolites of 2-methyl-1:4-naphthoquinone were separated by paper chromatography and their response to various hydrolytic procedures studied. Three conjugates PO₄, glucuronide, and SO₄ were hydrolysed by HCl and by ceric SO₄. The SO₄ was hydrolysed to a greater degree by HCl, but ceric SO₄ was more effective in splitting PO₄ and glucuronide. Rat urine treated with HCl or ceric SO₄ contained significant amounts of unhydrolysed SO₄ but both reagents together were effective. 2-Methyl-1:4-naphthoquinone was released from the glucuronide and SO₄ after incubation with Ketodase.

216. Hasan, J., Laamanen, A. and Niemi, M.
Effect of thermal stress and muscular exercise, with and without insulin hypoglycaemia, on the body temperature, perspiration rate, and electrolyte and lactate content of sweat. ACTA PHYSIOLOGICA SCANDINAVICA (Stockholm) 31:131–136 (1954). (In English)

The effects of thermal stress (Finnish Sauna bath) and muscular exercise (on treadmill) on the rise in body temperature, on the sweating rate, and on the electrolyte and lactate content of sweat were studied. In one half of the experiments, hypoglycemia was induced by intravenous injections of insulin. There were no significant differences in the rate of sweating and in the composition of sweat during insulin hypoglycemia and during euglycemia. There was some tendency to increased values with decreased blood sugar concentrations in the lactate content of sweat. The rise in body temperature under insulin hypoglycemia was significantly lower than in experiments without insulin injection. The reason for this observation is briefly discussed.
217. Haskins, W. T.
Simple qualitative test for chloroquine in urine.

A simple technique for the detection of chloroquine in urine samples under field conditions is described.

218. Häussler, A.
Estimation of N1-sulphanilyl-N2-n-butyl-carbamide (BZ55) in serum, urine, and feces. ARZNEIMETTEL-FORSCHUNG. 6:393–394 (1956). (In German)

Estimation of BZ55 depends on its diazotisation and coupling with thiocol, the extinction being determined at 470 µ. The calibration curve is linear over a range of 10 to 100 µg. Details of extraction from serum, urine, and feces are described.

219. Hawk, P. B., Oser, B. L. and Summersen, W. H.

The urine composition is as follows:

<table>
<thead>
<tr>
<th>Constituent</th>
<th>Amount (gms.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>1200</td>
</tr>
<tr>
<td>Solids</td>
<td>60</td>
</tr>
<tr>
<td>Urea</td>
<td>30</td>
</tr>
<tr>
<td>Hippuric acid</td>
<td>0.7</td>
</tr>
<tr>
<td>Uric acid</td>
<td>0.7</td>
</tr>
<tr>
<td>Creatinine</td>
<td>1.2</td>
</tr>
<tr>
<td>Indican (Indoxyl potassium sulfate)</td>
<td>0.01</td>
</tr>
<tr>
<td>Oxalic acid</td>
<td>0.02</td>
</tr>
<tr>
<td>Allantoin</td>
<td>0.04</td>
</tr>
<tr>
<td>Amino acid nitrogen</td>
<td>0.2</td>
</tr>
<tr>
<td>Purine bases</td>
<td>0.01</td>
</tr>
<tr>
<td>Phenola</td>
<td>0.2</td>
</tr>
<tr>
<td>Cl as NaCl</td>
<td>12.0</td>
</tr>
<tr>
<td>Na</td>
<td>4.0</td>
</tr>
<tr>
<td>K</td>
<td>2.0</td>
</tr>
<tr>
<td>Ca</td>
<td>0.2</td>
</tr>
<tr>
<td>Mg</td>
<td>0.15</td>
</tr>
</tbody>
</table>

61
Constituent | Amount (gms.)
--- | ---
\(\beta\) as \(SO_2\) | 2.5
Inorganic sulfates as \(SO_3\) | 2.0
Neutral sulfur \(SO_3\) | 0.3
Conjugated sulfates as \(SO_3\) | 0.2

220. Hayashi, Y.


221. Hecht, G.

Excretion of colloids [polyvinylpyrrolidone] by kidney. KLIN. WSCHR. 37:140-143 (1959). (In German)


Riboflavin concentration was determined in urine samples collected every two or four hours. Single urine specimens gave a poor estimate of riboflavin excretion. There was a greater variation in excretion per ml. of urine than when expressed per hour or per g. of reatinine. For accurate estimates the longest possible collection period should be attempted i.e. the best sample was that obtained upon waking in the morning.

223. Hellen, C.


Physiological variations in the urinary excretion of meso-inositol do not appear to be connected with the varying proportions of this substance found in different foods. The additional ingestion of 1-4 g. of meso-inositol or inositol PO\(_4\) does not increase the quantity of inositol found in the urine.
224. Hellmann, K. and Weiner, J. S.
Antidiuretic substance in urine following exposure to high temperatures. AMER.

The effect of short exposure to high temperatures on the output of antidiuretic substance in the urine of healthy young men has been studied. No antidiuretic activity was found in the urine passed immediately prior to entering the hot room and rarely in the hot room itself. Urine passed after leaving the chamber, however, in nearly every case showed antidiuretic activity.

225. Hellman, K.

The output of urinary adrenocorticoids has been studied in man before, during, and immediately after exposure to high environmental temperature. While there was no significant change in the excretion of 17-hydroxycorticoids, cortisone, and cortisol or of tetrahydrocortisone and tetrahydrocortisol there was a significant increase in the output of aldosterone.

226. Henn, O.
[Chloride content of sweat at high temperatures and high relative humidity during rest] DER CHLORIDGEHALT DES SCHWEISSES BEI HOHER TEMPERATURE, HOHER RELATIVER FEUCHTIGKEIT, ABER KÖRPERLICHER RUHE. — ARBEITS-SPHYSIOLOGIE (Berlin) 15:93–98 (1953).
(In German)

The effects of hot and humid environments on the chloride content of sweat were experimentally investigated in resting individuals whose body temperatures were rising. An increase was noted in sweat chloride concentration as well as an increase in the total amount of chlorides excreted. After lengthy acclimatization, the amount of chlorides excreted in sweat decreased. A short period of acclimatization, however, may produce the opposite results. Contradictory values were obtained for serum chlorides after acclimatization, as both increases and decreases in blood serum concentration were observed in different individuals.
Excretion of p-hydroxyphenylpyruvic acid, phenylpyruvic- and other α-keto acids in the urine of healthy human beings. HOPPE-SEYL. Z. PHYSIOL. CHEM. 306:221-228 (1957). (In German)

α-Keto-acids present in normal human urine have been detected by reaction with 2 : 4-dinitrophenylhydrazine and conversion of the resulting hydrazones into the corresponding amino acids namely glyoxylic, pyruvic, hydroxypyruvic, α-keto-γ-thiomethylbutyric, α-keto-β-hydroxybutyric, α-ketoisoheptolic, α-keto-β-methylvaleric, phenyl- and p-hydroxyphenyl-pyruvic, oxalacetic, α-ketogluartic, β-imidazolopyruvic, and α-keto-n-butyric acid. The problem of tyrosinosis is discussed in the light of the occurrence of p-hydroxyphenylpyruvic acid.

Chemical determination of urinary catecholamines.
ARCH. INTERN. MED. 100:196-200 (1957).

Urinary excretion of catecholamines (adrenaline and arterenol) was studied in 66 patients with hypertension. Six cases of pheochromocytoma were included in the series. The test advocated for determination of catecholamines in urine possessed a high specificity for pheochromocytoma and therefore a great advantage in the differential diagnosis of this disease.

Direct nesslerisation of ammonia formed by urease treatment of blood, serum, and urine.

One or more substances, normally present in filtrates of serum and in samples of urine, depress the color in the 480–540 μ range. Correct results are obtained if the color is read at 420 μ within one minute of adding the Nessler's reagent to the reagent to the reaction mixture.
230. Henseke, G. and R. Neinass
The depilatory action of human skin grease.
Depilating substances are present in the non-saponifiable fraction of human skin grease.
These are saturated hydrocarbons with \( C_{26-30} \). The depilatory action is probably due
to impeded skin respiration caused by the greasy paraffinic layer covering the skin.

231. Heremans, J.
Electrophoresis of urinary colloids. CLIN.
After filtering off the uromucoids and concentrating the urine by ultra-filtration, 3
types of urinary colloids could be distinguished: I. Gross renal permeability, nephrotic
syndrome: proteinuria, albumin and orosomucoid. II. Slight renal premeability, e.g.
congestive heart failure: minimum proteinuria, qualitative the same as in I. III. Muco-
proteinuria, febrile conditions, infections, traumas: slight proteinuria, orosomucoid
and chondroitin \( SO_4 \).

232. Heremans, J. F., Vaerman, J. P. and
Heremans, M. T.
Acid mucopolysaccharides of normal urine.

Physiocochemical method for estimation of
aldosterone in urine. METABOLISM 6:518-543
(1957).
The method is described and its reliability and usefulness are discussed. Levels of
aldosterone excretion in normal subjects and in patients suffering from a variety of
endocrine and other disorders have been determined. The effect on the excretion of
aldosterone of manipulation of the dietary intake of water, Na and K, of the administration
of ACTH, growth hormone and pitressin, of natural and synthetic steroids, and of
amphionone were studied. Chemical and biological characteristics of an unknown sub-
stance isolated from the urine of subjects on a low Na diet are described.
234. Herrmann, W. and Silverman, L.
The urinary extract is chromatographed on florisil. The eluate containing pregnanetriol is oxidized with bismuthate, and the pregnanetriol determined as ketogenic steroid.

235. Hertzman, A. B.
Total sweating rates in 5 subjects were very similar in comparable environments but the regional patterns of sweating were variable. There are some definite trends in the pattern however. The skin of the chest and abdomen sweated maximum along a zone just lateral to the midsternal line, the sweating rate then falling off to a minimum at the axillary line. Anterior and lateral aspects of the thigh and the whole calf showed a high sweating rate. At lower temperature the lower extremities tend to dominate sweating but trunk sweating increases relatively quickly with increase in total sweating rate.

236. Herzmann, J., Stembera, Z. K. and Vrchlabska, E.
Residual pregnanediol. ENDOKRINOLOGIE 38:67-69 (1959). (In German)
Material isolated from 25 liters of male urine and 25 liters menopausal urine was identified as pregnane-3α-20α-diol by Debye-Scherrer-Hull röntgenography.

Changes in urinary nitrogen and electrolyte excretion during stressful life experiences, and relation to thyroid function. J. PSYCHOSOM. RES. 1:177-184 (1956)
Increases in N and K excretion (but not in urine flow) were significantly greater in euthyroid than in hypothyroid subjects. This difference was less if the hypothyroid subjects were given (-)-trilodothyronine, i. v. It is suggested that the thyroid participates in rapid metabolic adjustment.
238. Heyrovsky, A.
New method for determination of inulin in plasma and urine. CLIN. CHIM. ACTA 2:470–474 (1956). (In English)

This is a rapid convenient method for determining inulin in plasma and urine. The reaction is based on the purple-violet color given by fructose and β-indolacetic acid in concentration HC1. The method is reliable for clearance studies, and in a number of experiments the error was about one percent.

239. Hiatt, H. H., Goldstein, M. and Tabor, H.

Using an enzymic spectrophotometric method for the assay of formiminoglutamic acid, small amounts were found in the urine of normal adults and children. A marked increase was found in the urine of patients with leukaemia after amethopterin (methotre xate) therapy.


241. Hoeprich, P. D.


The two steroids R3 and R4, previously described by de Courcy, et al. (1953) and which lack the Δ4-3-keto group, were identified as tetrahydrocortisol (5 β-pregnane-3α : 11β : 17α : 21-tetrol-20-one and tetrahydrocortisone (5 β-pregnane-3α : 17α : 21-triol-11-20-dione). The Δ4-3-ketone, X, is shown to be identical with Reichstein's compound E (Δ4 pregnane-11β : 17 α β 20β : 21-tetrol-3-one). X4 has chromatographic properties resembling Reichstein's compound U (Δ4-pregnane-17α : 20β : 21-triol-3 : 11-dione).
243. Honegger, C. G.
Volatile amines in human urine. HELV.
PHYSIOL. PHARMACOL. ACTA 14:C30–31 (1956). (In German)

244. Horton, E. W.
Human urinary kinin excretion. BRIT. J.

The isolated rat duodenum is relaxed by low concentrations (10 \mu g./ml.) of plasma and urinary kinin; vasopressin and oxytocin in large doses (100 m\mu/ml.) also relax the rat duodenum. This tissue contracts in the presence of ACh, substance P and 5HT. The use of rat uterus and rat duodenum in parallel assays using plasma kinin as a standard is described. This method will not distinguish between kinins of different origin. Studies of normal urinary kinin excretion are reported.

245. Horton, E. W.

A new method is described. When kallikrein is incubated with acid-treated dog plasma, the rate of plasma kinin (kallidin) formation is proportional to the concentration of kallikrein over the range 2.5–40 mM kallikrein/ml. plasma. The kinin is estimated on the isolated guinea-pig ileum and the amount of kallikrein is determined by referring to a standard curve. The 24 hour urinary excretion of kallikrein in one subject estimated by this new method, varied from 300–450 units, figures which fall within the range reported by previous workers using different methods.

Fifteen mental patients on a diet containing only 5.8 mg. niacin [NIA] and 265 mg. tryptophan [TRY] per 2300 cal. for 38 to 87 weeks showed no clinical evidence of pellagra. About 60 mg. TRY were equivalent to 1 mg. NIA, i.e. either of these amounts equals one "NIA equivalent." The level below which pellagra developed was 8.8 NIA equivalent for the first 2000 cal. with 0.44 equivalent for each extra 100 cal. Urinary excretions of NIA and TRY were little guide to their dietary supplies. N'-Methylnicotinamide excretion was an index of NIA-TRY availability but that for quinolinic acid was poorly related. TRY inlactalbumin and L-TRY were equally available for conversion to NIA. Ariboflavinosis was unaffected by low dietary levels of NIA, TRY or supplementary vitamin B₁₂. Scrotal dermatitis was consistently seen in ariboflavinosis.

247. Houghton, B. J. and Pears, M. A.

Rate of excretion of leucocytes and nonsquamous epithelial cells in normal subjects was 18,000-196,000 per hour. In 3 males no characteristic pattern of excretion was found over several days. Rate of excretion in some pathological urines is compared with normals.

248. Huis in't Veld, L. G.
Specificity of method of Klopper, Michie and Brown for determination of 5β-pregnane-3α, 20α-diol in urine. ACTA ENDOCR. (Copenhagen) 31:65-68 (1959). (In English)
249. Human, L. E., Middleton, M. and Geiger, E.
Effect of galactose ingestion on urinary amino acid excretion in rat. AMER. J. PHYSIO.

Groups of weanling rats were fed diets containing various levels of galactose or glucose or both. The excretion of amino acids was not affected by the type or quantity of ingested carbohydrate. It seems likely, therefore, that the aminoaciduria observed in galactosaemic infants must be due to some cause other than the toxic effects of galactose itself or a competition for the renal reabsorption mechanism.

250. Hunt, J. N.

No relationship could be demonstrated between the urinary output of acid and the acidity or alkalinity of the ash of the diet, but variation of the dietary content of S caused changes in the urinary output of acid which corresponded with changes in the output of SO4. There was a correlation between the mean daily output of Ca and that of titratable acid.

251. Hurlock, B. and Talalay, P.

The method depends on the selective oxidation or reduction of hydroxy- or ketosteroids by highly purified hydroxysteroid dehydrogenases of bacterial origin. The method can estimate 3 α-hydroxysteroids, 3 β- (and 17 β-) hydroxysteroids, 3-ketosteroids and 17-ketosteroids. Using microcells and a Beckman DU spectrophotometer, 0.2-0.5 μg. steroid may be assayed with an accuracy of a few percent in a reaction volume of 0.2 ml.
252. Hurlock, B. and Talalay, P.
Enzymic estimation of steroids in human urine.

Methods for the determination of $\alpha$- and $\beta$-hydroxysteroids in 25 ml. of urine are given. They depend on the use of $\alpha$- and $\beta$-hydroxysteroid dehydrogenases in the presence of DPN as H acceptor and the measurement of DPNH. Pure steroids added to urinary extracts were measured with 93 percent accuracy and the linear relation between amount of urine extract and optical density confirm the reliability of the method. Normal men excrete 42 $\mu$moles of $\alpha$- and 6 $\mu$moles of $\beta$-hydroxysteroids daily, on the average, and normal women 44 and 8 $\mu$moles daily. Examples are given of the excretion in abnormal patients and of the use of the method in assaying urinary steroids separated by paper chromatography.

253. Hutchinson, W. P.

254. Ingle, D. J., Meeks, R. C. and Humphrey, L. M.

Both normal and adrenalectomized rats (the latter receiving 4 ml. of adrenal cortical extract daily) exhibited the same general pattern of response to cold and of recovery at normal temperature. During exposure to cold (as low as 1°C.) the rats lost weight and excreted increased amounts of nonprotein nitrogen and K. These changes were reversed when the temperature was elevated to 26°C. When the temperature was elevated from 1°C to 26°C., all of the rats showed a sharp increase in weight and a decrease in sodium and chloride excretion. This response lasted for only 24 hours. The metabolic responses to cold, which occurred in the absence of the adrenal glands, must represent extra-adrenal regulatory mechanism.

Ingestion of NH₄Cl in human subjects increased the excretion of Mg. In mild acidosis, carbonic anhydrase inhibition with acetazolamide decreased Mg excretion. KC1 ingestion had no consistent effect. Infusion of MgSO₄ decreased K output but did not appear to modify the normal diuresis which follows carbonic anhydrase inhibition.

256. Jackson, S. H.

The usual electrophoretic fractions of serum proteins, obtained by the starch block technique, were examined further by DEAE-cellulose chromatography and by starch gel electrophoresis. Twenty-two different serum proteins were distinguished by the combination of starch block electrophoresis and DEAE-cellulose chromatography. The application of DEAE-cellulose chromatography to the resolution of urinary proteins was described. The examination of urines from patients with severe burns was reported.

257. Jacobsen, E.
Determination of 2-methyl-2:4-pentane diol (hexylene glycol) in urine of man and rats. ACTA PHARMACOL. (Copenhagen) 14:195–206 (1958) (In English)

The method described allows the recovery of 70 to 100 percent of hexylene glycol in urine.
258. Jahnke, K. and Heinzler, F.
Ultraviolet absorption of isolated serum and urine 
proteins. SCHWEIZ. MED. WSCHR. 87:1559-1562 
(1957). (In German)

Ultraviolet absorption curves of isolated serum and urine proteins in 0.05 N NaOH 
showed two absorption maximums at 284 and 250 m\(\mu\), with the exception of albumin 
with its low tryptophan content which had a peak at 292 m\(\mu\). Examination of the u.v. 
absorption (260–310 m\(\mu\)) of isolated globulins in \(\gamma\)-hyperglobulinaemic, plasmocytoma 
and Bence-Jones proteinuria did not reveal essential or consistent changes; however, 
macroglobulins did show changes in the absorption coefficient associated with low 
tryosine and tryptophan content. The clinical significance of such determinations is 
discussed.

259. Januszewica, W. and Wocial, B.
Estimation of catecholamines in urine by 
fluorometric method. ENDOKR. POLSKA 

Urinary phenolic steroids. I. Determination. 
CLIN. CHIM. ACTA 4:276–296 (1958) 
(In French)

The conjugated oestrogens are hydrolysed by \(\beta\)-glucuronidase and arylsulphatase. 
The ethereal extract is washed with \(\text{Na}_2\text{CO}_3\) and separated into neutral and phenolic 
fractions with N NaOH. The purified phenolic extract is measured photometrically by 
which oestriol, oestrone and oestradiol–\(17\beta\) are estimated, at 476, 516, and 556 m\(\mu\). 
The method is accurate and specific when the content of phenolic steroids is 
30 \(\mu\)g./1000 ml. or more. Average recovery of added oestrogens: 82 percent for 
oestriol, and 72 percent for oestrone (when a saponification procedure is used). 
Below 20 \(\mu\)g./1000 ml. the method is no longer specific.

261. Jayle, M. F., Scholler, R. and Veyrin- 
Forrer, F.
Urinary phenolic steroids. II. Clinical 
applications. CLIN. CHIM. ACTA 4:401-410 
(1959). (In English)
262. Jayle, M. F., Judas, O., and Crepy, O.
Methods for estimation of urine pregnanediol.

The method involves butanol extraction, enzymic hydrolysis and chromatography. If the butanol extraction is omitted then the determination becomes less accurate but nevertheless is still sufficient for clinical purposes. These methods are well adapted to functional studies of corpus luteum activity.

263. Jensen, C. C.
Quantitative determination of some tetrazolium salt-reducing adrenocorticoids in human urine.
ACTA, ENDOCR. (Copenhagen) 30:222–230 (1959) (In English)

A method is described for the quantitative extraction without previous hydrolysis of a group of urinary neutral ether-solution steroids, which reduce 2,3,5-triphenyltetrazolium chloride. Normal values for 24 hour excretion in 108 females and 86 males are given. Examples are given of the H$_2$SO$_4$ absorption spectra in spontaneously increased excretion of tetrazolium salt-reducing substances and in cases of increased excretion during ACTH treatment. Differences in the content and distribution of 17-oxy and 17-deoxycorticoids under various conditions are noted.

264. Jensen, K. B.
Slow contracting substances in human urine.

A method is described for purifying the rat uterus-stimulating component in human urine and absorption on Al$_2$O$_3$ or paper pulp allowed the separation of 2 fractions. The recovery from Amberlite IRC-50 columns is discussed. Butanol extracts of urine were more stable than urine.
On investigation of eccrine and apocrine human thermal sweat in 18 subjects a higher content of mucoproteins was found in apocrine sweat in the majority of subjects. This finding is consistent with the different mechanisms of action of the two types of gland.


I. The new method of analysis is based on the Zimmerman reaction without correction for non-specific chromogens. Evidence is presented that the simplifications involved are justified. Good results are obtained in all samples of urine regardless of the level of 17-ketosteroid excretion. The accuracy of the analysis is of the same order as of routine total 17-ketosteroid estimations. The method allows of the adoption of fractionation of the urinary 17-ketosteroids as a clinical routine method. II. Results of the analysis of samples from 215 normal individuals are presented, together with average values and the normal range for the excretion of various 17-ketosteroids fractions for men and women in all age groups. Androsterone usually constitutes a smaller fraction of the 17-ketosteroids in women than in men, and in old men than in young men. The significance of these results is discussed.
268. Johnsen, S. G.


After castration of male subjects the excretion of androsterone is decreased to a greater extent than the total 17-ketosteroid output. Fractionated 17-ketosteroid analyses in 29 cases of male hypogonadism, 11 patients with pituitary diseases, 21 hirsuto women, and 3 cases of liver cirrhosis are presented. The results indicate the superiority of the method and the applicability as a clinical routine. The detailed advantages of the method are described.

269. Johnsen, S. G.

Clinical routine method for quantitative determination of gonadotrophins in 24-hour urine samples.

II. Normal values for men and women at all age groups from prepuberty to senescence. ACTA ENDOCR. (Copenhagen) 31:209-227 (1959).

(In English)


A study was made of the excretion of pyridoxine, pseudopyridoxine, and 4-pyridoxic acid in the urine and sweat of four men subjected to a hot, moist environment. Over 85 percent of the total pyridoxine and metabolites excreted in the urine was in the form of 4-pyridoxic acid; 4 to 5 percent was pyridoxine, and 7 to 8 percent was pseudopyridoxine. The percentage composition of these 3 compounds in sweat was similar to that in urine. Total amounts of pyridoxine and its metabolites present in sweat appears to be too small to have any significant influence on the pyridoxine requirements of persons sweating profusely throughout the day.

No difference in choline loss through sweat in a hot, moist atmosphere in comparison with the loss in normal air.

The excretion of nicotinic acid, nicotinamide, nicotinuric acid, and N¹-methylnicotinamide by normal individuals. J. BIOL. CHEM. 159:231, Jun 1945.

The amounts of nicotinic acid and its metabolites present in sweat are too small to have any significant influence on the nicotinic acid requirements of persons subjected to profuse sweating throughout the day.

The excretion of folic acid through the skin and in urine of normal individuals. J. BIOL. CHEM. 159:425, Jul 1945.

Folic acid is excreted in human sweat. It is excreted in larger quantities under conditions of profuse sweating.

A method is described by which chloroform extracts of hydrolysed urine are chromatographed on silicic acid and graphs are presented relating eluate fraction number against ultraviolet absorption at 240 mμ and against Tetrazolium-Blue reduction. The procedure satisfactorily measures known amounts of deoxy- and dehydrocorticosterone, corticosterone, cortisone, cortisol, and Reichstein's compound S added to the chloroform extract. Illustrative graphs of results with various urine samples are given.

275. Johnson, R. E., Sargent, F. II, and Passmore, R.

Urinary ketone excretion rates under post-absorptive conditions differed significantly in summer and winter, the mean rates being 0.9 μmol./min. in hot weather and 2.8 μmol./min. in cold weather. Mean serum ketone level was 0.7 mmol./l. regardless of season. The suggested upper normal limits are 1.4 mmol./l. for serum and 5 μmol./min. for urine.

276. Johnson, R.

277. Johnson, W. D.
278. Jones, G. M.

AIRCREW FATIGUE IN LONG RANGE MARITIME RECONNAISSANCE. VII. STUDY OF RENAL EXCRETION OF UROPEPSINOGEN. RAF Inst. of Aviation Medicine (Gt. Brit.), Farnborough; issued by Flying Personnel Research Committee (Gt. Brit.), rept. no. FPRC 907.7, Aug 1956, 11p. ASTIA AD-112 724.

An increase in the rate of renal uropepsinogen excretion was found in 16 active aircrew members during test days (those including a 15-hour night sortie) as compared to rest days. No significant trend in the rate of excretion was detected either from beginning to end of the nine-day test period, or from beginning to end of a sortie. There was, however, a significantly greater water output during the first five hours than during the remainder of the sortie, a finding thought to reflect, in part, a general disincarnation for food and drink as a sortie progresses. It is concluded that, in the absence of any other obvious cause, the increased uropepsinogen excretion on test days may reflect in some measure the arduous or fatiguing nature of the operational experiences encountered.

279. Jones, R. V. H. and de Wardener, H. E.

Urine concentration after fluid deprivation or pitressin tannate. BRIT. MED. J. 1:271–274 (1956).

In 49 normal subjects (41 male, 8 female, average age 24 years) urine osmolarity was greater, and solute output and urine flow less, after 48 hours dehydration than after 5 units of pitressin tannate in oil subcut. Difference in osmolarity does not depend on rate of solute output, or on quantity or quality of pitressin administered. It is concluded that a factor other than the anti-diuretic hormone, or rate of solute output, is concerned in concentrating the urine during dehydration.
280. Irvine, W. T., Duthie, H. L. and Waton, N. G.


The rise in excretion of free histamine in urine after ingestion of a meat meal is similar in amount and duration to the rise obtained when the approximate (-)-histidine content of the meal is given instead of the meal itself. Previous reduction of the bacterial content of the intestine (with succinylsulphathiazole in man, and with chlortetracycline in dogs) significantly diminishes these rises. Succinylsulphathiazole and chlortetracycline do not prevent absorption of histamine from the intestine, nor do they prevent decarboxylase in the tissues from converting histidine to histamine in vitro.

281. Ishihara, I., Sak5, Y. and Ishigaki, K.

URINARY CATECHOLAMINES AND 17-OHCS EXCRETIONS AFTER MUSCULAR EXERCISE.

282. Iuchi, I. and Shibata, S.


The sugars in 10 µl of urine-buffer mixture were separated by paper electrophoresis at high V, and the color developed with silver solution. Diabetic urine showed 3 distinctively separated bands, which were glucose, uric acid, and urea-creatinine. Glucose, fructose, ribose, rhamnose, lactose, maltose, sucrose, glucuronic acid, and glucosamine could easily be identified by this technique. Sorbose and xylose were difficult to differentiate from glucose. Overlapping was seen with the bands of galactose and fructose, and ribose and mannose. The method is rapid and only small amounts of urine are needed.
283. Kandráč, M.
Excessive α-ketoglutarate excretion in urine —
new metabolic abnormality? CAS. LÉK. CES.

284. Kapeller-Adler, R. and Renwick, R.
Enzymic breakdown of histamine and cadaverine
in human serum and urine. CLIN. CHIM. ACTA

A slightly modified micro volumetric technique has shown that "histaminase" and
"cadaverinase" occur in normal male and female serum and urine in minute amounts.
Increased serum histaminase activity was found in 4 patients with thyrotoxicosis, in a
myxoedema patient treated with thyroxine, and in a case of diabetes. In normal preg-
nancy, serum and urine histaminase and cadaverinase values were increased. In some
case of pre-eclamptic toxaemia the serum and urinary histaminase tended to be low.
The cadaverinase values in some such cases were normal.

285. Kapeller-Adler, R. and Iggo, B.
Histamine and its derivatives in human urine.

Ion exchange and paper chromatographic techniques are used in the isolation of
iminazole compounds from human urine. Two new pharmacologically active compounds,
N-methylhistamine and N-dimethylhistamine, were identified, as well as histidine,
histamine, and acetylhistamine. The 2 compounds, and also acetylhistamine, were
not attacked by the histaminase of pig kidney, but partially inhibited the enzymic de-
gradation of histamine itself.

286. Karki, N. T.
Urinary excretion of noradrenaline and adrenaline
in different age groups, its diurnal variation and
effect of muscular work on it. ACTA PHYSIOL.
SCAND. 39(132):7–96 (1956). (In English)
Kechek, A.
Determination of amount of protein in blood serum fractions and in urine using stable standard turbidity. LABOR. DELO 5:15-17 (1956). (In Russian)

Kellie, A. E. and Wade, A. P.

A method for the separation of these is described based on acetylation of an ether/ethanol extract of unhydrolysed urine to which (NH₄)₂SO₄ had been added. Acetylation renders the glucuronides water insoluble and soluble in organic solvents without affecting the sulphates. The sulphate and glucuronide fractions were each hydrolyzed with acid and studied by gradient elution from an alumina column. Ten peaks could be separated, 7 of which are identifiable by paper chromatography. The distribution of the total ketosteroid among these peaks differed in detail from that obtained when the glucuronide was separated from sulphate enzymically but the general pattern was the same. Results of the analysis in this way of 6 urine samples (3 from men and 3 from women) are reported. Androsterone plus aetiocholanolone accounts for most of the total ketosteroid, usually about 40-60 percent as glucuronide and 5-10 percent as sulphate. The other steroids were present in more variable proportions, dehydroisoandrosterone being usually the next in amount chiefly as sulphate.

Kellie, A. E. and Wade, A. P.

An improved method is described for the analysis of the 17-oxosteroid fraction of urine. It avoids formation of artefacts during hydrolysis of conjugates and gives better separation of individual 17-oxo steroids.
290. Kellner, K., Ley, H. and Stark, T.  
A method for the estimation of cystine in urine is described. The urinary excretion of cystine and the total S excretion in urine in 24 hours were determined in normal subjects and in patients with malignant and non-malignant disease, both under normal conditions and following the oral administration of 2 g. of cystine. Variation in total S excretion was considerable and a statistical difference between the groups was not established. However, following loading with cystine the urinary S excretion in the malignant group < the normal group. Possible reasons for this difference are discussed.

291. Kerby, G. P.  
Acid mucopolysaccharides have been isolated from urine and an unsuccessful attempt to relate these to a chondroitin sulphate-like substance found in leucocytes was made.

292. Kerp, L., Merker, H. and Frey, J.  
Method and diagnostic value of enumeration of the cellular elements in urine. KLIN. WSCHR. 34:1147–1151 (1956). (In German)  
Some modifications of the present methods for enumerating cellular elements in urine are described. The values are expressed in cells per min., using 3 hour urine samples. The normal r.b.c. excretion in 123 healthy subjects ranged from 0–1850/min. mean = 730/Min. W. B. C. excretion was 0–2250/min. mean = 990/min. R. B. C. or w.b.c. excretion of more than 2000 or 4000/min. respectively is pathological. Five examples of pathological cellular excretion are described.
Kessler, G. and Schmidt, E. G.  

Methods are described for the microbiological determination of phenyl-lactic, p-hydroxy-phenyl-lactic and indole-3-lactic acids in urine. The volatile phenolic and aromatic hydroxy-acid fractions were determined chemically with the Folin-Ciocalteau reagent. While individual urines usually showed wide variations in these constituents, no obvious chemical differences between the urines from white and negro subjects were found.

Keutel, H. J., Schweispurth, R. and Litos, M.  

Kimmig, J., et al.  
N-(β-indolyl-3-acryloyl)-glycine isolation from urine and synthesis. PHYSIOL. CHEM. 311:234–238 (1958). (In German)

The compound is the chromogen which forms a red dye solution in amyl alcohol, when urine is acidified with concentrated HC1.

King, J. S., Jr., et al.  

TNDS of normal human urine were recovered by lyophilisation and found to be 433 ± 114 mg./24 hr. Approximate composition of TNDS was: protein 47 percent, protein-bound hexose 16.6 percent, sialic acid 9.7 percent, hexosamine 6.2 percent, lipids 3.3 percent, 'bound' water 12.2 percent, ash 8.5 percent.
The non-ultrafiltrable, buffer-solution (veronal pH 8.6) fraction (Fraction RS-1) of normal human serum is subjected to the first steps of Cohn's method 10. Three distinctly different apparently reproducible fractions were obtained. It was not possible to separate mucosubstances from proteins by this method. Data suggest RS-1 solids are almost entirely mucosubstances.

Separation of the ultrafiltrable fraction of the total non-dialysable solids of the normal urine into 6 arbitrary but reproducible subfractions is reported. 24 hour excretion rates and overall chemical composition of these subfractions is presented.
301. Kirby, J. K., Pelphrey, C. F. and Rainey, J. R., Jr.

Improved diacetylmonoxime method for determination of urea in blood and urine.

Blood serum is deproteinized with TCA, and the resulting filtrate heated for 30 min. with diacetyl monoxime reagent in the presence of perchloric acid until a stable yellowish color develops. The color is measured at 470 mμ. This method is simple and reliable and suitable for routine use: it compares well with the conventional urease method.

303. Kleeman, C. R., Bass, D. E. and Quinn, M.

Thermal sweat collected by arm bags from male subjects exposed for weekly periods of 1 to 1-1/2 hours to a temperature of 120°F. was found to be a moderately acid secretion, low in ammonia and titratable acid. Administration of a carbonic anhydrase inhibitor (6063), sodium bicarbonate, or ammonium chloride did not alter the acid-base composition of sweat regardless of changes in composition of extracellular fluids and urine. It is concluded that sweat glands have no regulatory role in the maintenance of the hydrogen-ion concentration of body fluids.

304. Kligman, A. M. and Shelley, W. B.

Surface lipids do not control the output of sebum by the sebaceous gland, nor does sweating promote the delivery of sebum. The muscles of piloerection are unable to propel sebum to the surface nor does emotion influence the output of sebaceous glands.

306. Klopper, A. I. and MacNaughton, M. C.

Pregnanediol was isolated from liquor amnii and feces and identified by the ultraviolet spectrum of its solution in H$_2$SO$_4$. The steroid isolated from bile after injection of progesterone was identified by melting point, and the quantitative relationship between injection progesterone and the biliary excretion of pregnanediol was determined.

307. Knappe, E. and Böckel, V.
(In German)

A simplified method for urinary Ca is described. Interfering anions are removed by cation exchange and Ca titrated complexometrically using Fluorexon or Calcein as indicator. Average error is ± 0.34 mg. Ca/100 ml. of urine.

308. Knorr, D.
Acid phosphatase in urine of yound male persons. KLIN. WSCHR. 36:760-763 (1958) (In German)

At puberty there is a large increase in urinary acid phosphatase. This is attributed to the commencement of active secretion by the prostate.

309. Knudsen, E. A.
(In Danish)
310. König, M. P.
Simple method for estimation of sugar in urine.
"Testape". SCHWEIZ. MED. WSRHR. 86:1028
(In German)

311. Kornel, L. and Wroclaw, M. D.
Renal clearance of free and conjugated 17-hydroxy-
corticosteroids in normotensive and hypertensive
subjects. LANCET ii:775–776 (1957).

312. Kovach, R. D., Carvalho, H. N. and Almeida, S.
[Experience with Sternheimer-Malbin stain
in the examination of urinary sediment]

313. Kovacs, B. A. and Melville, K. I.
The presence in normal human urine of a sub-
stance or substances antagonizing histamine,
5-hydroxytryptamine, and acetylcholine
(preliminary report). CANAD. J. BIOCHEM.
40:147–151, Jan 1962.

Phenolic acids in urine in phaeochromocytoma.
KLIN. WSRHR. 37:76–80 (1959). (In German)

Certain phenolic carboxylic acids found in normal urine as well as in phaeochromo-
cytoma may be increased in acute attacks, when they may also be accompanied by an
unidentified additional acid.
Lehmann's method of converting LA to pyruvic using the LA dehydrogenase of yeast has been combined with Šrskov's method for extraction of the LA with ether as a preliminary. In trial recovery estimations there were considerable losses unless this extraction was adopted. The method was satisfactory for 0.5 ml. of finger capillary blood and for duplicate estimations the scatter was ±3 percent; for urine it was somewhat greater.

Krejci, E., et al.
(In Czech)

Urocanic acid, an important intermediary product in histidine metabolism, can be simply determined polarographically. This acid gives an easily measured wave at pH 4.7 in an acetate buffer which can be used for analysis. The suggested method has been tested in analyses of human sweat. In this case it is sufficient to mix the sweat with the acetate of biological material, where interfering substances may occur, the acid can be determined polarographically after chromatographic separation. An unknown substance in sweat, giving a positive polarographic wave, has also been discovered. On storage of sweat this substance accumulates.

Krzemicka, J.

The Wilson and Fairbanks test and the Zimmerman reaction were applied to the extracts. Colors were obtained which approximate closely to the spectrum given by oxidised androsterone. Large amounts of various 17-hydroxysteroids (not hydrolysed by cold HCl) occur in the animal urines.
318. Krzymien, H.


319. Kunin, C. M

The quantitative significance of bacteria visualized in the unstained urinary sediment.

320. Kutter, D.


321. Kuz'mina, Yu. L. and Dyudyaev, V. V.

Quantitative assay of sugar in urine by titration.
SBORN. NAUCH. TRUD. IVANOV. MED. INST. 12:478–482 (1957). (In Russian)

Althausen's method gives very low results if the sugar content is high, and slightly high ones if it low. The conditions for titrating with Fehling's solution are worked out; the results are then reproducible, and are comparable with those found by polarimetry.

322. LaBrosse, E. H. and Mann, J. D.

323. Langecker, H.
Determination of dehydroepiandrosterone in urine.
ACTA ENDOCR., Kbn., 23:72–78 (1956). (In German)

The distribution of the color between the α and β fractions in the color reactions of Zimmermann and Pettenkofer with dehydroepiandrosterone was investigated in the ketonic fraction of 11 normal urines after careful acid or sulphatase hydrolysis. The same values were obtained with both methods of hydrolysis. A method using digitonin to precipitation dehydroepiandrosterone is described and this procedure is recommended for the determination of the Pettenkofer color reaction in the ketonic fraction.

324. Langston, J. B. and Guyton, A. C.
Effect of adrenaline on the rate of urine formation.

Adrenaline and noradrenaline affect urine formation by increasing the arterial pressure, which indirectly increases urinary output, and by acting directly on the kidney to decrease the output. When arterial pressure was held constant only the direct effect was evident.

325. Lansoni, E., Amore, P. and Colombo, O. P.

326. Lapin, L. N.
Colorimetric determination of traces of Cu in blood, urine and tissues with diphenylcarbazone.

The complex formed on treating the ashed material with diphenylcarbazone is extracted into benzene and assayed at 540 mμ. Microgram amounts can be determined to ± 3 percent.
327. Lathem, W.

Excretory rate of free Hb increased linearly with plasma concentration of the free unconjugated form. Calculation gives a GFR of 5 ml./min./1.73 m.$^2$ body surface equally 5 percent of insulin clearance. Maximum possible tubule reabsorption was 1.0 ml./min./1.7 m.$^2$ body surface and therefore too small to give conclusive evidence as to reabsorptive activity.

328. Leon, Y. A., Bulbrook, R. D. and Greenwood, F. C.

Preliminary experiments are described.

329. Lepp, A.

330. Leverton, R. M., Waddill, F. S. and Skellenger, M.

Quantitative microbiological assays are presented for the free or total threonine, valine, tryptophan, leucine, phenylalanine, and tyrosine in the urine of young women on a known amino acid intake. The subjects consumed semi-purified diets containing known amounts of crystalized amino acids and diammonium citrate as the chief N sources. Relatively large changes in intake effected only small changes in urinary amino acid excretion. The existence of individual excretion patterns is confirmed.
331. Levey, S. and Keonig, S.

Quality control standards were prepared by passing urine over a column of Amberlite IR 120, and then adding weighed quantities of NaCl, KCl and CaCO₃.

332. Levinsky, N. G. and Berliner, R. W.

When ureter and bladder of dogs are perfused at flow rates of < 1 ml. per min. movements of H₂O, urea, Na, K, Cl, creatinine and H occur, the magnitude of the movement increasing as the concentration gradient and are unaffected by antidiuresis, anaesthesia or surgical manipulations. With a flow rate of 0.1 ml./min. osmolarity may decrease by 10 percent and urea concentration by 15 percent. Urine allowed to collect in the bladder for 30 min. shows a 50–100 percent greater change.

333. Lewis, B. and Richards, P.

A turbidimetric method is recommended.

334. Lewis, P. R., Lobban, M. C. and Shaw, T. I.

Eight human subjects lived on a 22-hour day for six weeks. In only one subject did the pattern of urine flow indicate a complete adaptation to the environmental time-scale, and in one other there was some evidence for a progressive improvement in adaptation to a 22-hour routine during the course of the experiment. In the other six subjects the inherent 24-hour rhythm of urine production was maintained throughout the experimental period.
335. Lindberg, W.


The daily excretion of N-methyl-2-pyridone-5-carboxylic and -5-formamidoacetic acids in normal urine was 3-6 mg. and 8-12 mg. respectively. Both substances were isolated. Feeding trigonelline, nicotinic acid, nicotinuric acid or 6-hydroxynicotinic acid did not significantly alter the excretion of these pyridones.

337. Ling, N. R.
Spectrophotometric estimation of urinary taurine.

All amino acids except taurine are removed from 2 ml. of human urine by treatment with the resin "amberlite" IR 112 (H). The resin is removed by filtration and the taurine in 0.5 ml. of the filtrate is converted into the dinitrophenyl (DNP) derivative by treatment with fluorodinitrobenzene. The DNP derivative is purified by extraction with ethylene dichloride and aniline and estimated by reading the optical d at 360 μ.

338. Lisowski, Z. and Trazaski, M.
New reagent for sugar detection in urine.
FARM. POL. 14:99-100 (1958). (In Polish)

An aqueous solution of a mixture of CuSO₄, lactic acid, and NaOH proved a sensitive reagent for detecting sugar in urine by giving a red precipitate.
Chemical identification of aldosterone in post-operative urine. CLIN. CHIM. ACTA
1:236-241 (1956).

Collections of urine (24 hr.) from 80 patients in the early postoperative period were
acidified to pH 1 and extracted with CHCl$_2$. Aldosterone from the pooled sample was
chemically identified by conversion to the characteristic $\gamma$-lactone which was obtained
crystallly.

340. Lloyd, D. P.
Action potential and secretory potential of sweat
glands. PROC. NAT. ACAD. SCI. USA

341. Lloyd, D. P.
Temperature and the action of sweat glands.
PROC. NAT. ACAD. SCI. USA 47:358-362,

342. Loraine, J. A.
Quantitative determination of pituitary gona-
dotrophins in urine. ACTA ENDOCR.
(Copenhagen) 24(31):75-84 (1957). (In English)

343. Loraine, J. A.
Some observations on clinical value of pituitary
gonadotropin assays in human urine. In: CIBA
FOUNDATION COLLOQUIA ON ENDOCRINOLOGY.
HUMAN PITUITARY HORMONES. Ciba Foundation,
344. Lozenov, S.
(In Bulgarian)

345. Lugg, J. W. H., Bowness, J. M.
Relationships between twenty-four hourly urinary outputs of 17-ketosteroids and creatinine, and weights of twenty adult male subjects from each of six ethnic groups. AUST. J. EXP. BIOL. MED. SCI. 35:395-416 (1957).

Estimates of the weight in kg. \([W]\), of the 24-hour urinary output of creatinine in g. \([C]\) and of 17-ketosteroids in mg. \([K]\) were made for 20 adult male subjects from the Chinese, European, Indian, Malay, Negrito and Senoi ethnic groups resident in Singapore and the Federation of Malaya. \(W\) and \(C\) are approximately normally distributed within the groups and \(K\) appears to be approximately log-normally distributed. The correlation within ethnic groups and overall between pairs of variates suggests that the compound variates \(\log (K + 1)/W\) and \(\log (K + 1)/C\) may be useful in assessing the status of a subject with respect to 17-ketosteroid output. There is a low probability that the sampler from the 6 ethnic groups could all have been drawn from the same, normally distributed, population.

Heat, salt and hormones in panting and sweating animals. NATURE 182:672-673 (1958).

Evaporative cooling in animals is related to Na excretion. Na is retained by the kidney in man during sweating, but panting sheep which are distilling water from the respiratory surfaces eliminate Na in their urine while panting, in compensation for the water loss. In both man and sheep extracellular water is mobilized more easily from other sources in summer than in winter. In both man and sheep urinary flow diminishes on heating and may fall to 0.2 ml./min. before antidiuretic substance is detectable in the plasma.
347. Machattie, L. A.

348. Mai, L. A.
A simple and rapid method is described. The acid is reduced in alkali, and the resulting dark-blue complex titrated with ferricyanide. The ferricyanide is standardized against Li urate. The error does not exceed ± 5 percent. L-ascorbic acid, of all the substances present in normal urine, is the only one that interferes, and then only if it is present in large amounts.

349. Malangeau, P.
Cyclohexitols present in human urine. BULL. SOC. CHIM. BIOL. (Paris) 38:729–741 (1956). (In French)
Ion exchange resins were used to concentrate hexitols in the urine. Thus 100 ml. of urine yielded 40 mg. of extract the composition of which could be studied by paper chromatography. Examination of 200 urines from human adults of both sexes showed the presence of mesoinositol in every case. Sixty-seven percent of the urines analysed also contained scyllitol. The elimination of these two isomers is similar for both sexes, and their presence does not seem to show any seasonal or dietary fluctuations.

350. Malhotra, M. S.
Salt requirements in the tropics during summer. NATURE 182:1036 (1958).
Unacclimatised persons living in the tropics secrete more NaCl in sweat than acclimatised persons under the same conditions. A daily intake of 15 g. NaCl for manual workers and 6 g. NaCl for sedentary workers is adequate for acclimatised people. Low incidence of hypertension in India is due rather to heavy loss of NaCl in sweat than low NaCl intake.
351. Marcotte-Boy, G., Henry, R. and Issartel, R.
Estimation of urinary hexosamine. BULL. 
(In French)

The hexosamine content of normal urine may be separated into 3 fractions, a dialysable 
fraction, a fraction which can be prepared by 76 percent aqueous ethanol and a fraction 
which can be prepared from the ethanolic supernatant by CaC\textsubscript{2}. In normal subjects, 
the relative proportions of these fractions are constant.

352. Markham, R. L., Jacobs, J. H. and 
Fletcher, E. T. D.
Zone electrophoresis of serum and urine at pH 
4.5 and its application to isolation and investi-
gation of mucoproteins. J. LAB. CLIN. MED. 

Zone electrophoresis on filter paper at pH 4.5 enables 2 mucoprotein fractions — 
M1 and M2 — to be isolated in serum and urine. In both serum and urine, the mucoprotein 
fractions form a part of the $\alpha_1$ and $\alpha_2$ fractions on electrophoresis at pH 8.6. 
Two fractions occur in urine with mobilities at pH 4.5 $>$ that of M1 and their positions 
in the pattern at pH 8.6 are demonstrated. A method is suggested for the semiquan-
titative estimation of the mucoproteins of serum based on their isolation by zone electro-
phoresis and subsequent staining. In pathological serum and urine both mucoprotein 
fractions show marked heterogeneity, but in normal serum, M1 appears to consist of 
one component.

353. Marks, V.
Improved glucose-oxidase method for determining 
blood, c. s. f. and urine glucose levels. CLIN. 
CHIM. ACTA 4:395–400 (1959). (In English)

This method uses glucose-oxidase and peroxidase, and is simple, rapid, and accurate. 
Glucose and non-glucose reducing fractions were compared before, during, and after 
insulin, showing that non-glucose reducing substances in blood are diminished by in-
sulin over a prolonged period.
354. Marquardt, P. and Meyer, H. J. 
Diagnosis of phaeochromocytoma. MUNCH. 
(In German) 
Methods for and results of determinations of catechol amines in urine are discussed.

355. Marrian, G. F. 
Newly discovered urinary oestrogen metabolites. 
(In English)

356. Marrian, G. F. 
Urinary oestrogens and their quantitative 
A review.

357. Martin, H. E. and Jone, R. 
Effect of ammonium chloride and sodium 
bicarbonate on urinary excretion of magnesium, 
calcium and phosphate. AMER. HEART J. 
Six normal subjects showed mean or average increases which were significant in 
urinary output of Mg (+ 4.99 mequiv.). Ca (+ 22.86 mequiv.) and phosphate (+ 18.2 mM) 
during 5 days of ingestion of NH₄Cl (8 g.). During ingestion of NaHCO₃ (8 g.) there 
was a mean decrease over the control period which was statistically significant only 
for urinary output of Ca (−3.81 mequiv.).

358. Mattace, R. F., Santamaria, R., Sarto, G. 
[Denaturation of proteins by urea at an elevated 
pH] BOLL. SOC. ITAL. BIOL. SPER. 
35:840–844, 31 Jul 1959. (In Italian)
359. Matsch, E. and Graf, F.
Estimation of p-hydroxypropiophenone in urine.
BULL. SOC. CHIM. BIOL. (Paris)

A colorimetric method for the estimation of p-hydroxypropiophenone based on Molisch's reaction ($\alpha$-naphthol and concentrated $H_2SO_4$) is described. The method is suitable for studies of reabsorption and excretion.

TUMORI 45:229-250 (1959). (In Italian)

I. The stability of the G was shown by the fact that the activity of the enzyme remained unaltered during the day. In cases of malignant tumor of the bladder the G content of the urine is higher than in normal persons.

II. G activity in urine of 8 members of 3 different groups of persons was determined: (1) tumor free workers manufacturing benzidine, (2) workers who had been transferred several years previously from the benzidine department and (3) normal subjects. G activity was markedly increased in those exposed to the aromatic amine while in those no longer exposed it was practically normal. Increased enzyme activity (a) is dependent on the penetration of benzidine in the body (b) is not dependent on the presence of a vesical tumor and (c) precedes the possible occurrence of such a tumor. Some prophylactic and therapeutical aspects of vesical tumors are discussed.

361. Mattice, M. R.
Appendix - Resume of Normal Data. In:

Analysis of Normal Sweat

<table>
<thead>
<tr>
<th>Analysis of Normal Sweat</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Solids</td>
<td>0.04-0.86 percent</td>
</tr>
<tr>
<td>Total N</td>
<td>0.3 gm./day</td>
</tr>
<tr>
<td>NH$_3$-N</td>
<td>4.7-6.0 mg./100 ml.</td>
</tr>
<tr>
<td>Total Volume</td>
<td>100-500 ml./day</td>
</tr>
</tbody>
</table>
Analysis of Normal Swcrt

NPN | 32–67 mgm./100 ml.
Urea N | 20 mgm./100 ml.
Amino N | 6–8 mgm./100 ml.
Chloride | 4–6 mgm./ml.
pH | 6.1–6.6
Sugar | 12–20 mgm./100 ml.

Physical Characteristics of Urine and Feces

<table>
<thead>
<tr>
<th>Urine</th>
<th>Feces</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percent Water</td>
<td>90 – 95</td>
</tr>
<tr>
<td>pH</td>
<td>5.5–8.0</td>
</tr>
<tr>
<td>Total Solids</td>
<td></td>
</tr>
<tr>
<td>Freezing Point</td>
<td>-1.0 to 2.5°C.</td>
</tr>
</tbody>
</table>

362. Mattox, V. R. and Lewbart, M. L


Aldosterone present in urine was determined by acid hydrolysis of the aldosterone conjugate, CHCl extraction followed by successive chromatographic separation from other steroids in (1) formamide-CHCl, (2) formamide-butylacetate-water and (3) ethyl acetate-toluene-benzene-water, and estimation by the color and fluorescent intensity of the spots after alkaline blue tetrazolium treatment of the final chromatogram. Between 5–10 µg. there is 80–90 percent recovery of aldosterone and the determination takes 3 days. The normal values were found to be 2–16 µg. excreted per 24 hours.

363. Mases, F., Falet, R. and Martinot


Young men between 21 and 23 years of age showed an increase in the hourly urinary excretion of creatine during periods of exercise. Untrained subjects displayed a greater increase in creatine excretion than trained subjects. Nyctohemeral variations studied in one subject (diurnal activity 6–21 hours, sleep 21–6 hours) revealed a constant and progressive increase in the hourly urinary elimination of creatine during the period of activity, and a decrease during the period of rest.
364. Maske, H.  
Test for vitamin B₆ deficiency. Quantitative estimation of xanthurenic acid in urine following administration of DL-tryptophan. KLIN. WSCHR. 35:561-565 (1957). (In German)

A method for the estimation of xanthurenic acid in urine is described as well as a qualitative paper-chromatographic test. Urinary excretion of xanthurenic acid was determined in 170 patients following the feeding of 5 or 10 g. of DL-tryptophan. The normal urinary excretion of xanthurenic acid is variable and in the test the estimations were carried out on the total morning urine specimen, the tryptophan being given the previous evening. Following the high dose of tryptophan the normal maximum excretion of xanthurenic acid was 40–50 mg, but following the low dose it was 25–30 mg. In 12 patients with various disorders in which vitamin B₆ deficiency was likely the excretion of xanthurenic acid following 10 g. of DL-tryptophan was > normal, ranging from 51 to 196 mg.

365. Maslennikova, E. M. and Gvozdova, L. G.  
Determination of riboflavin in urine. VOP. PITAN. 2:25–27 (1956). (In Russian)

Instead of fluorometry it is recommended to titrate under an ordinary mercury-quartz lamp with a Wood filter – which can be done in any clinical laboratory. A sensitivity of 0.1 μg. is claimed, with an accuracy of ± 10 percent.

366. Masson, M.  
Determination of urinary catechol amines. REV. FRANC. ETUDES CLIN. ET BIOL. 5:306–308 (1960). (In English)

Details are given on a colorimetric chemical method modified from de Gennes, et al. [Presse med. v. 66, 805 (1958)]. The pH must be carefully controlled electrometrically for accurate results. Catechol amines in urine may be assayed by determining their effect in elevating the blood pressure of animals. The colorimetric method employed is less specific than fluorimetric techniques, but the results are accurate enough for the diagnosis of pheochromocytoma.
Protein, hexose, and hexosamine in non-dialysable fraction of filtered urine in normal young men.

Three main fractions were obtained: (1) a carbohydrate not bound to protein, which has been tentatively identified as a mucopolysaccharide; (2) a protein-bound carbohydrate which is probably a mucoid or a mucoprotein; and (3), a protein and carbohydrate bound to protein.


369. Menache, R.

The tyrosine method for uropepsin estimations was modified to a micromethod which is simple and rapid. Some normal and pathological results are given.


The effects of sensory deprivation on urinary epinephrine and norepinephrine excretion were studied in 10 adult male volunteer subjects. The combined group data revealed a rise in epinephrine and norepinephrine excretion during the experiment, with a fall toward control values during the post-experimental period. There was wide individual variation in the endocrine response, five categories being differentiated. Behavioral measures made during the experiment included length of stay in the experiment, mental experiences, motor activity, amount of verbalization, somatic references, and judgment of passage of time. The relevance of these findings to previous studies and the problems of relating biochemical indices to behavioral assessments are discussed.
371. Meulemans, O.


The method by which phenylpyruvic acid was estimated quantitatively, by measuring the green color with FeCl₃, was modified. The extinction was measured after the green color with FeCl₃ has faded, and this value is subtracted from that found initially. This method is more accurate, and lower values of phenylpyruvic acid can be measured.

372. Meulemans, O.


A demasking agent, a mixture of Mg and NH₄Cl and NH₃, is added to the urine to precipitate phosphates which tend to mask the FeCl₃ reaction. The alkaline urine filtrate is then acidified and the FeCl₃ added. The green color of the positive action can then be seen if phenylpyruvic acid is present.


The maximum plasma level was regularly seen in normal subjects at about 6 a.m. from which time a steady decline occurs until about midnight, when the concentration rises rapidly during the next 6 hours. The urine levels were parallel but delayed by about 2 hours. Night workers and the blind showed the same pattern. Plasma Fe concentrations follow the same periodicity, but 2 hours later, except in the blind group in which the relationship was less distinct. An inverse cycle appeared to exist for eosinophil concentration, but the variations were too great to be able to attach certain significance to this.

374. Mikolajczk, W. and Sadowski, Z.

375. Moolenaar, A. J.

The method for CHCl₃ extraction, chromatographic isolation, and determination of aldosterone using its reaction with 2:4-dinitrophenylhydrazine is detailed.

376. Morato-Manaro, J., Cervino, J. M. and Maggiolo, J.

377. Morgan, P. J.

378. Morris, R.

A new method for the determination of pregnanetriol in urine is described depending on the oxidation of pregnanetriol glucuronide to aethiocholanolone and its measurement as a Zimmerman chromogen after chromatography on silica gel.
379. Moser, R. H.
An atlas of urinary sediments. II.

380. Moulierac, L. and Sais, J.
[The role of static muscular work in fatigue of the fighter pilot: attempted determination of muscular fatigue by Donaggio’s reaction]

Static muscular exertion is a major cause of fatigue in fighter pilots and is largely determined by postural factors, such as the pilot's seating position, as well as by external factors such as acceleration. Donaggio's reaction (precipitation of thionine in the presence of ammonium molybdate in a urinary specimen) is recommended for the determination of the degree of fatigue following muscular work. In spite of the very limited number of case studies conducted so far, it could be established by this method that the degree of muscular fatigue (e.g., fatigue experienced in the course of firing maneuvers) seems to vary with the amount of training received by the pilot. Static contractions of muscle groups of the neck and of the spinal column in response to acceleration may eventually induce clinical symptoms and deformities.

381. Moxham, A. and Nabarro, J. D. W.

Modifications of the Reddy-Jenkins-Thorn and Norymbershi methods for 17-ketogenic steroids and 17-hydrocorticoids are described.
382. Moya, F.

Hyperglycaemic activity of normal human urine.


The i.v. administration of pancreatin or an α-amylase of bacterial origin was found not to affect the blood sugar of the rabbit. They induce an increase in the amount of reducing matter released into the medium by rabbit liver slices incubated in vitro. A urinary extract previously found to be hyperglycaemic and glycogenolytic appears to stimulate in vitro glycogenolysis, not through an intracellular mechanism but by the action of urinary amylase on glycogen that has escaped from the cells into the medium. The urinary extract has a hypotensive effect on the rabbit. The hyperglycaemia following the administration of the urinary extract can be completely inhibited by the adrenolytic drug Hydergin. Normal human urine extracts prepared by Meduna's method were shown to be hyperglycaemic, hypotensive, and inhibited in their hyperglycaemic action by Hydergin.

383. Moya, F., Szerb, J. C. and Macintosh, M.

Identification of a hyperglycaemic factor in urine.


The precipitate obtained by adding two volumes of ethanol to acidified urine is hypotensive and hyperglycaemic when injected into a rabbit. It appears that the active principle is kallikrein.

384. Moyer, J. H., Morris, G. and DeBakey, M. E.

Hypothermia on renal haemodynamics and on excretion of water and electrolytes in dog and man.


In dogs undergoing hypothermia to 27° the mean blood pressure [B.P.] fell to 75 percent of the control levels. At the same time there was a fall in both renal blood flow [R.B.F.] and glomerular filtration rate [G.F.R.] without change in urine or Na excretion. Infusion of noradrenaline improved the B.P. but not the R.B.F. or the G.F.R. Increase in temperature to control levels resulted in return of B.P. to normal and of R.B.F. and G.F.R. to about 75 percent of normal. R.B.F. and G.F.R. returned to normal in about 24 hours. Essentially similar changes occurred in 11 humans undergoing hypothermia for vascular operations.
385. Murphy, C. W


Visual and tactile perception is reduced for 1-6-1/2 days in male subjects. Some subjects became overtly distressed in this period. No variation beyond normal limits could be detected in the urinary output of 11-oxycorticoids.

386. McArdle, B.


The method is described. The amounts of pyruvate and α-oxoglutarate in post absorptive blood and urine from healthy humans and in c.s.f. from patients with neurological disease are given. A striking feature is the low level of α-oxoglutarate in c.s.f. as compared with that of blood. A woman excretes almost twice as much urinary α-oxoglutarate as does a man.


An assay method was used that depends on the repér of ventral prostatic atrophy in the hypophysectomised immature male rat. ICSH was barely detectable in the urine of 3 pre-pubertal children. In 5 adult females, ICSH activity was detected in mid-cycle, and in 3 of the subjects, during the follicular and luteal phases as well, 16 out of 17 adult males showed ICSH activity; males appeared to excrete appreciably more ICSH than adult females, except when the latter were in the mid-cycle peak phase. In 10 post-menopausal women the rate of excretion of ICSH was higher than that observed in any other group of either sex. The increases in testicular and ventral prostatic weight were produced by the same dose of urine concentrate in most cases, suggesting a rough equivalence between the amounts of FSH and ICSH excreted.
388. McDonald, D. F. and Murphy, G. P.
Bacteriostatic and acidifying effects of methionine, hydrolyzed casein and ascorbic acid on the urine.


By closely controlling chromatographic and color-development conditions, the optical properties of the color bands on two-dimensional paper-sheet partition chromatograms of amino acids treated with ninhydrin become markedly reproducible. 'Minimum transmission' densitometry of the bands is carried out with a special instrument which eliminates the effects of sheet textural irregularities, and the band transmittances are corrected for 'background'. Applied to analysis of desalted human urines the procedure has furnished reliable values for rates of excretion of glycine, taurine, β-aminoisobutyric acid, alanine and glutamine by male members of three ethnic groups. Cystine excretion rates were estimated polarographically.

390. McMillan, M.
Urinary excretion of individual catechol derivatives studied by a chemical method. LANCET 1:715–718 (1957).

A chromatographic method is described for the separate assessment in urine of noradrenaline, adrenaline, hydroxytryptamine, and dihydroxyphenylacetic acid.

391. Nachlas, M. M. and Blackburn, R.
Colorimetric determination of urinary lipase.

The method employs a new chromogenic substrate, naphth-2-yl caprylate; the liberated naphth-2-ol is coupled with tetratozotised di-o-anisidine and the color density of the resulting soln, is determined colorimetrically. Urine contains an antilipase, and this inhibitor is separated from the enzyme only by dialysis. Urinary and pancreatic lipase are probably identical.
A new preservative, thymol dissolved in isopropanol, will keep urine 'fresh' and free from ammoniacal and other bacterial breakdown products for over 48 hours at room temperature. Thymol (5 ml. of 10 percent w/v solution in isopropanol per 24 hours urine collection) is used. Hay's test and the Zimmerman reaction cannot be performed in the presence of this preservative.

A detailed description for the determination of aldosterone in urine.

III. Zinc powder in boiling aqueous acetic acid reductively removes the keto group in 4 : 5-unsaturated-3-oxosteroids, the 17- and 21-hydroxy group in 17 α : 21-dihydroxy-20-oxosteroids and the 21-acetoxy group in 21-acetoxy-17 α-hydroxy-20-oxosteroids. 17-ketones, 17 : 20-diols, and 17 : 20 : 21-triols are unaffected. A method, based on these results, is described for the differential determination of "zinc resistant" and "zinc labile" 17-ketogenic steroids.

IV. The system sodium abismuthate-NaCl-dil. acetic acid oxidises 17-hydroxy-androstanes to 17-ketones; the oxidation is inhibited by urea. Treatment of human
urine with sodium bismuthate-acetic acid, followed by reductive removal of excess of reagent and then treatment with hot HCl does not oxidise 17-hydroxyandrostanes to 17-ketones or destroy the 17-ketones. The failure of urinary chloride to induce these reactions is due to the inhibitory effect of native urea.

396. Nothman, M. M., Pratt, J. H. and Callow, A. D.

The urines of 463 persons either healthy or diseased had a lipase concentration of 0.75 units or less. Most of those who had raised values of this enzyme (1.0 to 3.5 units) had symptoms pointing to pancreatic disease. In 15 cases of carcinoma of the pancreas the values were in the normal range, but there was no response of the gland to stimulation with secretin and this is of value in the diagnosis of the disease.

397. Nowaczynski, W., Koiv, E. and Genest, J.

The crude neutral residue obtained after the hydrolysis and extraction procedure was fractionated on a silica gel column. The portion eluted by CHCl₃-acetone 1:1 v/v contains the corticosteroid fraction including aldosterone and is used for further paper chromatographic purification. Characterisation of the substance as aldosterone is based on the mobilities in the three chromatographic systems used, on the u.v. absorption curve, on agreement between the values obtained by u.v. absorption and by blud tetrazolium reaction, and by the typical chromogen spectra in concentrated H₂SO₄ and in 100 percent H₃PO₄.

398. Nowarytko, Y. and Sarneck-Keller, M.
(In Polish)

Amino acid content of normal and pathological human urine was investigated by one dimensional paper chromatography (isatin development). The urine was desalted by ion exchange chromatography (Zeobarb 225). Treatment of the resin with 2N ammonia removes the amino acids the metallic cations remaining on the resin. The amino acids were then freed from ammonia by repeated evaporation to dryness under vacuum at 37°.
399. Oakley, B. W.
AN INVESTIGATION OF THE URINARY EXCRETION OF ENDOGENOUS CREATININE FROM A GROUP OF MALE HUMAN SUBJECTS.

400. Osmond, D. G., et al.

401. Otaguro, K.
[Quantitative studies of leukocytes in urine]
(In German)

402. Pai, M. L.

Standard urea clearance of 7 normal healthy males averaged 43.3 c.c.; maximum urea clearance of 11 similar subjects averaged 54.3 c.c. Blood urea clearance, both standard and maximum is lower in normal Indians [I] than normal Westerners [W]. Blood urea is more or less the same in both I and W and urinary urea is lower in I than in W. This may be due to lower dietary protein intake of I or different vegetarian composition of the diet of I, and it may be the factor responsible for the lower urea clearance.
403. Pain, S. K. and Banerjee, S.
Studies on the nitrogenous constituents of urine
in normal subjects and in patients suffering from
cirrhosis of liver, subacute nephritis and hyperten-
(In English)

Normal Bengalees had a mean total urinary N excretion of 7.8 g. daily; the patients
had a lower total N excretion. The relative proportions of 7 nitrogenous fractions
are given for normal and diseased subjects.

Deoxycytidine in urine as indicator of changes after

Urinary deoxycytidine excretion of Wistar male rats was correlated with the irradiation
dose. Damage could be detected earlier and much more simply than with other methods.
Excretion of deoxycytidine could be demonstrated after low irradiation doses.

405. Passmore, R. and Johnson, R. E.
Modifications of post-exercise ketosis (the Courtice
Douglas effect) by environmental temperature and
water balance. QUART. J. EXP. PHYSIOL.

Urinary ketone-body excretion rates of young men were always greater after than
during a 2.5 hour walk at 6.7 km./hr. Ketosis (defined as ketonuria > 5 μmol./min.)
occurred in 9 of 20 experiments, 6 of these occurrences being in a cool environment.
Ketosis was greatest when water balance was positive and was suppress by large
negative water balance.
406. Paupe, J.
Cutaneous elimination of calcium in perspiration.
(In French)
The Ca content of 115 samples of sweat taken from 98 subjects of varying age from the suckling infant to the adult shows appreciable concentration especially in the suckling child. The concentration ranges from 30–300 mg./l., but it appears that the total decreases with an increase in the quantity of sweat produced. The elimination is not influenced by age, and is independent of Ca in the urine and calcaemia.

407. Pecile, A.
(In Italian)

408. Pelzer, H., Staib, W. and Ott, D.
Isolation and identification of urinary 17-keto-steroid glucuronides by combined electrophoretic and chromatographic method. HOPPE-SEYLERS Z. PHYSIOL. CHEM. 312:15–21 (1958). (In English)

409. Pentz, E. I.
Test for determination of taurine in urine.
A colorimetric method for the determination of taurine in urine is described. Samples of the hydrolysed and unhydrolysed male urine contained 233.5 and 211.6 mg./24 hr. of taurine.
410. Pentz, E. I., Moss, W. T. and Denko, C. W.

A period of high protein intake did not significantly affect the daily urinary taurine excretion, which averaged in a normal male maintained on an ordinary diet, 161 mg./24 hr. During the treatment of 6 patients with suspected or known adrenocortical disorders with ACTH or 9 α-fluorohydrocortisone, there was an increase in urinary excreted taurine, although there did not appear to be a correlation between chronic disease and taurine excretion.

411. Perry, H. M., Perry, E. F.
Normal concentrations of some trace metals in human urine: changes produced by EDTA.

A method for simultaneous assay of Zn, Cd, Mn, Pb, V, Mo, Ni, Ag and Sn by spectroscopy is described and mean concentration over 24 hours of each metal are given for 24 normal adults. Day to day variations and changes accompanying basic, acid dilution and concentrated urine are reported for one adult. The di-sodium, Ca derivative of EDTA given to hypercholesterolaemic patients produced marked increases in urinary Zn and lesser decreases in Ca, Mn, Pb and V.

412. Pignard, P. and Delga, J.
Concentration of Mg in blood serum and urine.
(In French)

413. Pirlet, K.
(In German)
414. E. Pitkänen
Determination and excretion of adrenaline and noradrenaline in urine. ACTA PHYSIOL. SCAND. 38(129):1-98 (1956). (In English)

An experimental study incorporating a review of the determination of adrenaline and noradrenaline in urine; of the insulin-induced urinary output of adrenaline in rats; and the determination of the hormones in the urine in the diagnosis of phaeochromocytoma.

415. Plantin, L. O. and Birke, G.
Occurrence of 11-hydroxyaetiocholanolone in urine.
ACTA ENDOCR. (Copenhagen) 19:8-10 (1955).
(In English)

An improved method is described for separating steroids by acetylation before re-chromatography on aluminum oxide and identification by i.r. spectrography. This allowed the identification of aetiocholane-3α : 11β-diolα17-one in the urine of cancer patients, as well as in that of normal men and women and patients with rheumatoid arthritis and cirrhosis of the liver.

416. Plantin, L. O., Diczfalussy, E. and Birke, G.
Estimation of corticosteroid metabolites in urine.
(In English)

417. Ploug, J. and Kjeldgaard, N. O.
Isolation of a plasminogen activator (urokinase) from urine. ARCH. BIOCHEM. BIOPHYS. 62:500-501 (1956). (In English)
418. Plough, I. C. and Consolazio, C. F.
The use of casual urine specimens in the
evaluation of the excretion rates of thiamine,
riboflavin and N^{1}-methylnicotinamide. J. NUTR.

A man's urinary excretion of thiamine or riboflavin per 6 hours can be predicted from
the excretion per gram of creatinine within limits of plus or minus 30 to 40 percent.
The limits are larger for N^{1}-methylnicotinamide. The predictability is affected by
variations in body size, by diurnal variations in creatinine excretion, and by dietary
intake of creatinine. The predictability is more accurate with fasting urine specimens.
It is concluded, however, that for surveys of large groups of individuals the measure-
ment of vitamin excretion rate per gram of creatinine in casual urine specimens is a
satisfactory procedure in the biochemical evaluation of nutritional status.

419. Plough, C. and Baker, M.
Maximum physiological concentration of sodium
in human urine. J. APPL. PHYSIOL. 14:1036-1038
Nov 1959.

Six apparently normal young men received salt intakes of up to 540 mEq/day, or more,
with free access to water. The five subjects who tolerated these high intakes drank
enough water to maintain the sodium concentration in the 24-hour urine specimens at
a mean of 248 mEq/l. with a range of means in the individual subjects of 240-295
mEq/l. Under these circumstances there was little change in the size of the body
fluid compartments. The results indicate that there is a maximum physiological con-
centration of sodium in the urine, probably in the range of 270-290 mEq/l., which is
similar to the 'limiting isorrheic concentration' described by Wolf. (The Urinary
Function of the Kidney. New York: Grune, 1950.)

420. Politzer, W. M. and Tucker, B.
Urinary 17-ketosteroid and 17-ketogenic
excretion in South African Bantu. LANCET

Urinary 17-KS and 17-Ketogenic steroid values were determined in 50 outwardly
healthy South African Bantu and in 20 whites. There was no significant difference in
17-KS excretion; but excretion of ketogenic steroids was significantly lower in Bantu
men.
Relation of urinary CO₂ tension to HCO₃⁻ excretion.

422. Powell, J.
Evaluation of chloride in sweat: collection by
two thermal methods. J. AMER. OSTEOPATH

423. Pozzi, L.
Column chromatography of urine hydrolysed at
different pH, and extracted with various organic
solvents. ARCH. SCI. BIOL. (Bologna).
41:295–298 (1957). (In Italian)

424. Praetorius, E.
Uric acid and other purine derivatives.
(In Danish)

425. Price, J. M. and Brown, R. R.
Quantitative studies on human urinary metabolites
of D-, DL-, acetyl-L-, and acetyl-D-tryptophan.

Quantitative analysis of the urine for N-methyl-2-pyridone-5-carboxamide, xanthurenic
acid, kynurenic acid, kynurenine, N⁴-acetylkyurenine, o-aminohippuric acid, anthranilic
acid glucuronide and an unidentified aromatic amine after ingestion of the tryptophans
indicated that acetyl-L-tryptophan was absorbed without deacetylation and that it was
converted to nicotinic acid to a lesser extent than was L-tryptophan.

118

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Four normal males were fed a constant diet containing 15 mg. nicotinic acid and 900 mg. tryptophan daily and the excretion of metabolites measured. After 2 g. supplementary tryptophan the excretion of N-methyl-2-pyridone 5-carboxamide, kynurenic acid, o-aminohippuric acid and kynurenine were increased. These compounds were presumably major tryptophan metabolites. Minor metabolites were xanthurenic acid, acetylkynurenine and anthranilic acid glucuronide. A constant diet was not necessary for quantitative studies on tryptophan metabolism.

427. Racz, G., Kisgyorgy, Z. and Fuzi, J.  

428. Raftopoulo, R., Staudinger, H. and Weissbecker, L.  
Determination of corticoids in human urine — review and comparison of existing methods. CLIN. CHIM. ACTA 4:463-483 (1959). (In German)

A review.


4-Pyridoxic acid (3-hydroxy-5-hydroxymethyl-2-methylpyridine-4-carboxylic acid) in urine is determined fluorimetrically after removal of interfering fluorescent compounds by ion exchange chromatography on Dowex 1 (Cl) and Dowex 50 (H). This treatment removes 40-70 percent of the fluorescence, which is not due to 4-pyridoxic acid. The method is suitable for human urine samples that contain > 2 μmol. of the acid per 24 hours. Approximately 50 percent of a single dose of 10 mg. of pyridoxine
hydrochloride is accounted for by increased urinary 4-pyridoxic acid excretion. After ingestion of the acid, approximately 50 percent is present in the urine, but after s.c. injection it is excreted almost quantitatively within 24 hours.

430. Remington, J. S. and Finland, M.
Precipitating antibody in normal human urine.

431. Reznik, I. B. and Fedorov, G. M.

A description of a fluorescent method of determining coproporphyrin in urine, a modification of the Langen and Berg method (Acta med. scand., 1958, 137, 130). 5 ml. of urine were acidified with glacial acetic acid to litmus, shaken up with 5 ml. of ether and the fluorescence of the ether layer as observed in u. v. light. Experiments on rabbits showed that the intramuscular injection of a 1 percent solution of Pb(NO₃)₂ resulted in porphyrinuria which was clearly discernible by using the method described, even before the onset of other symptoms of poisoning. The determination of coproporphyrin in human urine (226 cases) showed that porphyrinuria, discovered by this method, occurs in 18.7 percent of people whose work brings them into contact with Pb preparation and only in 1.7 percent of persons who are not, in contact with Pb. This method is useful for an early diagnosis of Pb poisoning.

432. Richardson, E. M., Bulaschenko, H. and Dohan, F. C.
433. Robinson, K. W. and Macfarlane, W. V.

With moderate exercise both 17-ketosteroids and 17-ketogenic steroids decreased more than 50 percent. Urinary Na decreased and K/Na increased. The rate of urine flow was not related to plasma antidiuretic substance. In one subject exercised to exhaustion the initial steroid fall was followed by a marked rise.

434. Robinson, S. and Robinson, A. H.

The seating rate varies from 2–8 liters for soldiers carrying on moderate activity to 10–12 liters for desert workers. Sweat was collected in various ways. Components which were noted include: NaCl, Na, Cl, K, Ca, Mg, Cu, Mn, SO4, Fe, I, F, Br, lactic acid, glucose, N, urea, NH4, creatinine, uric acid, amino acids, phenol, and histamine. The pH ranged from 4 to 6.8.

435. Rodnight, R.
Separation and characterisation of urinary indoles resembling 5-hydroxytryptamine and tryptamine. BIOCHEM. J. 64:621-626 (1956).

The indole bases in urine are studied by chromatography on Zeo-Karb 226, elution with acid-ethanol and concentration of the eluate to 0.002 of the volume of urine used. They are then investigated by paper chromatography and tests on guinea-pig ileum. Urine contains two indoles which are probably tryptamine and its 5-hydroxy derivative. Extracts of urine contain no N-methyl-4-hydroxytryptamine or bufotenin. The excretion of urinary "5-hydroxytryptamine" in 12 adults ranged from 45 to 120 µg./24 hr. Similar values are obtained for "urinary tryptamine".
Romani, I. D. and Albeaux-Fernet, M.
Chromatographic fractionation of urinary corticoids in normal and certain pathological conditions.
(In French)

The methods used consist of enzyme hydrolysis, extraction, chromatography on florisil and on paper and color and fluorescence reactions for the identification of steroids. Thirteen α-ketolic catabolites were detected of which six were identified. The catabolites, which were determined quantitatively in several cases, are described in detail.

Romani, J. D.

The chromatograms were run in propylene glycol saturated toluene for 55 hours. A standard mixture of aldosterone and hydrocortisone was used to compare with the experimental studies. The RDOC of aldosterone after development with tetrazolium is calculated by the formula,

\[ \text{RDOC (aldosterone)} = \frac{\text{Migration c.m. aldosterone} \times \text{RDOC F}}{\text{Migration cm. F}} \]

(F is taken to be the front). Urine is hydrolysed by the digestive juices of Helix pomatia, or at pH 1.5 by the method of Neher and Wettstein (J. clin. Invest., 1956, 35, 800). The excretion of aldosterone is shown to vary between 3.3-9 μg./24 hr., which is increased in certain pathological conditions with a retention of NaCl.

Romani, J. D., Bugard, P. and Fischer, G.
Urinary elimination of α-ketolic corticoids in the normal subject and in chronic fatigue.
Evaluation after enzymic hydrolysis in urines.
C.R. SOC. BIOL. (Paris) 150:1755-1759 (1956). (In French)

This study of urinary corticoids confirms that the adrenals are disturbed in their functioning by prolonged fatigue. The production of corticosterone is shown to be increased.
Determination of tetrahydrocortisol [THF] and
tetrahydrocortisone [THE] in urine of normal
and schizophrenic men. J. CLIN. ENDOCR.

A method is presented for the routine estimation of urinary extracts of THF and THE.
The output of these two metabolites by normal and schizophrenic men did not differ
substantially in 24 hours. The expected diurnal rhythm in the excretion of THE and
THF was confirmed. The ratio of the excretions appears to be remarkably constant
in men.

Urinary excretion of \( \beta \)-cortolone (\( 3\alpha:17\alpha:20\beta:21 \)-tetrahydroxypregnane-11-one) in young
and elderly men and women. J. CLIN. ENDOCR.

\( \beta \)-cortolone was found as a regularly occurring metabolite in the urine of 20 young and
elderly subjects of both sexes. When expressed as a function of creatinine excretion,
\( \beta \)-cortolone excretion was not significantly altered by age. It was significantly corre-
lated and proportional to the urinary excretion of tetrahydrocortisol, allostetrahydro-
cortisol and tetrahydrocortisone.

441. Roecoe, M. H.
Biphasic response of solute excretion to
changes in urine flow. ACTA MED. SCAND.

The effect of varying urine volume on the excretion rate of Na, Cl, K, P, urea, and
of urine osmolarity were studied in 4 subjects, small urine samples being collected
at the same time each day for periods of 28 to 42 days. At low urine flow, rate of
solute excretion increased approximately linearly with urine flow; at a definite rate
of urine flow, fairly constant for different solutes in an individual subject, but varying
somewhat from subject to subject, the rate of increase of solute excretion with increas-
ing urine flow fell off though remaining approximately linear. For any given filtration
rate, a constant amount of fluid enters the distal tubules; at rates of flow below the
critical value there is re-absorption of fluid from the distal tubules and at rates above
this value there is secretion of fluid into the distal tubules.
442. Roscoe, M. H.
A comparison of calculated and estimated osmolarities of urine. J. CLIN. PATH.

443. Rossi-Fanelli, A., Antonini, E. and Caputo, A.
Effect of urea on oxygen equilibrium of mammalian haemoglobins. ARCH. BIOCHEM.

O\textsubscript{2} equilibria of human, horse and sheep Hb all showed progressive decreases in the sigmoid character of the curve and increases in O\textsubscript{2} affinity as the urea concentration was raised to 6.5M. The changes did not seem to be correlated with the apparent splitting of the Hb molecule. Removing the urea by dialysis reversed most of the changes.

444. Rovensky, J. and Toman, M.
A semi-quantitative method for the determination of chlorides in sweat. CESK. PEDIAT.
16:331–335, Apr 1961. (In Czech)

445. Rowe, D. S. and Soothill, J. F.
Serum proteins in normal urine. CLIN. SCI.

Siderophilin, \gamma-globulin and ceruloplasmin were detected in normal, male, human urine at urine/serum ratios, which did not differ systematically from that of albumin; but a high molecular weight \alpha\textsubscript{2}-globulin and \beta-lipoprotein were either absent or present only at greatly reduced urine/serum ratios. Material of sedimentation constant 7 could not be demonstrated in normal urine colloid, despite the immunological detection of \gamma-globulin and other globulins. This implied that some urine globulins were partially degraded.
446. Rowe, D. S. and Soothill, J. F.
Proteins of postural and exercise proteinuria.

Immunological studies of urine/serum concentration ratios have shown that proteinuria, induced in healthy subjects by exercise, is only moderately selective to a range of serum protein molecules of different molecular weight, while proteinuria, induced by changes of posture is poorly selective; values for the mean molecular weight of the protein were lower for exercise than for postural proteinuria. Purified albumin, obtained from exercise urine protein, had a molecular weight identical with that of serum albumin.

447. Roy, O. Z.


BAIBA was found in increased amounts in urine from a group of human beings accidentally exposed to serous radiation. The BAIBA levels excreted appear related to the estimated doses received. Possible metabolic pathways and implications of increased BAIBA excretion are discussed.

449. Sabbadini, E., Savino, L. and Albera, G.
Polysaccharides in urine of normal subjects.
ATTI. SOC. LOMBARDA SCI. MED. BIOL. 14:13–17 (1959). (In Italian)

Determinations were made of the polysaccharides, hexosamines, uronic acids and mucopolysaccharides in samples of urine from 34 healthy men and women between the ages of 18 and 71. There are marked differences in the amounts of the various substances excreted according to the sex and age of the individual.
450. Sabbadini, E., Stoppani, L. and Zilioli, E.
On fibrinolytic factors contained in the urine.
I. Behavior in normal individuals. ARCH.
SCI. MED. (Tor) 112:352, Nov 1961. 
(In Italian)

451. Sabbadini, E., Stoppani, L. and Zilioli, E.
On fibrinolytic factors contained in the urine.
II. Behavior in thrombophlebitis and in
thrombophilic diathesis. ARCH. SCI. MED.
(Tor) 112:357–360, Nov 1961. (In Italian)

452. Saito, S. and Tani, F.
Biological characteristics of the crude thyrotropin
releasing principle from urine. ENDOCR. JAP.
7:13–18, Mar 1960. (In English)

453. Salomon, L. L. and Johnson, J. E.
Enzymic microdetermination of glucose in blood

Glucose is oxidised with glucose oxidase and the H₂O₂ produced was used to oxidise
o-toluidine in presence of horseradish peroxidase. The chromogen formed absorbs
at 365 and 635 μm. Lower limit is 5 μg./ml.
454. San Martín, M., Prato, Y. and Fernández, L.
Excretion of some urinary steroids in the native
from the coast and the native at altitude and the
changes experienced in the coastal native during
his adaptation to altitude. EXCRECIÓN DE
ALGUNOS ESTEROIDES URINARIOS EN EL
NATIVO DE LA COSTA Y EN EL DE ALTURA
Y CAMBIOS QUE EXPERIMENTAN LOS
COSTENOS EN SU ADAPTACIÓN A LA ALTURA.
ANALES DE LA FACULTAD DE MEDICINA

455. Sargent, F., II.
Effects of environment and other factors on
nutritional ketosis. QUART. J. EXP. PHYSIOL.

Healthy young men on a variety of air-crew survival rations and work programs were
subjected to 2 weeks of complete starvation or high fat diets and developed ketosis.
Ketonaemia and ketonuria were less in summer than in winter and were reduced in the
second week of the regimen as well as by increased caloric intake, restriction of water
intake and doing lighter work.

Vasodilator properties of urine. I. Comparison
of the effect of human urine and nitroglycerin on
coronary resistance and myocardial oxygen con-
sumption in isolated supported heart preparation.
II. Reproducibility in blood flow bioassay tech-
niques for vasoactive substances: studies with
human urine. III. Comparison of vasodilator
activity in the urine of normal individuals and
patients with orthostatic hypotension. CIRCULAT.
I. In the dog heart preparation, where aortic pressure, cardiac output and heart rate could be independently controlled, addition of normal urine to the blood reservoir increased coronary flow and coronary vascular resistance fell. Comparing the effect of 0.6 mg. nitroglycerin in 10 ml. saline with that of 10 ml. urine showed that the latter was 2-3 times more potent coronary vasodilator. Neither caused any change in myocardial O2 consumption of cardiac efficiency at the peak of their effect.

II. Since model experiments suggested that inadequate mixing of the test substance in the external circuit, a reproducible bioassay technique measuring the femoral artery flow in consequence of locally vasoactive material was developed. By adjusting the pentobarbital anaesthesia of the test dog to maintain blood pressure and by observing some other precautions, over 100 individual assays could be performed on one preparation. 0.4 ml. dialyzed urine was used for one assay.

III. The vasodilator activity in the urine of 5 hypotensive patients was < 15 percent of that in the urine of 5 normal individuals studied simultaneously. The active substance was non-dialyzable, quick acting, stable during 2-1/2 months storage at -15° and in its chemical characteristics similar to callicrein. An approximate comparison of activity of urine and that of callicrein indicates that, if callicrein was the active substance, it exhibits its activity in 0.2-0.3 µg. amounts. Urines from 9 mammalian species all showed high vasodilator activity. The possibility that the vasodilator substance in the urine may be associated with autonomic function and/or the regulation of blood pressure, is discussed.

457. Satoh, K. and Price, J. M.
The 2 acids are absorbed on Dowex 50 and are eluted simultaneously by washing the resin with water. The kynurenic acid is rendered fluorescent by treatment with concentrated H2SO4, and the xanthurenic acid is determined after treatment with concentrated alkali. The new method is a simplified procedure for kynurenic acid, and is much more specific for urinary xanthurenic acid. Other quinoline derivatives do not interfere.

458. Scaro, J. L.
(In French)
459. Scaro, J. L.
(In Spanish)

460. Schmidt, G. W.
(In German)

Increasing alkalinity of the urine reduced the intensity of amino acid stains on paper chromatograms of urine. The intensity of amino acid stains was increased when the urine contained 'Diamox' or when its salt concentration was lowered by treatment with an ion exchange resin.

461. Schmid, R.
Glucuronic acid-conjugated bilirubin as the "direct reacting" bilirubin in serum, urine, and bile. SCHWEIZ. MED. WSCHR. 186:775–776 (1956). (In German)

Bilirubin in bile occurs predominately as the water solution glucuronide. In hepatogenic jaundice this appears in blood and gives the direct van den Bergh reaction and appears in urine. Free bilirubin is almost insoluble in water and only couples with diazotised sulphanilic acid in the presence of alcohol or a similar solvent.

129
462. Schmid, R.
Direct-reacting bilirubin, bilirubin glucuronide, in serum, bile, and urine. SCIENCE 124:76-77 (1956).

The two forms of bilirubin, one reacting directly with diazotised sulphanilic acid and one reacting only after addition of alcohol, have been separated by conversion to the dipyrromethene diazonium pigments which could be chromatographed on paper using a solvent system of ethyl methyl ketone: n-propionic acid : water in the ratio 75 : 25 : 30. The indirectly reacting form could be converted to the other by hydrolysis with HCl or treatment with β-glucuronidase and proved to be bilirubin glucuronide. In bile, most or all of the bilirubin was in the form of the glucuronide in which 2 molecules of glucuronic acid were conjugated through the α : α'-hydroxy groups of 1 molecule of bilirubin.

463. Schmid, R.

The 'direct-reacting' water solution bilirubin in serum of jaundiced patients is bilirubin glucuronide which includes both the mono- and di-glucuronide. In normal bile and urine, most of the bilirubin is present as glucuronide.

464. Schmidt, G. W.
(In German)

Urinary amino-N was estimated by the method of Pope and Stevens (Biochem. J., 1939, 33, 1070) on 380 healthy children. No correlation was found between the concentration or absolute amount of amino-N and the urine vol./kg. of body wt./hr.

465. Schmidt-Nielsen, G., O'Dell, R. and Osaki, H.
466. Schneider, W. G. and Birtel, A.

Significance of an aminosteroid component in gonadotrophin extracts. KLIN. WSCHR. 34:1175–1178 (1956). (In German)

A method of extraction of gonadotrophins from urine and the subsequent electrophoretic separation of an aminosteroid component is described. This fluorescent fraction was separated from 24 hour urine samples in early (56–84th day) and late pregnancy (196–224th day). The activity of the extract was determined by the mouse-uterus test before and after removal of the aminosteroid fraction. In early pregnancy the removal of this fraction reduced the activity of the extract by about 15 percent but in late pregnancy the reduction was about 43 percent. The influence of this fraction on the quantitative estimation of gonadotrophins is discussed. It is suggested that this fraction is derived from the adrenals.

467. Schoen, E. J.


A quantitative study of the diluting power of the kidneys, based on 31 water-loading experiments in 10 normal men, is reported. A minimum urine total solute concentration [MUC] of 59 mOs/l. was observed, with a range of 37 to 80 mOs/l. The MUC appears to be independent of the size of the water load when the load exceeds a minimum level (1000–1500 ml.). Further increase in water intake only extends the period of minimum urine total solute concentration.

468. Schoen, E. J., Young, G. and Weissman, A.


The measurement of urinary specific gravity as an indication of renal concentrating and diluting ability is valid only as it reflects urinary total solute concentration (osmolarity). A specific gravity < 1.005 may be said to represent a hypo-osmolar urine. In the range 1.005 and 1.020, the specific gravity reading may be misleading as an indication of urinary total solute concentration. Above this value it reflects well the urinary osmolarity.
469. Schön, H. and Lippach, I.
New color reaction for detection of acetone, acetoacetic acid and \( \beta \)-hydroxybutyric acid in blood and urine. KLIN. WSCHR. 34: 1083–1084 (1956). (In German)

The method depends on the formation of the respective 2:4-dinitrophenylhydrazones which are extracted with \( \text{CCl}_4 \) and estimated colorimetrically. The values in normal blood are: acetone and acetoacetic acid 0.1–0.3 mg. percent, \( \beta \)-hydroxybutyric acid 0.2–0.4 mg. percent. In urine (24 hr. specimen) the values are: acetone and acetoacetic acid 1.0–3.0 mg. and \( \beta \)-hydroxybutyric acid 10.0–30.0 mg.

470. Schrade, W., Böhle, E. and Heupke, G.
Regular occurrence of lipoproteins in the urine of healthy human subjects. KLIN. WSCHR. 34: 903–906 (1956). (In German)

A method for the detection and estimation of small amounts of lipoproteins in urine by paper electrophoresis of dialysed urine is described. In 21 subjects the average amount was 2.9 mg. 5 percent which is equivalent to 23.5 mg./24 hr. The analysis gave the following percent composition. Albumin 26.4, \( \alpha_1 \)-globulin 10.3, \( \alpha_2 \)-globulin 19.5, \( \beta \)-globulin 31.1, \( \gamma \)-globulin 12.7. The protein-bound lipids were classified into 3 electrophoretically distinct zones, one, the strongest, being associated with \( \beta \)-globulin (63.8%), a less intense band with the albumin and \( \alpha_1 \)-globulin (19.8%) and a further zone being at the starting line (16.4%). The occurrence of phosphatides in the first two fractions was indicated by isotope studies in 1 subject.

471. Schram, E. and Crokaert, R.

Guanidotaurine and carbamyltaurine may be separated using ion-exchange chromatography on Dowex 2 and 50 respectively. The effluents from the columns can then be submitted to spectrophotometric analysis. These methods are of considerable value in the detection and estimation of the two compounds in biological fluids such as urine.
472. Schreier, K. and Flaig, H.
Excretion of indole-pyruvic acid in urine of normal subjects and of patients with Folling's disease (oligophrenia phenyl-pyruvica). KLIN. WSCHR. 34:1213 (1956). (In German)

473. Schreiner, G. E.
Identification and clinical significance of casts.

Methods for examination of urinary casts are described in detail and a descriptive classification included which is illustrated with photographs of abnormal urinary sediments. The significance of various casts is discussed and clinical correlations made between renal pathology and urinary sediments. The identification of urinary casts is of considerable value in diagnosis, and it is of considerable aid in treatment and prognosis.

474. Schreiner, G. E.

475. Schüller, E.

A method is given for the assay of 17-ketosteroids in human urine: the analytical error as well as the individual day to day fluctuations are quoted. The average normal excretion and the spreading of the values are calculated from data from 100 male and 125 female normal 24-hour determinations. The output depends on the age and the sex: it is higher in males.
476. Scott, J., Emanuel, D. and Haddy, F.

In anesthetized laparotomized dogs KC1 was infused into the renal artery, the rate of blood flow either held constant or not controlled. Infusion of 0.11–0.69 mequiv. K/min. decreased resistance, but resistance increased when the K was over 0.69 mequiv./min., these relationships being uninfluenced by phentolamine. 0.6 mequiv. K./min. increased urine flow rate both before and after renal denervation, this increase not occurring if blood flow rate was held constant. The dilator action of K on renal vessels is thus probably related to increase in urine flow rate.

477. Scott, R., Jr. and McIlhaney, J. S.

478. Scowen, E. F., Hadfield, J. and Donath, E. M.

Mice of 5 strains primarily insensitive to mammotrophic substances in human urine and anterior pituitary gland were equally sensitive to the mammotrophic action of progesterone. Two insensitive strains became responsive to human mammotrophic substances after progesterone treatment. A sensitive strain, Strong A2, became more sensitive to human whole anterior pituitary after progesterone was given. A human growth hormone preparation elicited a mammotrophic response in the mouse similar to that of human whole pituitary. The major mammotrophic potency of the pituitary was present in the growth hormone fraction.
479. Segar, W. E., Riley, P. A., Jr. and Barila, T. G.
Urinary composition during hypothermia.

An increase in blood pH and decrease in serum K occurred in dogs under thiopental anaesthesia cooled to 22°; haematocrit, serum Na, Cl or total CO₂ concentration were unaffected. Urine flow increased with cooling and the urinary/plasma ratios of Na, K and Cl approached unity while that for creatinine dropped from 150 to 8. The urine produced during cooling was essentially glomerular filtrate which had undergone isomotic reabsorption but had been unaltered by further renal tubular activity.

480. Sellers, A. L.
Mechanism and significance of protein excretion by normal kidney. ARCH. INTERN. MED.

Glomerular filtration and tubular reabsorption of plasma proteins is part of the normal activity of the mammalian kidney. Metabolic processes in the proximal tubule cells that dealt with this reabsorbed protein are considered. Recent experiments to elucidate the functions of the normal mammalian kidney are reviewed.

481. Seto, T. A. and Schultze, M. O.
Determination of trichloroethylene, trichloroacetic acid, and trichloroethanol in urine. ANALYT.

The procedure is a modification of the Fujiwara pyridine-alkali reaction which permits the direct determination of the above substances in urine.


A study of the adaptation of the diurnal rhythm of keto- and ketogenic steroid excretion to a reversed activity-sleep and light-darkness schedule, was undertaken on 4 human subjects, living under standardized conditions of diet, activity and lighting in Spitzbergen, where 24 hour daylight persists in summer. Adaptation of the ketosteroid
rhythm was found to occur in 2 days and that of the ketogenic steroid rhythm in 8 days. Possible reasons for, and significance of, these results are discussed.

483. Sharp, G. W.
Persistence of the diurnal rhythm of flow of urine.

484. Shatalova, A. A. and Meerov, G. I.
(In Russian)
A method is suggested for determining hippuric acid in urine using [14C] hippuric acid. The method could be used in medical practice for studying liver function.

485. Shaw, E. I. and Goldsby, R.
Chromatographic techniques for separation of iodinated thyroid products from human urine.

486. Shaw, K. N. F. and Trevarthen, J.

Diminished color intensity and a brown discoloration in the reaction between p-dimethylaminobenzaldehyde seemed to be correlated with the incidence of 'smog'. One set of 2-dimensional chromatograms of urine extracts revealed faint brown spots (instead of blue) of only 5-hydroxyindolesacetic acid. A duplicate set, dried in a stream of air previously passed through a charcoal filter, revealed 14 indole derivatives. The role of ozone and organic peroxides are discussed.
487. Shaw, K. N. F. and Trevarthen, J.

The urinary indole and phenol acids of 2 adults placed on a high-protein diet from which materials of plant origin were excluded and who ingested bananas and coffee respectively were investigated by means of 2-dimensional paper chromatography. After ingestion of bananas urinary 5-hydroxyindoleacetic acid increased sharply in the first 7 hours but soon returned to normal; the excretion of indoles no. 14 and 15 also increased. The same m-hydroxyphenyl and 3-methoxy-4-hydroxyphenylacids which were excreted after coffee also were detected in urine extracts after ingestion of caffeic or ferulic acids. Vanillic acid and other related exogenous 3-methoxy-4-hydroxyphenyl acids were also present.

488. Sheath, J. B.

The colorimetric determination of neutral 17-KS in urine using the Zimmerman reaction was investigated with reference to the purity of reagents hydrolysis of urine, optimal times and temperature and to the absorption spectra of pure steroids and ketonic and other urinary extracts. Formalin treatment of the urine prior to enzymic hydrolysis removed interfering chromogens and thus obviated the necessity for using a correction formula.

489. Sheath, J. B.

The rapid separation of androsterone, androstenedione, dehydroisoandrosterone, adrenosterone, 11β-hydroxy-Δ4-androstene-3, 14-dione and 11β-hydroxytestosterone was possible on ethanol-extracted Whatman No. 2 paper using the solvent system petroleum ether (40–60 b.p.)/H2O/purified methanol 2/1/1. The aqueous layer was the stationary phase and the petroleum ether layer the mobile phase.
490. Sokliar, N. M.
(In Russian)

Two ml. of Erhlich's diazo reagent is added to 8 ml. of urine. The color developed after 30 seconds is compared with that of a standard Fe(CNS)₃ solution. The determination takes 1-1/2 min. The reaction has a specific sensitivity of 1 in 250,000.

491. Short, E. I.

492. Silverman, F. G., Ebaugh, F. G., Jr. and Gardener, R. C.

The bulk of the growth-supporting activity for Leuconostoc citrovorum which occurs in human urine after a test dose of folic acid is due to anhydrocitrovorum factor (N-5 to N-10 bridge compound) and N-10-formyltetrahydrofolic acid.

493. Silverman, M., Gardiner, R. C. and Condit, P. T.

I. Absorption of TMS from the gastrointestinal tract and from subcut. tissues was low when an oily vehicle was used. Complete excretion of 14C after i. v. injection required 15–20 days; urine contained 20–30 percent and feces 70–80 percent of the excreted 14C. After parenteral administration of a tracer dose of TMS, free α-tocopherol comprised 40–50 percent of the ethanol-extractable fecal 14C. The bulk of the urinary 14C was present in a metabolite of α-tocopherol, possibly the glucuronide.

II. The urine of humans ingesting large quantities of vitamin E contained 2 metabolites of α-tocopherol, largely in conjugated form. After hydrolytic removal of the conjugating groups, the metabolites were identified as 2-(3-hydroxy-3-methyl-5-carboxy-pentyl)-3:5:6-trimethylbenzoquinone and its γ-lactone.

Sjoerdema, A., et al.

Tryptamine was identified in human urine by its activation and fluorescence spectra, its distribution between various solvent systems, and its Rf value. The daily output varies between 40–70 μg./day. When humans are fed with 20 mg./kg. of tryptophan, there is a 4-fold rise in tryptamine output, but this does not occur if tryptamine itself is given orally (up to 40 mg./kg.). Presumably the amine does not come from the intestine. When monamine oxidase inhibitors are given to humans (1-phenyl-2-hydrazinopropane, iproniazid), the output of tryptamine rises 6 times within 2 days with a dose of 25 mg. of inhibitor per day; after the drug is withdrawn, tryptamine excretion gradually falls to pre-treatment levels over 6 days.
496. Slaunwhite, W. R., Jr. and Sandberg, A. A.

Binding of urinary conjugated steroids to serum albumin: new method of extraction.


Urinary steroid conjugates bind readily to human or bovine serum albumin, especially the conjugated metabolites of oestradiol, oestrone, progesterone and testosterone. A new method of extraction which utilizes this fact is described.

497. Smith, P.

STUDIES IN THE CHEMISTRY OF STRESS. I.

THE EXCRETION OF ETHER SOLUBLE METABOLITES IN ANOXIA. RAF Inst. of Aviation Medicine (Gt. Brit.), Farnborough; issued by Flying Personnel Research Committee (Gt. Brit.). Rept. no. FPRC 931(a), Nov 1955, 5p. ASTIA AD-81 809.

Two series of chromatograms of extracts from acid-hydrolyzed urine samples of subjects exposed to normal working-day and mild anoxia conditions were compared to determine whether anoxia caused the appearance in urine of any abnormal metabolites. The samples were obtained from 5 apparently healthy young male subjects who were placed in a decompression chamber at an altitude equivalent to 14,000 feet without oxygen for 2-hour periods. Urine was collected just before descent; urine from the control subjects was collected at about the same time during similar periods of normal activity. Chromatograms of not more than 2 of the 5 subjects' samples showed occasional abnormal spots. No over-all increase or decrease in anoxia was noted in the numbers and intensities of the total spots which were detected.
Material obtained by precipitation with ferric chloride from the urine of normal and anoxic subjects was chromatographed in ethanol-water-concentrated ammonia and butanol-acetic-acid water. An increase in number of spots was observed in chromatograms from anoxic subjects. The uncertainty of chemical transfer mechanisms in the preparation of the chromatographed material makes the method unsatisfactory for the quantitative analysis of urine.

Charcoal-adsorbed material from the urine of normal and anoxic subjects was chromatographed in ethanol-ammonia and butanol-acetic acid. An increase in the number of spots and a distribution shift from weak to stronger spots were observed in chromatograms from anoxic subjects. It is concluded that anoxia causes a general increase in the excretion of substances which can be detected by the charcoal adsorption method.
500. Smith, P. and Bennett, A. M. H.
Vallinic acid excretion during stress.

Increased amounts of 4-hydroxy-3-methoxybenzoic (vanillic) acid were detected chromatographically in the urines of some of the subjects undergoing periods of prolonged stress (motor car rally). This increased excretion of vanillic acid may reflect the secretion of adrenaline and noradrenaline in stress situations.

501. Smith, P.

Although some urinary vanillic acid is of dietary origin, there is evidence that vanillic acid has an endogenous origin, arising from the metabolism of adrenaline or noradrenaline. In the urine of 2 subjects the increase in urinary 4-hydroxy-3-methoxymandelic acid, a known metabolite of noradrenaline was paralleled by an increase in urinary vanillic acid. Further evidence is found in the changes in the excretion of 3-ethoxy-4-hydroxybenzoic acid, closely related chemically to vanillic acid, which occurs during stress.

502. Smith, P.
STUDIES IN THE CHEMISTRY OF STRESS.

A convenient method of separating strong (carboxylic) acids from neutral or weakly acidic (phenolic) compounds such as occur in ether extracts of acid-hydrolysed urine is described. Methods of chromatographing separately on paper the resulting acidic and non-acidic fractions and of detecting the individual compounds are also described and applications to the study of human excretion in stress, particularly mild anoxia, are reviewed. Brief mention is made of the chromatography of extracts of unhydrolysed urine.
503. Sobel, C. and Henry, R. J.

A method of preserving the catecholamines in urine for 7 days at room temperature and fluorimetric methods for the determination of adrenaline and noradrenaline, independently or their sum, in urine, or adrenal tissue, have been used for 66 patients with hypertension. There were six proven cases of phaeochromocytoma, all excreting increased amounts of catecholamines, 1 false positive and no known false negatives. 24 normal urines were also assayed.


The specificity of the $\text{Cu}_3(\text{PO}_4)_2$ and napthoquinone methods is materially improved by preliminary isolation of the amino acids on an ion exchange column.

505. Sobel, C., Golub, O. J. and Basu, G. K.

Several factors in the Zimmermann reaction were studied: time and temperature of color development, composition of reagents, specificity and method for correcting for background absorbance. The stoichiometry of the bismuthate oxidation reaction was studied and shown to effect satisfactory recoveries. Conditions for quantitative reduction of 17-KS and the 17-ketogenic steroids appear to be relatively stable at room temperature without added preservative.

506. Sorensen, L. B.
507. 

Soupart, P.

(In French)

A gasometric method of determining histidine based on enzymic decarboxylation and manometric measurement of the CO₂ evolved has been developed. It is quick, easy to perform, and can be applied directly to urine. Compared with ion exchange chromatography the method is more accurate when the urinary output of histidine is low, as in non-pregnant women. In non-pregnant women the daily urinary excretion of histidine is less than 210 mg./24 hr. under controlled diet conditions. It rises above this level as early as two weeks after a missed period.

508. 

Soupart, P.

When amino-acid excretion is calculated in terms of α-amino N, average figures are 87 mg./24 hr. for females, and 91 mg./24 hr. for males.

509. 

Sperber, I.

510. 

Spioch, F. M.
On thermal loss of iron with the sweat in man. POL. TYG. LEK. 16:701-703, 8 May 1961.

(In Polish)
511. Stalder, K.

512. King, J. S., Jr. and Warnock, N. H.

Non-dialysable hexosamine in human urine increases significantly and consistently during the last half of pregnancy, and in patients with renal calculi or atherosclerosis. Two days on a high (800 mg./day) Ca diet did not raise the bound hexosamine level in a normal male.

513. Starka, L.

514. Starlinger, H.
Daily fluctuation in urinary electrolyte and ketosteroid output and changes with different work and climatic conditions. INT. Z. ANGEW. PHYSIOLOG. 17:341-370 (1958). (In German)

The effect was found of work of different kinds, at a rate of 5 kcal./min., and of hot conditions on the 24 hour rhythms of excretion of electrolytes and of 17, 20-dihydroxy-21-ketosteroid in 2 heat acclimatized men. For one the heat chamber was set at 39°, relative humidity of 60-65 percent, wind velocity 0.5 m./sec; for the other the setting was 45°, relative humidity of 20 percent, wind velocity 1 m./sec. In 2 series of experiments the food intake was controlled but generally only the breakfast taken before the 3 hour experimental period was controlled. The most striking change from the well known pattern of electrolyte excretion was in the K:Na ratio; this was greatly increased. The steroid excretion followed no simple rule but increased in the subject working at the higher temperature to equal his morning value.
515. Steigleder, G. K.
Behavior of ground substance, basal membrane and sweat glands in human skin together with an observation on the phenomenon of loss of glycogen.

516. Stern, M. I.

5α-Pregnane-3α:17α:29α-triol is found in unusually large quantities in the urine of many patients with adrenal hyperplasia. A method for its determination is described, which enables this and urinary pregnanediol to be measured concomitantly. The sensitivity, precision and specificity of the method are discussed.


Measurement is made with pH meter, Ag/AgCl and reference calomel electrodes after standardisation with 0.1 N KCl. In pure solutions the accuracy is 0.02-0.03 pCl units in the concentration range 1.0 to 10-4 M. The principal use is the analysis of Cl in sweat collected as a diagnostic test for cystic fibrosis of the pancreas.

518. Strickler, H. S., Grauer, R. C. and Caughey, M. R.
519. Stuettgen, G. and Lewald, L.
On the distribution of depot sulfonamides in the liver and skin of the mouse and in the skin and sweat of man. ARCH. KLIN. EXP. DERM. 214:123-130 (1961). (In German)

520. Sullivan, M. X. and Irreverre, F.

The colorimetric test depends on the reaction of creatinine with K 1:4-naphthaquinone-2-sulphonate to give a carmine color. This very specific method is used for determination of creatinine in urine and in blood. Blood contains very small amounts of creatinine — approximately 1 mg./100 ml. of blood. The estimation of creatinine from total creatinine values in urine is unsatisfactory.

521. Svatos, A.
(In English)

522. Svatos, A.

A factor in urine of men and animals evokes the contraction of the gall bladder without increasing blood pressure. It increases in urine after application of a secretogenous stimulus to the duodenum but decreases after resection of the duodenum. A concentrate of urine had an effect similar to that of cholecystokinin, and was therefore called urocholecystokinin.
523. Tabor, H. and Wyngarden, L.


Formimino-L-glutamic acid, an intermediate in the metabolism of histidine, accumulates in the urine in folate acid deficiency. A spectrophotometric method based on enzymic reactions is described.

524. Taussky, H. H.

Procedure for increasing the specificity of the Jaffe reaction for determination of creatinine and creatine in urine and plasma. CLIN. CHIM. ACTA 1:210—224 (1956). (In English)

525. Tcherkes, I. A. and Filchagin, N. M.

Role of S-containing amino acids in changes of amount of N-methylnicotinamide in urine caused by protein content of diet. BIOKHIMIA 21:64—70 (1956). (In Russian)

Low protein content in rat diet causes an increase in the elimination of N-methylnicotinamide, but if cystine or methionine are included in the diet the rate of elimination is greatly reduced. Other essential amino acids (lysine, valine) have no such effect. If the diet contains sufficient tryptophan, S amino acids do not reduce the amount of N-methylnicotinamide in the urine. It is suggested that nicotinic acid participates in the metabolism of S amino acids, their increased amount in the diet increasing the niacin requirement and reducing the excretion of niacin metabolites.

526. Teller, W. and Staib, W.

Determination of reducing corticosteroids in urine.


(In English)

The contents of reducing corticosteroids by the Tetrazolium Blue and the phosphomolybdic acid reactions. A simplified procedure is given in addition to the detailed methods.
527. Tertitsa, E. E.
Quantitative determination of sugar in urine by drop method. VOEN. -MED. ZH. 1:77–78 (1953). (In Russian)

The determination of sugar in urine is carried out by the titration of 2 ml. reagent (a mixture of 20 ml. glycerine with 80 ml. of 20 percent NaOH is boiled, then successively treated with 80 ml. 10 percent K ferrocyanide and 40 ml. 10 percent CuSO₄) with urine, using a dropping pipette. The pipette is previously calibrated by titrating 2 ml. of the reagent with a 1 percent glucose solution. Conversion tables are given.

528. Thomas, K., et al.
Methylmalonic acid in urine. HOPPE-SEYLER Z. PHYSIOL. CHEM. 308:213–219 (1957). (In German)

Methylmalonic acid is present in human, dog, and rat urine and in small amount in rabbit urine. Rats fed large amounts of anthracene excrete increased amounts of methylmalonic and succinic acids.

529. Thomas, K. and Stalder, K.

The isolation of glutaric and methylsuccinic acids from normal urine using methods previously described by Stalder (1958) is reported. In human urine each of the acids was present, up to 2.5 mg./day; in rats the amount was about 20–25 μg./day. Methylfumaric and dimethylmalonic acid were not found in normal urine but the latter was found in trace amounts after feeding α, γ-dihydroxy-β, β-dimethylbutyric acid. Feeding experiments in rats showed that urinary glutaric acid was derived from glycine and methylsuccinic acid was derived from leucine.
Alterations in urinary pH flow and electrolyte excretion were determined for some hours after standing up and after lying down and compared with controls in which the initial posture was maintained. Standing up was followed by: (i) prolonged reductions in urine flow and the outputs of Na and Cl, (ii) increased hydrion excretion as manifested by decreases in urine pH and HCO₃ output, and increases in NH₄ and titratable acid outputs, (iii) decreases in the percent of urinary anion [A] covered by sodium (Na/A) and in the percent of cation [B] covered by bicarbonate (HCO₃/B), and increases in K/A and NH₄/A. The opposite changes occurred after lying down. The progressive changes in urine acid-base balance indicate an altered tubular Na = H exchange and it is suggested that this is mediated by a hormonal mechanism, possible aldosterone, in response to stimulation of some extracellular fluid 'volume receptor'.

Urinary electrolyte outputs were determined for several hours before and after change of posture during the day and at night and compared with experiments in which the initial posture was maintained. In addition to any acute change in Na output attributable to an alteration of GFR, standing up was always followed by a specific retention of Na—largely associated with an increased tubular ion-exchange for H and K—and a relative decrease in Na/K excretory ratio; recumbency was associated with opposite changes. These responses, which profoundly modified the diurnal rhythm in Na and H outputs and Na/K ratio, are considered to be due to the stimulation of a homeostatic 'volume receptor' mechanism, involving variations in aldosterone secretion.
Effort was directed toward improving methods for measuring adrenal function in man. A new method was developed for the determination of ACTH in blood which appeared to be much more sensitive than previous methods. Methods for measuring aldosterone were investigated, and a routine reproducible procedure was set up. Investigations were carried out on specific keto fractions which are excreted in the urine under normal and pathological conditions. Effort was directed toward the development of better quantitative and qualitative methods for measuring corticosteroids in blood and urine.

Seven subjects flew a prescribed pattern in an F9F simulator under three suit conditions for six hour periods. The three suit conditions were (1) summer flight suit, (2) the Navy's full pressure suit, pressurized to 0.5 psi, and (3) the full pressure suit, pressurized to 2.0 psi. Urines were collected prior to and after each experimental trial for epinephrine and norepinephrine determinations. Results show that there is a marked increase in epinephrine and norepinephrine excretion in the pressure suit conditions over the summer flight suit condition.

This new method is based on the movement of drops of stained standard solution of known specific gravity in the urine. 0.5 ml. can be estimated, so the method is specially suitable for pediatric work.
535. Tompsett, S. L.
Identification and determination of phenols and phenolic acids in urine. CLIN. CHIM. ACTA 3:149-159 (1958). (In English)

The following reactions for determining phenols and phenolic acids in urine were investigated:— Folin-Ciocalteau reagent, indophenol pigment formation, reaction with 1-nitroso-2-napthol, and Erhlich's reaction, p-dimethylaminobenzaldehyde. Some degree of specificity was achieved by preliminary treatment of the urines, and paper chromatography. Higher values for phenolic substances in normal urine were obtained by these methods than by ion exchange or microbiological methods.

536. Tompsett, S. L.

537. Tompsett, S. L.
Determination in urine of some metabolites of tryptophan—kynurenine, anthranilic acid and 3-hydroxyanthranilic acid and presence of o-aminophenol in urine. CLIN. CHIM. ACTA 4:411-419 (1959). (In English)

Methods are described for the determination of these substances. Their urinary excretion has been studied in normal subjects, one case of hypoplastic anaemia, and a few cases of malignant disease of the bladder. In normals the oral ingestion of 5 g. of L-tryptophan caused a significant increase in the excretion of 3-hydroxyanthranilic acid, kynurenine and o-aminobenzoic acid, but a large amount of tryptophan was unaccounted for. There was no apparent effect on the excretion of o-aminophenol. Acetanilide (200 mg.) given orally to normal humans increased the excretion of p-aminophenol but not the o-compound.
538. Torban, M. A.
Importance of control assays in the study of urinary diastase. LABOR. DELO 1:22–24 (1956). (In Russian)

539. Touchstone, J. E., et al.
Excretion of pregnane-3α:17α:21-triol-20-one (tetrahydro S) in normal and pathological urine.

The identification of tetrahydro-S is discussed. The urinary excretion of this substance has been studied by paper chromatographic methods. Urine was obtained from normal and pregnant subjects, from patients with hyperfunction or hypofunction of the adrenal cortex, and from patients with miscellaneous conditions. Excretion of tetrahydro S varied from zero (undetectable) to 15 mg. per 24 hours. The highest values were found in patients with adrenocortical tumors.

540. Touchstone, J. C.

The separation of urinary steroids by paper chromatography is described. From the mobility in different solvents and in some cases from i.r. spectra, pregnane-3α, 11β, 21-triol-20-one, allopregnane-3α, 11β, 21-triol-20-one, Δ^2-pregnen-21-ol-3, 11, 20-trione and allopregnane-3α, 21-diol-11, 20-dione were identified.

541. Tsao, M. U. and Pfeiffer, E. L.

Methylethylketone was isolated from normal human urine and identified. The most likely precursor is α-methylacetoacetic acid, which has been suggested as an intermediate of isocucine catabolism. Methylethylketone may have a dietary origin.
Ullrich, K. J. and Jarausch, K. H.
I. Concentration and dilution of urine.
Distribution of electrolytes (sodium, potassium, calcium, magnesium, chloride, inorganic phosphate), urea, amino acids and exogenous creatinine in the cortex and medulla of the dog kidney in the course of diuresis.
PFLUGERS ARCH. GES. PHYSIOL.
262:537-550 (1956). (In German)

The Na, K, Ca, Mg, Cl, inorganic PO₄, creatinine, urea, and amino acid content of portions of tissue from the cortex, inner and outer medulla and tips of the papillae of the dog kidney were determined. The animals were killed and the kidneys examined immediately after a period of water-deprivation or water diuresis. Following water deprivation there was an increased concentration of Na, Cl, urea, exogenous creatinine and amino acids from the outer medulla towards the papillae, and this increased with increasing urine concentrations. These substances in these regions showed no change in the animals subjected to water diuresis, and the process depends on the hypertonicity of the urine. The total osmotic pressure of the substances present in the papillae was less than that of the urine produced. The urea concentration in the tissues of the papillae was similar to that in the urine indicating a full equalization of the urea concentration between the collecting tubules, loop of Henle, interstitium and cells. The concentrations of K, Mg, Ca, and inorganic PO₄ showed no variation which could be related to the state of diuresis. The concentration of Ca and inorganic PO₄ were particularly high in the inner medulla in old animals, possibly indicating a storage or deposition of a Ca – PO₄ compound.

Ullrich, K. J. and Dehling, G.
Occurrence of phosphorus compounds in various slices of kidney and changes of their concentration in relationship to the course of diuresis. PFLUGERS ARCH. GES. PHYSIOL. 262:551-561 (1956). (In German)

In a similar study the inorganic + labile, acid-soluble, lipoid-nucleic acid- and residual-P were determined, the AMP, ADP, and ATP fractions also being estimated. No significant change of concentrations of these substances was detected in relation to the course of diuresis. There was a decrease in concentrations of lipid-P, AMP, and ADP from the cortex to the tips of the papillae; the concentration of acid-soluble phosphorus increased.
organic-P increased from cortex to papillae and was related to the concentration of the urine formed. No relation between this and the organic-P concentration of the urine was detected. The increase in acid-soluble organic-P is brought about the occurrence of a P-compound which is not absorbed on Dowex 1, 2 or 50 and does not form sparingly-soluble Ba, Pb, or uranyl salts. A similar substance is found in the outer medullary zone. Observations on the nature of this compound are reported, including measurement of the rate of incorporation of $^{32}$P.


I. Young women on a low-niacin, low-tryptophan intake utilized gradually increasing tryptophan supplements in the following sequence: to establish N equilibrium, for blood pyridine nucleotides synthesis and finally there was an increase in the urinary excretion of the two niacin metabolites.


Results with ultrafiltration and ethanol precipitation are comparable. Control studies indicate that 50-100 percent of the gonadotropic activity in the urine is measured by the procedure. Illustrative assays on urine from normal men and normal pre- and post-menopausal women are given.

548. Van Pilsum, J. F. and Seljeskog, E. L.

Effects of urinary volume, diet, and exercise, on long term endogenous creatinine clearance were studied in normal subjects. Variations in urinary volume did not affect the clearance values, but protein ingestion and exercise seemed to increase it slightly. One hour clearances were similar to 24 hour clearances. Long term creatinine clearances of 39 normals of various age groups were determined and found to be similar to reported inulin clearance values for these age groups.

549. Van Sumere, C. F., Teuchy, H. and Massart, L.

Normal and pathological human urine were analysed for coumarins. A circular paper chromatographic method for identification of small quantities of coumarins and phenolic acids was used. Umbelliferone, (7-hydroxy-coumarin) and aesculetin (6, 7-dihydroxy-coumarin) were found in trace amounts in normal human urine. Patients under treatment with prednisone showed a surprisingly higher urine content of umbelliferone and/or aesculetin. It is suggested that the production of these coumarin derivatives is related to the level of corticosteroid hormones in the body.
Van Thoai, N., et al.
(In French)

Humans and rats are treated orally or by i.p. injection with seven amino acids; glycine, sarcosine, alanine, lysine, phenylalanine, tyrosine, and taurine, at concentrations of 200–300 mg./kg. body weight. The metabolites appearing in the urine are chromatographed for analysis. Carbamyl derivatives are found for glycine, sarcosine, tyrosine, and taurine. Seven derivatives of guanidine corresponding to arginine, glycocamine, guanidobutyric acid, and taurocyamine are found. The results indicate that carbamyl and guanidine derivatives are concerned in the detoxication of ammonia.

Van Thoai, N. and Lacombe, G.

After extraction procedures involving a solvent extraction and ion-exchange chromatography, a substance is detected in human urine that behaves on paper chromatograms in exactly the same way as δ-guanido-n-valeric acid. It is present in very small concentrations only.

Vartio, T. and Vuopio, P.

Uropepsin and urocathepsin were determined on 24-hour urine samples from 50 normal subjects and 37 patients with various diseases. Normal uropepsin values ranged from 3.9–201.4 (mean = 53.7) units/hr., and urocathepsin values from 0–66 (mean = 21.0) mg. edestin/hr. There was no dependence of the 2 values on each other either in normals or in disease; in 7 cases of total or subtotal gastrectomy where uropepsin was zero, 6 patients had normal urocathepsin values, possible due to extraventricular sources of urocathepsin. Urocathepsin determinations in disease have no diagnostic value.
553. Vassileff, G.
Quantitative determination of hippuric acid
in urine. C.R. ACAD. BULG. SCI.

Hippuric acid was extracted with ether from an acidified saturated water-solution, and estimated by titration.

554. Veksler, R. I.
Assay of the nitrogen content of urine by the
titration method. VOP. MED. KHIM. 1:450–452
(1955). (In Russian)

A method is suggested based on the oxidation of urinary N-compounds with NaBrO in a weak alkaline medium. To 4 ml. of 0.5 percent solution of CdSO₄ (for fixing possible sulphides) 0.1 ml. of urine diluted in water (1:10), 5 ml. of freshly prepared NaBrO solution and 10 drops of 35 percent HCl acidified with HCl and titrated with 0.005 N-Na₂S₂O₄. The method is quick and accurate, and the presence of protein up to 16 mg. percent does not interfere with the assay.

555. Verboom, E.
Quantitative determination of pregnane-3 (α);
20(α) diol in urine. ACTA ENDOCR.
(Copenhagen) 24:1–50 (1957). (In English)

556. Verghese, N.
Paper electrophoresis of urinary porphyrins.
557. Verneulen, A.
Urinary corticoids; paper chromatographic evaluation of colorimetric method. ACTA ENDOCR. (Copenhagen) 26:399–405 (1957).
(In English)

Although important differences exist between the results obtained by paper chromatography and by the chemical method, statistical analysis shows a significant correlation between the results obtained by the two methods. This indicates that the routine reaction using phenylhydrazine, although of low specificity, is nevertheless a useful index of corticoid excretion. Thus, a relatively simple but reliable method is available for the routine determination of corticoids for clinical purposes.

558. Verney, E. G.

559. Vestergaard, P. and Leverett, R.
Excretion of combined neutral urinary 17-ketosteroids in short term collection periods; spontaneous variability. ACTA ENDOCR. (Copenhagen) 25:45–53 (1957). (In English)

Great individual differences were found in the excretion. In subjects with the most stable excretion patterns a number of factors claimed to influence 17-ketosteroid excretion had no verifiable influence: these include nutritional, emotional and climatic factors and also exercise. In subjects with labile excretion patterns, one of the factors most often correlated with increased excretion was emotional tension. A double wave rhythm in excretion with a morning maximum and a later secondary maximum was found on 179 of the 200 collection days. A variability difference between the sexes was found.

560. Vestergaard, P. and Leverett, R.

Considerable individual variation was found in urinary creatinine excretion. The estimation of urinary creatinine excretion in short collection periods varies considerably more than 24-hour estimations. Creatinine should not be used to check the completeness of urine collection in short experimental periods, nor should it be used for establishing excretion ratios, unless a preliminary investigation of variability is undertaken.
561. Visco, G.
The bacteriological examination of urine.
POLICLINICO (Prat) 68:523-530,
3 Apr 1961. (In Italian)

562. Voigt, K.
Chemical determination of histidine in protein hydrolysates and in urine. BIOCHEM. Z.
331:127-132 (1959). (In German)
A micro-determination (0.2 - 0.7 mg.) of histidine by colorimetry is described. It is a modification of Keppler-adler's method. In this modification the excess bromine, cyclic amino acids and heavy metals are removed, partly by absorption and partly by coupling reactions. A table summarizes the results of measurements on human serum, rat globin, Jensen's sarcoma, Walker's carcinoma of the rat and ascites tumor of the mouse.

563. Von Euler, U. S. and Lishajko, F.
(In English)
Certain modifications in the fluoremetric method of Euler and Floding are described.

564. Von Euler, U. S. and Lishajko, F.

565. Von Kaulua, K. N.
Extraction and concentration of thromboplastic material from human urine. PROC. SOC. EXP. BIOL. N. Y. 91:543-545 (1956).

The thromboplastic material is extracted from normal male human urine by absorption on BaSO₄ and subsequent elution 2 - 3 mg./l. of comparatively heat resistance thromboplastic material are obtained. 6 µg. per ml. of hemophilic plasma will restore the clotting properties to normal. Neither physiological significance nor source of this urinary thromboplastic material is known as yet.
566. Von Metzsch, F. A.
Examples of multiple distributions. ANGEW. CHEM. 68:323–334 (1956). (In German)
Includes tables giving details of separation of many biological compounds by Craig countercurrent method.

567. Walaszek, E. J.
Bradykinin was shown to contain two substances when chromatographed on paper. Two active polypeptides found in urine corresponded to the two active substances found in bradykinin.

568. Walser, M. and Bodenlos, L. J.
From experiments using $^{15}$N and $^{14}$C labelled urea injected i. v. it was shown that urea production exceeded excretion by 20 percent and 1/4 of the labelled urea is not recovered in urine. Oral neomycin increased urine recovery of labelled area to 95 percent, suggesting that there is normally a loss of 1/4 of the urea produced due to hydrolysis by intestinal bacteria.

569. Walters, C. L.
The isolation of a pigment inhibitor (of mol. wt. 2100) of alkaline phosphatase in vitro from concentrated normal male urine is described. Kinetic experiments showed that the pigment is a competitive inhibitor, with reversible combination of one molecule of pigment with one molecule of the enzyme. Its inhibitory action depended on its acidic groups.
570. Watson, D. and Pratt, D. A. H.
Micro estimation of urea. NATURE

A method in which Feigl's reagent (Ag/Mn nitrate soln.) and a filter paper spot test are used to determine the concentration of urea in 5 to 20 µl. of biological fluid is described. A simple apparatus has been designed which deals with 24 analyses in less than 15 minutes.

571. Webb, T., Rose, B. and Schon, A. H.

The biocolloids of normal urine have been isolated and characterized by free electrophoresis and electrophoresis on filter paper. An average of 133 mg. of material was recovered from 24-hour aliquots of normal urine. This material was composed of at least 7 components as revealed by free electrophoresis at pH 8.6. Five of these components were similar in electrophoretic mobility to the 5 serum components. A relatively large amount of material was present which behaved like the acid mucoproteins of normal serum. No lipoproteins were detected. Some of the components of the urinary biocolloids were shown to be derived from human serum γ-globulins by labelling the latter with I¹³¹.

572. Webb, T., Rose, B. and Schon, A. H.

The biocolloids of normal urine were separated by electrophoresis on starch and compared with similarly prepared fractions of serum by ultracentrifugal, free diffusion, and immunochemical techniques. The albumin fraction of urine was indistinguishable from the serum component. The urinary γ2-globulins were shown to consist of low molecular weight (10,000) fragments of the normal antigenically related to some of the serum components but appeared to contain lower molecular weight materials. Some of the components of normal serum could not be detected in the urine and the urine contained at least 2 components which were not present in the serum.
573. Weil-Malherbe, H. and Bone, A. D.

A method for the separate estimation of adrenaline, noradrenaline, and hydroxytyramine in urine. Values are given for normal urine and urine from patients with hypertension. The concentration of adrenaline and hydroxytyramine are definitely higher in hypertensives, and noradrenaline is probably also higher.

574. Weinmann, S. H. and Hayle, M. F.

A simple and sensitive method for the determination of alcoholic and phenolic hydroxyl derivative is described. Using this method, it has been possible to demonstrate substances hitherto undetectable by the usual methods of steroid determination. The chemistry and physiology of these compounds is ill defined.


Urine is hydrolysed in acetic acid (0.1 M, pH 4.7) for 4 hours and then extracted in CHC13. This process releases SO4 of Δ5-3β-hydroxysteroids. It is shown that Δ5-androstene-3β:17β-diol and Δ5-androstene-3β:16α:17β-triol represent the metabolites of dehydroepiandrosterone.
576. Weinmann, S. H. and Jayle, M. F.
Comparative estimation of the hydroxyl group of lipids and that of various urinary steroids.

The estimation of total lipid OH in urine is of very little value due to its low specificity. However, under certain physiological or pathological conditions it is sometimes useful to detect substances not determined by the usual techniques.

577. Weintrub, I. W. and Hollander, F.

The method of determining uropepsinogen by measuring milk-clotting activity, using the urine of subjects with a wide variation in gastric secretory activity, is evaluated.

578. Weissman, B., Bromberg, P. A. and Gutman, A. B.

The purine bases of human urine are absorbed from the acidified urine on Dowex 50, eluted with NH₃, precipitated with AgNO₃ and finally separated by 2-dimensional paper chromatography or ion-exchange chromatography. 1-Methylguanine, N²-methylguanine, 1-methylhypoxanthine, 8-hydroxy-7-methylguanine, guanine, hypoxanthine, xanthine, adenine and 7-methylxanthine were demonstrated in normal urine. 1-Methyl-7-methyl- and 1:7-dimethylxanthine are present only after intake of coffee and similar substances.
Purine bases were estimated semiquantitatively by u.v. measurements after their isolation by methods indicated in the previous abstract. The daily urinary excretion of 9 normal adult females were: hypoxanthine 9.7, xanthine 6.1, 7-methylguanine 6.5, 8-hydroxy-7-methylguanine 1.6, adenine 1.4, guanine 0.4, 1-methylguanine 0.6, N-methylguanine 0.5, 1-methylhypoxanthine 0.4. The absence of significant changes in excretion with diet indicates an endogenous source of these substances in man. The N from fed glycine was incorporated into all the urinary purines tested.

6-Succinoaminopurine and 8-hydroxy-7-methylguanine are normal urinary constituents. The amounts of each in urine, in normal and diseased states, may be related to the rate of synthesis of the precursors of nucleic acid adenine and guanine, respectively.

Healthy male volunteers were made to sweat profusely in a steam room at 40° and their sweat collected. This was tested quantitatively by a modified BaCl₂ method of Folin for inorganic and total sulfates. The results were not significantly increased after oral ingestion of elemental S precipitation.
Wilson, H., Borris, J. and Garrison, M.

CHROMATOGRAPHIC PROCEDURE FOR THE
DETERMINATION OF URINARY CORTICOSTEROIDS
AND C₁ᵉ STEROIDS. Walter Reed Army Inst. of
Research, Washington, D. C. Interim rept. on
Psychological, Endocrinological and Metabolic
Homeostatic Mechanisms in Health and Disease,
Oct 1957, 27p. (Rept. no. WRAIR 146-57).
ASTIA AD-152 743.

A comprehensive procedure for routine analysis of urinary steroids is described, con-
sisting of a simple partition chromatographic column, operated to separate three
fractions: C₁ᵉ₂ steroids or androgen metabolites, C₁ᵉ₃ steroids, and corticosteroids.
The column consists of synthetic aluminum silicate as supporting phase, and 50 percent
ethanol as stationary phase, developed by "stepwise" gradient employing hexane con-
taining increasing proportions of chloroform. Eluates are sufficiently pure to give
accurate titers in colorimetric assays. Steroid metabolites accurately determined with-
out complete separation are: total 21-hydroxy corticosteroids, total 17-hydroxy steroids,
polar 17-hydroxy-γ-glycols, Silber-Porter chromogens, C₁ᵉ₂ and C₁ᵉ₃ steroids both
ketonic and non-ketonic.

Wilson, H., Lipsett, M. V. and Ryan, D. W.

Urinary excretion of Δ⁵-pregnenetriol and other
3β-hydroxy-Δ⁵ steroids by subjects with and
without endocrine disease. J. CLIN. ENDOCR.

In all the urine samples analysed, Δ⁵-pregnen-3β, 17α, 20α-triol [5-PT] was found,
which indicated that its presumptive adrenal precursor 3β, 17α-dihydroxy-Δ⁵-pregnen-
20-one is regularly formed. Excretion of 5PT varied from 0.1 to 0.4 mg./day in 10
subjects without endocrine disorders and from 4 to 53 mg. in 5 patients with adrenal
carcinoma; but raised levels were not found in 2 patients with Cushing's syndrome nor
in 2 with Stein-Leventhal syndrome. Results obtained suggest that an inefficient con-
version of 3β-17α-dihydroxy-Δ⁵-pregnen-20-one to dehydroepiandrosterone [DHA]
may result in increased formation of 5-PT. Δ⁵-Pregnen-3β, 20α-diol was detected in
the urine of all subjects without endocrine disorders and was found in increased amounts
in the urine of 4 out of 5 adrenal cancer patients, in whom Δ⁵-androstenediol excretion
was about 1/10th that of the DHA.
Urinary erythropoietic factor was partially purified by adsorption on kaolin followed by serial elution with NH₄ acetate buffers of increasing pH and then with 1 M NH₄OH giving a 39 percent yield with a 230-fold purification of the active factor. The purified preparation produces metachromasia with Toluidine Blue, has an absorption peak at 280 mÊ and migrates very slowly on paper electrophoresis. The similarity and differences between urinary and plasma erythropoietin are discussed.

586. Winkert, J., Gordon, A. S. and Winkert, E.


587. Winters, R. W. and Davies, R. E.


588. Wittenhagen, G.

Qualitative detection of protein in urine in presence of excretion product of N-4-methylbenzylsulphonyl-N-butyl urea (D860). DTSCH. MED. WSCHR. 82:254–255 (1957). (In German)

The urinary excretion product of D860 is precipitated at pH 5 and leads to errors in the quality detection of protein. This may be avoided if the urine (5 ml.) is heated for 30 seconds with an acetate buffer solution (0.5 ml.) when the protein is precipitated without the excretion product. The composition of the buffer is Na acetate 118 g.; 5 percent acetic acid 56 ml.; water to one liter. After filtration the excretion product may be precipitated with concentrated HCl.
589. Wohnlich, H.

Glycogen was incubated with human perspiration and the cleavage products analysed. Results indicate that it contains amylase and $\alpha$-glucosidase. Sweat also contained free phosphoric acid and P-esters of carbohydrates.

590. Wotiwod, A. J. and Knight, R.

The acid is extracted with ether, coupled with diazotised p-nitroaniline, and the dye extracted and used in colorimetry. Some normal values are given, and the method is compared with the Sandler-Ruthven method.

591. Wood, T.


Incubation with $\beta$-glucuronidase releases from urine only a fraction of the total amounts present of androsterone, 11-ketoandrostosterone, 11 $\beta$-hydroxyandrostosterone, aetiocholanolone, 11-ketoaetiocholanolone, and 11 $\beta$-hydroxyaetiocholanolone. A significantly greater proportion of the derivative of aetiocholanolone than of androsterone is released by the enzymic treatment.
593. Wright, J. T.

Acidified urine is passed through an anion-exchange column in the acetate form, the effluent being free of strong organic and mineral acids. Boric acid is added to form strongly acidic complexes with the catechols present in solution. Passage of this solution through an anion-exchange resin in the borate form results in retention by the resin of its catechol complex. This is eluted by diluted acid and the catechols estimated fluorimetrically.

594. Wright, T.

595. Sendroy, W. J. and Bishop, C. W.
Interpretation of urinary $^{15}$N excretion data following administration of $^{15}$N labelled amino acids. J. APPL. PHYSIOL. 14:11–21 (1959).

Calculations of the size of pools is discussed and examples given of such calculations following administration of various amino acids. As labelled NH$_2$ is incorporated into more and more compounds and as each of these diffuses into an increasing number of body compartment the apparent size of the mixed amino-N pool, as reflected by urinary excretion, seems to expand with time until eventually it equals the total exchangeable NH$_2$ in the body.
596. Wu, H. and Elliott, H. C.
Urinary excretion of hippuric acid by man.

Under the experimental conditions endogenous hippuric, uric and glucuronic excretions were constant. The excretion constant $K_E$ of exogenous hippuric acid was $2.7 \text{ hr}^{-1}$ (Na hippurate doses of $1\text{–}4 \text{ mequiv}$). The $K_S$ for synthesis of hippurate from benzoate is $10.5 \text{ hr}^{-1}$ (Na benzoate doses of $1\text{–}4 \text{ mequiv}$). The determination of $K_E$ in various renal diseases suggests that it may be of value in the study of renal function. There is some suggestion that $K_S$ determination may be useful in the study of the delay of hippurate synthesis that has been observed in some forms of hepatic damage.

597. Yardley, H. J.

Six normal and 14 pathological urines were analysed for inorganic ions, creatinine, urea, and protein. The results of these determinations were compared with the total salt concentration, total concentration of dissolved particles, and total solids. Na, K, Ca, Mg and $\text{NH}_4$ normally accounted for nearly all the cations present in urine. In one pathological specimen which contained large amounts of amino acids, a high concentration of undetermined cations was demonstrated. $\text{Cl}$, $\text{SO}_4$, and $\text{HCO}_3$ accounted for about 80 percent of the anions present in urine. One pathological urine showed a concentration of undetermined anions higher than normal. If the vapor pressure due to urea, creatinine and inorganic ions was subtracted from the total vapor pressure, unanalysed constituents were found to make up about 20 percent of the total in normal urine. Abnormally high values for unanalysed constituents were also found in urine from a patient with the nephrotic syndrome.

Fractional composition of sweat produced by heat and strenuous work. III. Effect of previous baths. CAS. LEK. CESK. 100:170-175, 10 Feb 1961. (In Czech)
SUBJECT INDEX

-A-

acetaldehydogenic steroids in urine, determination ................. 98
acetic acid, imidazole, in urine .................................. 129
acetoacetic acid in urine, determination ............................ 469
acetone in urine, determination ...................................... 151, 469
acetylcholine antagonist in urine ..................................... 313
acetylhistamine in urine ............................................. 285
acetylkynurenine in urine ............................................ 425, 426
acetyltryptohan in urine ............................................ 16, 425
acetyltryptophan in urine, determination ............................. 16
acid (see also pH)
  acid mucopolysaccharides in urine .................................. 232, 291
  acid phosphatase in urine ........................................... 308
  adenoine in urine, determination .................................... 578, 579
  adenosinediphosphate in urine, effects of water deprivation .... 543
  adenosinemonophosphate in urine, effects of water deprivation . 543
  adenosinetriphosphate in urine, effects of water deprivation . 543
  adrenal carcinoma, urinary metabolites ........................... 584
  adrenal disease, urinary pregnane compounds ...................... 150
  adrenaline, effect on urine formation rate ....................... 324
  adrenaline in urine ............................................... 228, 286
  adrenaline in urine, determination ................................ 12, 99, 120, 130, 149
  390, 414, 503, 563, 564, 573
  adrenaline in urine, during simulated flight ....................... 533
  adrenaline in urine, effects of sensory deprivation ............ 370
  adrenaline in urine, effects of stress .......................... 370, 500

171

LOCKHEED MISSILES & SPACE COMPANY
<table>
<thead>
<tr>
<th>Topic</th>
<th>Page Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>adrenaline in urine, factors affecting</td>
<td>139</td>
</tr>
<tr>
<td>adrenocortical diseases, urinary taurine</td>
<td>410</td>
</tr>
<tr>
<td>adrenocortical diseases, urinary tetrahydro S compounds</td>
<td>539</td>
</tr>
<tr>
<td>adrenocorticoestrogens in urine</td>
<td>225,242,274,433</td>
</tr>
<tr>
<td>adrenocorticoestrogens in urine, determination</td>
<td>263,438,532</td>
</tr>
<tr>
<td>adrenocorticotropic hormone in urine, determination</td>
<td>173</td>
</tr>
<tr>
<td>adrenogenital syndrome, urine analysis for</td>
<td>187</td>
</tr>
<tr>
<td>adrenosterone in urine, determination</td>
<td>469</td>
</tr>
<tr>
<td>aesculetin in urine</td>
<td>549</td>
</tr>
<tr>
<td>aetiocholanc-3α:11β-diol-17-one in urine</td>
<td>415</td>
</tr>
<tr>
<td>aetiocholanolone in urine</td>
<td>228,592</td>
</tr>
<tr>
<td>alanine in urine</td>
<td>161,389</td>
</tr>
<tr>
<td>alanine metabolites in urine</td>
<td>550</td>
</tr>
<tr>
<td>albumen, serum, reactions with urinary steroids</td>
<td>496</td>
</tr>
<tr>
<td>albumin in urine</td>
<td>321,445,446</td>
</tr>
<tr>
<td>albumin in urine, determination</td>
<td>151</td>
</tr>
<tr>
<td>albumin in urine, lipoids in association with</td>
<td>9</td>
</tr>
<tr>
<td>β-alcohols in urine</td>
<td>198</td>
</tr>
<tr>
<td>aldosterone in urine</td>
<td>225,233</td>
</tr>
<tr>
<td>aldosterone in urine, determination</td>
<td>22,111,131,339,362</td>
</tr>
<tr>
<td>375,394,397,437,532</td>
<td></td>
</tr>
<tr>
<td>aklaline phosphatase inhibitor in urine</td>
<td>569</td>
</tr>
<tr>
<td>alkaptonuric urine, reducing substances in</td>
<td>153</td>
</tr>
<tr>
<td>allantoic in urine</td>
<td>219</td>
</tr>
<tr>
<td>allopregnane-3α, 21-diol-11-20 dione in urine</td>
<td>540</td>
</tr>
<tr>
<td>allopregnane-3α, 11β, 21-triol-20-one in urine</td>
<td>540</td>
</tr>
<tr>
<td>allotetrahydrocortisol in urine</td>
<td>72,440</td>
</tr>
<tr>
<td>altitude, effects on urinary constituents</td>
<td>49,454,458,459</td>
</tr>
<tr>
<td>ammonium chloride, dietary, effects on electrolytes in sweat</td>
<td>303</td>
</tr>
<tr>
<td>ammonium chloride, dietary, effects on electrolytes in urine</td>
<td>225,357</td>
</tr>
<tr>
<td>ammonium in feces</td>
<td>193</td>
</tr>
</tbody>
</table>

172
ammonium in sweat .................................................. 361,434
ammonium in urine .................................................. 28,567
ammonium in urine, effects of phosphate rich diet ................. 305
ammonium in urine, effects of posture ................................ 530
amines, catechol, determination ................................... 155,204
amines in urine ...................................................... 243
amines in urine, determination ..................................... 98,259,366,390,495
amino acid metabolites (see also the specific metabolite)
amino acid metabolites in urine ..................................... 550
amino acids in feces .................................................. 193
amino acids in sweat .................................................. 361,434
amino acids in urine .................................................. 38,161,219,249,330,508,595
amino acids in urine, determination ................................ 38,398,460
amino acids in urine, effects of age and diet ......................... 161
amino acids in urine, effects of L-ascorbic acid administration .. 14
amino acids in urine, effects of potato and carrot ingestion ........ 14
amino acids in urine, effects of water deprivation ................. 542
amino acids in urine of ethnic groups ................................ 389
amino acids in urine of twins ......................................... 13
amino-nitrogen in urine, determination ................................ 504
amino-nitrogen in urine, flow-volume effects ......................... 464
0-aminobenzoic acid in urine, determination ......................... 537
0-aminobiphenyl acid in urine ....................................... 425,426
β-aminoisobutyric acid in urine ..................................... 8,389,180
β-aminoisobutyric acid in urine after irradiation .................. 448
aminopeptidase in urine, determination ................................ 185
0-aminophenol in urine, determination ................................ 537
aminosteroids in urine .............................................. 466
amphoteric reaction with urine ...................................... 24
amylase in sweat ..................................................... 589
amyloidosis, hyaluronidase in urine ................................ 183
<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>androgen metabolites in urine, determination</td>
<td>583</td>
</tr>
<tr>
<td>androgens in urine</td>
<td>210</td>
</tr>
<tr>
<td>androstenedione in urine, determination</td>
<td>489</td>
</tr>
<tr>
<td>androstenediol in urine</td>
<td>159,575</td>
</tr>
<tr>
<td>androstene-triol in urine</td>
<td>159,575</td>
</tr>
<tr>
<td>androsterone in urine, determination</td>
<td>48,268,288,592</td>
</tr>
<tr>
<td>androsterone in urine, determination</td>
<td>184,323,489</td>
</tr>
<tr>
<td>anhdrocitrovorum in urine, determination</td>
<td>492</td>
</tr>
<tr>
<td>anions in urine (see also the specific anion)</td>
<td></td>
</tr>
<tr>
<td>anions in urine</td>
<td>509</td>
</tr>
<tr>
<td>anoxia, urinary metabolites</td>
<td>497,498,499,502</td>
</tr>
<tr>
<td>anthracene, dietary, and urinary methylmalonic acid</td>
<td>528</td>
</tr>
<tr>
<td>anthranilic acid glucuronide in urine</td>
<td>425,426</td>
</tr>
<tr>
<td>anthranilic acid metabolites in urine, determination</td>
<td>537</td>
</tr>
<tr>
<td>antibodies in urine</td>
<td>430</td>
</tr>
<tr>
<td>antidiuretic substance in urine</td>
<td>224</td>
</tr>
<tr>
<td>antigenic components of urine</td>
<td>197</td>
</tr>
<tr>
<td>arginine in urine</td>
<td>550</td>
</tr>
<tr>
<td>aromatic acids (see also the specific compound)</td>
<td></td>
</tr>
<tr>
<td>aromatic acids in urine</td>
<td>293</td>
</tr>
<tr>
<td>aromatic acids in urine, determination</td>
<td>581</td>
</tr>
<tr>
<td>aromatic amines in urine</td>
<td>425</td>
</tr>
<tr>
<td>arterenol in urine</td>
<td>228</td>
</tr>
<tr>
<td>arthritis, effects on urine composition</td>
<td>415</td>
</tr>
<tr>
<td>arylsulfatases in urine</td>
<td>10,36,114,115</td>
</tr>
<tr>
<td>ascorbic acid, bacteriostatic and acidifying effects in urine</td>
<td>388</td>
</tr>
<tr>
<td>L-ascorbic acid administration, effects on urinary amino acids</td>
<td>14</td>
</tr>
<tr>
<td>atherosclerosis, urinary hexosamine</td>
<td>512</td>
</tr>
<tr>
<td>auditory deprivation, effects on uropepsin excretion</td>
<td>49</td>
</tr>
<tr>
<td>azotriiodothyronines in urine and plasma</td>
<td>27</td>
</tr>
</tbody>
</table>
bacteria, cultures in urine .............................................. 299
bacteria, effects of urinary ascorbic acid ................................ 388
bacteria, effects on glucose oxidase .................................... 320
bacteria, effects on urinary glucuronic acid .......................... 294
bacteria in feces .......................................................... 193
bacteria in urine ........................................................ 20,319,561
bacteriostatic effects of urine after ingestion of pear leaf extracts . 427
bananas, dietary, effects on urinary 5-hydroxyindoleacetic acid 12
bensidine, environmental, urinary β-glucuronidase .................. 360
berries, residue in feces ................................................ 193
bibliography on saliva .................................................. 41
bicarbonates in urine ................................................... 28,597
bicarbonates in urine, effects of posture ................................ 530
bile in urine, determination ............................................ 85,490
bilirubin in urine ....................................................... 461,462
bilirubin in urine, determination ...................................... 151,200,301,463
bilirubin glucuronide in urine, determination ........................ 463
biocolloids in urine ..................................................... 571
bladder tumor, urinary metabolites .................................... 360,537
blood cells in urine .................................................... 247,292,401
blood pressure urinary vasodilator factor ............................. 466
body weight, relation to urinary 17-ketosteroids and creatinine 345
bradykinin, relation to kinin .......................................... 177
bradykinin in urine .................................................... 177,188
bromine in sweat ........................................................ 494
burns, urinary proteins ................................................ 256

175

LOCKHEED MISSILES & SPACE COMPANY
cabbage residue in feces. .................................................. 183
 cadaverinase in urine ....................................................... 204
 cadmium in urine, effects of EDTA ....................................... 411
 caffeic acid ingestion, effects on urinary phenol and indole acids 487
 calcium, dietary, effect on urinary hexosamine .......................... 512
 calcium in sweat ............................................................. 406,434
 calcium in urine .................................................................. 219,250,597
 calcium in urine, determination ........................................... 307,331
 calcium in urine, effects of NH₄Cl and NaHCO₃ ....................... 357
 calcium in urine, effects of pituitary hormones ....................... 170
 calcium in urine, effects of water deprivation ......................... 542
 calcium oxalate in urine, precipitation technique ..................... 124,125
 calculi, urinary, analysis ................................................... 301
 callicrein-like substance in urine ......................................... 456
 cancer, cystine in urine ..................................................... 280
 cancer, urinary 11-hydroxyaetiocholanolone ........................... 415
 cancer, urinary leucine amino-peptidase ................................ 185
 cancer of bladder, urinary β-glucuronidase ............................. 396
 cancer of pancreas, urinary lipase ......................................... 550
 carbamyl metabolites in urine .............................................. 471
 carbamyltaurine in urine, determination ................................ 176
 carbohydrate-protein complexes in urine ................................. 193
 carbon dioxide in feces ...................................................... 28,421
 carbon dioxide tension and urinary constituents ....................... 303
 carbonic anhydrase inhibitor, effect of electrolytes in sweat ....... 314
 carboxylic acids, phenolic, in urine ....................................... 388
 casein, hydrolyzed, bacteriostatic and acidifying effects in urine 473
 casts, urinary ................................................................. 81,281,563,564,593

cabbage residue in feces. .................................................. 183
 cadaverinase in urine ....................................................... 204
 cadmium in urine, effects of EDTA ....................................... 411
 caffeic acid ingestion, effects on urinary phenol and indole acids 487
 calcium, dietary, effect on urinary hexosamine .......................... 512
 calcium in sweat ............................................................. 406,434
 calcium in urine .................................................................. 219,250,597
 calcium in urine, determination ........................................... 307,331
 calcium in urine, effects of NH₄Cl and NaHCO₃ ....................... 357
 calcium in urine, effects of pituitary hormones ....................... 170
 calcium in urine, effects of water deprivation ......................... 542
 calcium oxalate in urine, precipitation technique ..................... 124,125
 calculi, urinary, analysis ................................................... 301
 callicrein-like substance in urine ......................................... 456
 cancer, cystine in urine ..................................................... 280
 cancer, urinary 11-hydroxyaetiocholanolone ........................... 415
 cancer, urinary leucine amino-peptidase ................................ 185
 cancer of bladder, urinary β-glucuronidase ............................. 396
 cancer of pancreas, urinary lipase ......................................... 550
 carbamyl metabolites in urine .............................................. 471
 carbamyltaurine in urine, determination ................................ 176
 carbohydrate-protein complexes in urine ................................. 193
 carbon dioxide in feces ...................................................... 28,421
 carbon dioxide tension and urinary constituents ....................... 303
 carbonic anhydrase inhibitor, effect of electrolytes in sweat ....... 314
 carboxylic acids, phenolic, in urine ....................................... 388
 casein, hydrolyzed, bacteriostatic and acidifying effects in urine 473
 casts, urinary ................................................................. 81,281,563,564,593

LOCKHEED MISSILES & SPACE COMPANY
catecholamines in urine, determination. 120, 130, 155, 186, 204, 228, 259, 354, 366, 390, 414, 503, 536, 573

catecholamines in urine, effects of sensory deprivation. 370

catecholamines in urine, effects of simulated flight. 533

catecholamines in urine, effects of stress. 500

catecholamines in urine, effects of simulated flight. 533

cells in urine. 18, 79, 116, 214, 247, 277, 292, 401, 594

cells in urine, relations to 17-hydroxy-corticosteroid excretion. 116

ceruloplasmin in urine. 445

colorides in sweat. 31, 33, 271, 361, 422, 434, 444

colorides in sweat, determination. 152, 517

colorides in urine. 219, 597

colorides in urine, determination. 182, 517

colorides in urine, effects of cooling. 254, 479

colorides in urine, effects of posture. 80, 530

colorides in urine, effects of water deprivation. 542

colorides in urine, flow-volume effects. 332, 441

chloroquine in urine, determination. 217

colorpromazine in urine, determination. 163

cholecystokinin in urine. 522

chondroitin-sulfate in urine. 109, 231

cirrhosis of liver, urinary metabolites. 403, 415

citrovorum factor in urine. 492

colligative properties of sweat. 167

colloids in urine. 53, 221, 571

colloids in urine, determination. 231

confinement, effects on uropepsin excretion. 49

connective tissues in feces. 193

contraction substance in urine. 188, 284

cooling, effects on urine composition. 254, 384, 479

cooling, effects on urine flow. 477

177

LOCKHEED MISSILES & SPACE COMPANY
<table>
<thead>
<tr>
<th>Substance</th>
<th>Page Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Copper in sweat</td>
<td>434</td>
</tr>
<tr>
<td>Copper in urine</td>
<td>73</td>
</tr>
<tr>
<td>Copper in urine, determination</td>
<td>326</td>
</tr>
<tr>
<td>Coproporphyrin in urine, determination</td>
<td>87, 117, 431</td>
</tr>
<tr>
<td>Corticoid metabolites in urine,</td>
<td>437</td>
</tr>
<tr>
<td>determination</td>
<td></td>
</tr>
<tr>
<td>Corticoids (see also the specific</td>
<td></td>
</tr>
<tr>
<td>corticoid)</td>
<td></td>
</tr>
<tr>
<td>Corticoids in urine</td>
<td>436</td>
</tr>
<tr>
<td>Corticoids in urine, determination</td>
<td>88, 428, 567</td>
</tr>
<tr>
<td>Corticoids in urine, effects of heat</td>
<td>73</td>
</tr>
<tr>
<td>Corticoids in urine, effects of sensory</td>
<td>385</td>
</tr>
<tr>
<td>deprivation</td>
<td></td>
</tr>
<tr>
<td>Corticoids in urine, influence of</td>
<td>65</td>
</tr>
<tr>
<td>volume on</td>
<td></td>
</tr>
<tr>
<td>Corticosteroid metabolites in urine,</td>
<td>416</td>
</tr>
<tr>
<td>metabolites</td>
<td></td>
</tr>
<tr>
<td>Corticosteroids, influence on</td>
<td>549</td>
</tr>
<tr>
<td>urinary coumarine</td>
<td></td>
</tr>
<tr>
<td>Corticosteroids in urine, determination</td>
<td>395, 526, 532, 557, 583</td>
</tr>
<tr>
<td>Corticosterone in urine</td>
<td>274, 438</td>
</tr>
<tr>
<td>Corticosterone in urine, determination</td>
<td>22</td>
</tr>
<tr>
<td>Corticosterone metabolites in urine</td>
<td>540</td>
</tr>
<tr>
<td>Cortisol in urine</td>
<td>225, 274</td>
</tr>
<tr>
<td>Cortisol in urine, determination</td>
<td>22</td>
</tr>
<tr>
<td>Cortisone in urine</td>
<td>225, 274</td>
</tr>
<tr>
<td>β-Cortolone in urine</td>
<td>48, 440</td>
</tr>
<tr>
<td>Coumarins in urine</td>
<td>549</td>
</tr>
<tr>
<td>Creatinines in sweat</td>
<td>31, 33, 434</td>
</tr>
<tr>
<td>Creatinine in urine</td>
<td>162, 208, 219, 222, 363</td>
</tr>
<tr>
<td></td>
<td>399, 418, 440, 548, 597</td>
</tr>
<tr>
<td>Creatinine in urine, determination</td>
<td>11, 134, 282, 520, 524</td>
</tr>
<tr>
<td>Creatinine in urine, effects of</td>
<td>479</td>
</tr>
<tr>
<td>cooling</td>
<td></td>
</tr>
<tr>
<td>Creatinine excretion in urine, effects</td>
<td>80</td>
</tr>
<tr>
<td>of posture</td>
<td></td>
</tr>
<tr>
<td>Creatinine in urine, effect of water</td>
<td>542</td>
</tr>
<tr>
<td>deprivation</td>
<td></td>
</tr>
<tr>
<td>Creatinine in urine, relation to body</td>
<td>345</td>
</tr>
<tr>
<td>weight</td>
<td></td>
</tr>
<tr>
<td>Creatinine in urine, relation to</td>
<td>332</td>
</tr>
<tr>
<td>urinary volume</td>
<td></td>
</tr>
<tr>
<td>Topic</td>
<td>Page(s)</td>
</tr>
<tr>
<td>----------------------------------------------------------------------</td>
<td>---------</td>
</tr>
<tr>
<td>creatinine-urea excretion rate relationship</td>
<td>44</td>
</tr>
<tr>
<td>crystals in urinary sediments</td>
<td>19</td>
</tr>
<tr>
<td>Cushing's syndrome, urinary metabolites</td>
<td>584</td>
</tr>
<tr>
<td>cyclohexitols in urine</td>
<td>349</td>
</tr>
<tr>
<td>cystic fibrosis, chlorides in sweat and urine</td>
<td>517</td>
</tr>
<tr>
<td>cystic fibrosis of the pancreas, sweat composition</td>
<td>90, 113, 517</td>
</tr>
<tr>
<td>cystine, dietary, and urinary N-methyl-nicotinamide</td>
<td>525</td>
</tr>
<tr>
<td>cystine in urine</td>
<td>290, 389</td>
</tr>
<tr>
<td>cystine in urine of ethnic groups</td>
<td>389</td>
</tr>
<tr>
<td>dehydration, effects on urinary electrolytes</td>
<td>195, 542</td>
</tr>
<tr>
<td>dehydration, effects on urinary nitrogen</td>
<td>195</td>
</tr>
<tr>
<td>dehydration, effects on urine volume</td>
<td>141, 279</td>
</tr>
<tr>
<td>dehydrocorticosterone in urine, determination</td>
<td>274</td>
</tr>
<tr>
<td>dehydroepiandrosterone in urine</td>
<td>48, 288</td>
</tr>
<tr>
<td>dehydroepiandrosterone in urine, determination</td>
<td>50, 160, 184, 323</td>
</tr>
<tr>
<td>dehydroepiandrosterone metabolites in urine</td>
<td>158, 159, 575</td>
</tr>
<tr>
<td>deoxycorticoids in urine, determination</td>
<td>263, 274</td>
</tr>
<tr>
<td>deoxycytidine in urine after irradiation</td>
<td>404</td>
</tr>
<tr>
<td>deoxyribonuclease in urine</td>
<td>207</td>
</tr>
<tr>
<td>depilating substance in skin grease</td>
<td>230</td>
</tr>
<tr>
<td>detritus in feces</td>
<td>193</td>
</tr>
<tr>
<td>diammonium citrate, dietary, and amino acid excretion</td>
<td>330</td>
</tr>
<tr>
<td>diastase in urine, determination</td>
<td>538</td>
</tr>
<tr>
<td>C₅-dicarboxylic acids in urine</td>
<td>529</td>
</tr>
<tr>
<td>dicarboxylic acids in urine, determination</td>
<td>511</td>
</tr>
<tr>
<td>dietary amino acids and urinary amino acid excretion</td>
<td>330</td>
</tr>
<tr>
<td>dietary ammonium chloride and urinary magnesium</td>
<td>255, 357</td>
</tr>
<tr>
<td>dietary ammonium chloride and NaHCO₃, effects on urinary Mg, Ca, and PO₄</td>
<td>357</td>
</tr>
</tbody>
</table>

179

LOCKHEED MISSILES & SPACE COMPANY
dietary anthracene and urinary methylmalonic acid .......................... 528
dietary caffeic and ferulic acids, effects on urinary phenol and indole acids ... 487
dietary cystine and urinary N-methyl-nicotinamide ............................. 525
dietary diammonium citrate and urinary amino acids .......................... 330
dietary fats, effects on ketonuria ............................................... 455
dietary folic acid, urinary metabolites ......................................... 492
dietary galactose and urinary amino acids ..................................... 249
dietary 6-hydroxynicotinic acid, and urinary pyridones ........................ 336
dietary influence on urinary creatinine ........................................ 548
dietary influence on urinary glucuronic acid ................................... 171
dietary lysine, and urinary N-methyl-nicotinamide ............................. 525
dietary nicotinic acid and urinary metabolic products ........................ 336, 426
dietary pear leaf extracts, on bacterio-static effects of urine ..............
dietary phosphate, effects on urinary urea, ammonia, and pH ................ 305
dietary protein, effects on urine composition .................................. 142, 195, 211, 280, 402, 487, 525
dietary salts, effects on thermal sweat composition ........................... 303
dietary salts, effects on urine composition ..................................... 465
dietary sodium and urinary aldosterone ......................................... 233
dietary sulfur and urine acidity .................................................. 250
dietary trigonelline, effect on urinary pyridones ................................ 336
dietary tryptophan, effect on urinary metabolites ............................... 426
dietary DL-tryptophan, effect on urinary xanthuranic acid .................. 364
dietary urea, effect on urine composition ....................................... 142
dietary valine, and urinary N-methyl-nicotinamide ............................. 525
dietary vitamin E, urinary metabolites ......................................... 494
6, 7-dihydroxycoumarin in urine ............................................... 549
dihydroxyacetones in urine, determination ..................................... 395
3β:16α-dihydroxyandrost-5-en-17-one in urine, isolation of ................ 158
17,20-dihydroxy-21-ketosteroids in urine, effects of work and climate .... 514
3α:17α-dihydroxy-17β-methyl-D-homoaetocholane-17-one in urine ........ 174
3α:17α-dihydroxy-17β-methyl-D-nomoaeticholane-17α-one in urine ........ 174
dihydroxyphenylacetic acid in urine, determination .......................... 390
3α:17α-dihydroxy pregnane-20-one in urine .................................. 174
4, 8-dihydro-oxyquinoline-2-carbonic acid in urine, determination .... 92
dihydrothymine, effects on urinary B-aminoisobutyric acid .............. 180
N-dimethylhistamine in urine .................................................. 285
dimethylmalonic acid in urine ................................................. 529
1:7-dimethylxanthine in urine, determination ................................ 578
5-dinitrobenzoic acid reagent for urinary 17-ketosteroid identification . 93
diuresis ..................................................................................... 61
dopamine in urine, determination ............................................... 120

- E -

eccrine sweat gland ....................................................................... 113
EDTA, effects on urinary trace metals .......................................... 411
electrical conductivity of sweat ..................................................... 45
electrolytes, dietary, effect on urine concentration ......................... 465
electrolytes in sweat ................................................................. 216
electrolytes in sweat, determination ............................................. 123,152
electrolytes in urine ...................................................................... 237,597
electrolytes in urine, effects of cold exposure ................................. 255
electrolytes in urine, effects of posture ........................................ 529,531
electrolytes in urine, effects of work and climate ......................... 514
enzymes in sweat ........................................................................ 589
enzyme denaturation by urea ....................................................... 156
enzymes, urea decomposition by urease ........................................ 23
enzymes in urine .......................................................................... 185,391,538
enzymes in urine, age factors ...................................................... 61
enzymes in urine, bacterial inhibition .......................................... 320
enzymes in urine, determination ................................................. 146,569

181

LOCKHEED MISSILES & SPACE COMPANY
enzymes in urine, purification .................................. 107
epinephrine (see Adrenaline) ..................................
epithelial cells in feces .................................... 193
epithelial cells in urine ..................................... 247
erthropoietic action of urinary extracts, effects of altitude. .... 458,459
erthropoietin in urine, determination .......................... 585,586
Eskimo, urinary β-aminoisobutyric acid ........................ 8
esocephilus in urine, relation to 17-hydroxycorticosteroid excretion .. 116
estriol-17β in urine ........................................ 35,69
estriol in urine, determination ................................ 63,64,179
estriol in urine, reaction with serum albumin .................. 496
estriol in urine ............................................. 35,69
estriol in urine, determination ................................ 63,64,133,179
estrogen metabolites in urine ................................ 355
estrogens in urine ........................................... 63,64,69,207
estrogens in urine, determination ............................. 105,137,260,356,518
estrogens in urine, effects of storage ........................ 328
estron metabolites in urine ................................. 159
estrone in urine ............................................. 35,69,140
estrone in urine, determination ................................ 63,64,179
estrone in urine, reaction with serum albumin ................. 496
ethnic groups, urinary amino acids in ......................... 389
ethnic groups, urinary 17-ketosteroids in ................... 52,345
3-ethoxy-4-hydroxybenzoic acid in urine during stress ...... 501
ethyl esters in urine ....................................... 153
ethiocholanone in urine, determination ........................ 184
Europeans, urinary 17-ketosteroids and creatinine .......... 345
excretion rates, urinary, day and night ...................... 105
exercise, effects on sweat composition ....................... 216,598
exercise, effects on urine composition ....................... 363,433,446,514

182

LOCKHEED MISSILES & SPACE COMPANY
<table>
<thead>
<tr>
<th>Topic</th>
<th>Page Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fat mobilizing substances in urine</td>
<td>77, 83, 84, 148</td>
</tr>
<tr>
<td>Fatigue, effects on urinary corticoids</td>
<td>438</td>
</tr>
<tr>
<td>Fatigue, effects on urinary thionine</td>
<td>380</td>
</tr>
<tr>
<td>Fats, dietary, effects on ketonuria</td>
<td>455</td>
</tr>
<tr>
<td>Fats in feces</td>
<td>193</td>
</tr>
<tr>
<td>Fatty acids in feces</td>
<td>193</td>
</tr>
<tr>
<td>Feces, amino acids in</td>
<td>193</td>
</tr>
<tr>
<td>Feces, ammonia in</td>
<td>193</td>
</tr>
<tr>
<td>Feces, bacteria in</td>
<td>193</td>
</tr>
<tr>
<td>Feces, berry residue in</td>
<td>193</td>
</tr>
<tr>
<td>Feces, cabbage residue in</td>
<td>193</td>
</tr>
<tr>
<td>Feces, carbon dioxide in</td>
<td>193</td>
</tr>
<tr>
<td>Feces, composition</td>
<td>106, 193</td>
</tr>
<tr>
<td>Feces, connective tissues in</td>
<td>193</td>
</tr>
<tr>
<td>Feces, detritus in</td>
<td>193</td>
</tr>
<tr>
<td>Feces, epithelial cells in</td>
<td>193</td>
</tr>
<tr>
<td>Feces, fats in</td>
<td>193</td>
</tr>
<tr>
<td>Feces, fatty acids in</td>
<td>193</td>
</tr>
<tr>
<td>Feces, fruit skin residue in</td>
<td>193</td>
</tr>
<tr>
<td>Feces, hydrogen in</td>
<td>193</td>
</tr>
<tr>
<td>Feces, hydrogen sulfide in</td>
<td>193</td>
</tr>
<tr>
<td>Feces, indole in</td>
<td>193</td>
</tr>
<tr>
<td>Feces, limey accretions in</td>
<td>193</td>
</tr>
<tr>
<td>Feces, methane in</td>
<td>193</td>
</tr>
<tr>
<td>Feces, methylmercaptan in</td>
<td>193</td>
</tr>
<tr>
<td>Feces, mucus in</td>
<td>193</td>
</tr>
<tr>
<td>Feces, muscle fibers in</td>
<td>193</td>
</tr>
<tr>
<td>Feces, nut residue in</td>
<td>193</td>
</tr>
<tr>
<td>Feces, paracresol in</td>
<td>193</td>
</tr>
<tr>
<td>Feces, para-oryphenyl-proprionic acid in</td>
<td>193</td>
</tr>
<tr>
<td>Substance</td>
<td>Page(s)</td>
</tr>
<tr>
<td>-----------------------------------------------</td>
<td>---------</td>
</tr>
<tr>
<td>Feces, peptides in</td>
<td>193</td>
</tr>
<tr>
<td>Feces, peptones in</td>
<td>193</td>
</tr>
<tr>
<td>Feces, pH of</td>
<td>193, 361</td>
</tr>
<tr>
<td>Feces, phosphate crystals in</td>
<td>193</td>
</tr>
<tr>
<td>Feces, pickle residue in</td>
<td>193</td>
</tr>
<tr>
<td>Feces, pregnanediol in</td>
<td>306</td>
</tr>
<tr>
<td>Feces, proteoses in</td>
<td>193</td>
</tr>
<tr>
<td>Feces, radish residue in</td>
<td>193</td>
</tr>
<tr>
<td>Feces, skatol in</td>
<td>193</td>
</tr>
<tr>
<td>Feces, soaps in</td>
<td>193</td>
</tr>
<tr>
<td>Feces, solids in</td>
<td>361</td>
</tr>
<tr>
<td>Feces, starch granules in</td>
<td>193</td>
</tr>
<tr>
<td>Feces, N'-sulfanilyl-N\textsuperscript{2}-n-butyl carbamide in</td>
<td>218</td>
</tr>
<tr>
<td>Feces, tissue remnants in</td>
<td>193</td>
</tr>
<tr>
<td>Feces, vitamin E metabolic products in</td>
<td>494</td>
</tr>
<tr>
<td>Feces, volatile fatty acids in</td>
<td>193</td>
</tr>
<tr>
<td>Feces, water content of</td>
<td>361</td>
</tr>
<tr>
<td>Ferulic acid ingestion, effects on urinary phenol and indole acids</td>
<td>487</td>
</tr>
<tr>
<td>Fibrinolytic factors in urine</td>
<td>450, 451</td>
</tr>
<tr>
<td>Fibrocystic disease, sweat electrical conductivity in</td>
<td>45</td>
</tr>
<tr>
<td>Flavocytochrome (\delta_2), effects of urea on</td>
<td>47</td>
</tr>
<tr>
<td>Fluorine compounds in sweat</td>
<td>434</td>
</tr>
<tr>
<td>Fluorometric estimation of catecholamines</td>
<td>259</td>
</tr>
<tr>
<td>Folic acid, dietary, urinary metabolites</td>
<td>492</td>
</tr>
<tr>
<td>Folic acid deficiency, urinary formiminino-glutamic acid</td>
<td>523</td>
</tr>
<tr>
<td>Folic acid in serum and urine, determination</td>
<td>26</td>
</tr>
<tr>
<td>Folic acid in sweat and urine</td>
<td>273</td>
</tr>
<tr>
<td>Folic acid measurement in serum and urine</td>
<td>26</td>
</tr>
<tr>
<td>Follings disease, urinary indolepyruvic acid</td>
<td>472</td>
</tr>
<tr>
<td>Formiminoglutamic acid in urine</td>
<td>239, 493</td>
</tr>
<tr>
<td>Formiminoglutamic acid in urine, determination</td>
<td>523</td>
</tr>
</tbody>
</table>
formyltetrahydrofolic acid in urine ............................................. 7,492
freezing point of sweat .......................................................... 3
freezing point of urine ........................................................... 361
fructose in urine, determination ............................................. 282
fruit skins, residue in feces ...................................................... 193

- G -

G-forces, effects on uropepsin excretion ...................................... 49
galactose in urine, determination ............................................. 282
galactose ingestion and urinary amino acids .................................. 249
gamma globulin (see Globulin) .................................................. 445
α2-globulin in urine .................................................................. 445
γ-globulins in urine ................................................................... 165,445,571,572
globulins in urine, determination ............................................. 258
glucocorticoids, effects on urinary sugar level .............................. 172
glucochorticosids in urine .......................................................... 282
glucochorticosids in urine ......................................................... 381
glucosamine in urine, determination .......................................... 282
glucose in sweat ........................................................................ 434
glucose in urine, determination .................................................. 151,172,283,353,453
glucose oxidase in urine, bacterial inhibition ................................. 320
glucose oxidase test .................................................................... 2
α-glucoconidase in sweat ............................................................ 589
gluconurate, effects on urinary glucuronic acid ............................ 171
gluconic acid, metabolites in urine .............................................. 293
gluconic acid in urine ................................................................. 171,596
gluconic acid in urine, determination ........................................... 282
gluconic acid-conjugated bilirubin in urine .................................... 416
gluconidase, determination ........................................................... 1
β-gluconidase in urine .................................................................. 360
glucononides in urine .................................................................. 30,215,462,463
<table>
<thead>
<tr>
<th>Topic</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>glucuronides in urine, determination</td>
<td>101, 288, 408</td>
</tr>
<tr>
<td>glucuronolactone, effects on urinary glucuronic acid</td>
<td>171</td>
</tr>
<tr>
<td>glutamic acid in urine</td>
<td>161</td>
</tr>
<tr>
<td>glutamine in urine of ethnic groups</td>
<td>389</td>
</tr>
<tr>
<td>glutaric acid in urine</td>
<td>529</td>
</tr>
<tr>
<td>glycine in urine</td>
<td>161</td>
</tr>
<tr>
<td>glycine in urine of asthmic groups</td>
<td>389</td>
</tr>
<tr>
<td>glycine metabolites in urine</td>
<td>529, 550</td>
</tr>
<tr>
<td>glycoxyamine in urine</td>
<td>550</td>
</tr>
<tr>
<td>glycogen in sweat</td>
<td>515</td>
</tr>
<tr>
<td>gonadotrophins in urine</td>
<td>209, 407, 466</td>
</tr>
<tr>
<td>gonadotropins in urine, determination</td>
<td>269, 342, 343, 547</td>
</tr>
<tr>
<td>gonadotropins in urine, recovery</td>
<td>5, 6, 75, 76</td>
</tr>
<tr>
<td>grease, skin, depilatory action</td>
<td>230</td>
</tr>
<tr>
<td>guanidine metabolites in urine</td>
<td>550</td>
</tr>
<tr>
<td>guanidobutyric acid in urine</td>
<td>550</td>
</tr>
<tr>
<td>guanidotaurine in urine, determination</td>
<td>471</td>
</tr>
<tr>
<td>δ-guanido-n-valeric acid in urine</td>
<td>551</td>
</tr>
<tr>
<td>guanine in urine, determination</td>
<td>578, 579</td>
</tr>
</tbody>
</table>

---

**Heat Stress** (see also Stress)

- heat stress, action of sweat glands                                | 341 |
- heat stress, chloride content of sweat during                       | 226 |
- heat stress, deacclimation to, excretion trends during              | 208 |
- heat stress, effects on corticoid excretion                         | 78 |
- heat stress, effects on iron content of sweat                       | 510 |
- heat stress, effects on 17-ketosteroid excretion in urine           | 78 |
- heat stress, effects on sodium and potassium content of sweat       | 70 |
- heat stress, effects on sweat and urine formation                   | 346 |

LOCKHEED MISSILES & SPACE COMPANY
heat stress, effects on sweat composition ........................ 33,70,71,216,226,303
heat stress, effects on sweat rate ........................................ 357,58,59,341,346
heat stress, effects on urea content of sweat ......................... 71
heat stress, effects on urinary adrenal steroids ..................... 433
heat stress, effects on urinary electrolytes and ketosteroids .... 514
heat stress, effects on uropepsin excretion .......................... 49
heat stress, electrolytes in sweat ....................................... 303
heat stress, salt requirements ............................................ 350
heat stress, urinary adrenocortical steroid excretion ................ 225
heat stress, urinary diuretic substance excretion .................... 224
hematopoietic response to urinary extracts ........................... 400
hemoglobin, effects of urea on ......................................... 443
hemoglobin in urine ........................................................ 327
hemoglobin in urine, determination ...................................... 102,276
hemopoietine in urine ..................................................... 240
hexosamine in urine ....................................................... 296,367,368,449,512
hexosamine in urine, determination ...................................... 351
hexose in urine ............................................................... 295,367,368
hexylene glycol in urine, determination ................................ 257
hippuric acid in urine ...................................................... 219,596
hippuric acid in urine, determination ................................... 484,553
histamine, antagonist in urine ............................................ 313
histamine in blood and urine, correlation ............................ 128
histamine in sweat .......................................................... 434
histamine in urine .......................................................... 126,128,129,280,285
histamine in urine, determination ....................................... 127
histaminase in urine ......................................................... 284
histidine, metabolic products in sweat ................................ 316
histidine, metabolic products in urine .................................. 523
histidine in urine ............................................................ 129,285
histidine in urine, determination ......................................... 507,562
homogentisic substances in urine ........................................ 153
D-homosteroids in urine .................................................. 174
hormones (see also the specific hormone) .............................. 170
hormones, influence on sweat and urine formation .......................... 346
hormones, parathyroid regulation of urinary phosphorus ....................... 191
hormones in urine ....................................................................... 
5, 6, 42, 69, 149, 203, 207, 209
210, 228, 376, 387, 407, 478

hormones in urine, determination .............................................. 108, 130, 238, 342, 343, 414

hormones in urine during simulated flight ............................... 533

hormones in urine, effects of storage ....................................... 328

hormones in urine, extraction techniques for gonadotropins ................... 75, 76

humidity, effects on sweat rates ............................................. 57

hyaluronidase in urine .......................................................... 39, 183

hyaluronidase in urine, age factors ......................................... 61

hyaluronidase inhibitor in urine ............................................. 146

17-hydrocorticoids in urine, determination .................................. 381

hydrocortisone metabolites in urine ......................................... 72

hydrogen chloride in urine, relation to CO$_2$ tension ....................... 421

hydrogen in feces ............................................................... 193

hydrogen ions in urine, effects of posture .................................. 531

hydrogen ions in urine, relation to volume .................................. 332

hydrogen sulfide in feces ...................................................... 193

hydroxy-acid fractions in urine .................................................. 293

11-hydroxyaeticoholanolone in urine ........................................ 414, 592

11 β-hydroxy-Δ4-androstene-3, 14 dione in urine, determination ............... 489

11-hydroxyandrosterone in urine, determination .............................. 184, 592

3-hydroxyanthranilic acid metabolites in urine, determination ............... 537

β-hydroxybutyric acid in urine ................................................ 469

17-hydroxycorticosteroids in urine ............................................. 51, 116, 167, 168, 208
225, 281, 311, 505, 583

17-hydroxycorticosteroids in urine, determination .................................. 74

17-hydroxycorticosteroids in urine, diurnal variation .......................... 73

188

LOCKHEED MISSILES & SPACE COMPANY
<table>
<thead>
<tr>
<th>Substance</th>
<th>Page Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>β-hydroxycorticisol in urine</td>
<td>166, 167</td>
</tr>
<tr>
<td>7-hydroxycoumarin in urine</td>
<td>549</td>
</tr>
<tr>
<td>16 γ-hydroxydehydroepiandrosterone in urine, isolation of</td>
<td>158</td>
</tr>
<tr>
<td>11-hydroxyetiocholanone in urine, determination</td>
<td>184</td>
</tr>
<tr>
<td>17-hydroxy-γ-glycols in urine</td>
<td>583</td>
</tr>
<tr>
<td>Hydroxyhippuric acid in urine</td>
<td>15, 17</td>
</tr>
<tr>
<td>3-hydroxy-5-hydroxymethyl-2-methylphridine-4-carboxylic acid in urine</td>
<td>429</td>
</tr>
<tr>
<td>5-hydroxyindole-3-acetic acid, chromatographic behavior</td>
<td>16</td>
</tr>
<tr>
<td>5-hydroxyindole-2-carboxylic acid, chromatographic behavior</td>
<td>16</td>
</tr>
<tr>
<td>5-hydroxyindole-3-carboxylic acid, chromatographic behavior</td>
<td>16</td>
</tr>
<tr>
<td>β-(5-hydroxyindole-3-)-lactic acid, chromatographic behavior</td>
<td>16</td>
</tr>
<tr>
<td>5-hydroxyindoleacetic acid in urine</td>
<td>12, 16, 487</td>
</tr>
<tr>
<td>5-hydroxyindoleacetic acid in urine, effect of banana feeding</td>
<td>487</td>
</tr>
<tr>
<td>4-hydroxy-3-methoxybenzoic acid in urine, effects of stress</td>
<td>500, 501</td>
</tr>
<tr>
<td>2-(3-hydroxy-3-methyl-5-carboxypentyl)-3:5:6-trimethylbenzoquinone in urine</td>
<td>494</td>
</tr>
<tr>
<td>8-hydroxy-7-methylguanine in urine</td>
<td>580</td>
</tr>
<tr>
<td>8-hydroxy-7-methylguanine in urine, determination</td>
<td>578, 579</td>
</tr>
<tr>
<td>6-hydroxynicotinc acid, dietary, and urinary pyridones</td>
<td>336</td>
</tr>
<tr>
<td>M-hydroxyphenyl compounds in urine, effects of coffee ingestion</td>
<td>487</td>
</tr>
<tr>
<td>β-m-hydroxyphenylhydracrylic acid in urine</td>
<td>15, 17</td>
</tr>
<tr>
<td>P-hydroxy-phenyl-lactic acid in urine</td>
<td>283</td>
</tr>
<tr>
<td>P-hydroxyphenylpyruvic acid in urine</td>
<td>227</td>
</tr>
<tr>
<td>P-hydroxypropiophenone in urine, determination</td>
<td>359</td>
</tr>
<tr>
<td>Hydroxysteroids in urine</td>
<td>583, 584</td>
</tr>
<tr>
<td>Hydroxysteroids in urine, determination</td>
<td>159, 251, 252, 307, 574, 575</td>
</tr>
<tr>
<td>11 β-hydroxytestosterone in urine, determination</td>
<td>489</td>
</tr>
<tr>
<td>5-hydroxytryptamine, antagonist in urine</td>
<td>313</td>
</tr>
<tr>
<td>Hydroxytryptamine in urine, determination</td>
<td>390, 573</td>
</tr>
<tr>
<td>5-hydroxytryptamine-like compounds in urine</td>
<td>435</td>
</tr>
<tr>
<td>5-hydroxytryptophan, chromatographic behavior</td>
<td>16</td>
</tr>
</tbody>
</table>
hyperglycemic activity of urine ........................................ 382,383
hypertension, urinary catecholamines ........................................ 573
hypertension, urinary 17-hydroxycoitcosteroids .......................... 311
hypertension, urinary nitrogen ............................................. 403
hyperthermia (see Heat and Stress)
hypoxanthine in urine, determination ..................................... 578,579
hypoplastic anemia, urinary metabolites ..................................... 537
hypotension, urinary vasodilator factor ..................................... 456
hypotensive activity of urine ............................................... 382
hypothermia (see Cooling)

-I-
imidazole acetic acid in urine .............................................. 129
imidazole compounds in urine ............................................... 285
Indians (Am.), urinary β-amino-isobutyric acid .......................... 8
Indians, urinary 17-ketosteroids and creatinine ......................... 345
indican in urine .............................................................. 219
iodinated thyroid products in urine, determination ......................... 485
iodine in sweat ............................................................... 434
indole, chromatographic behavior .......................................... 16
indole, in feces ............................................................... 193
indole, urinary metabolites, determination ................................ 486
indole, in urine ............................................................... 435
indole acids in urine .......................................................... 12,16
indole-3-acetaminde, chromatographic behavior .......................... 16
indoleaceta mide in urine .................................................... 16
indole-3-acetic acid, chromatographic behavior ........................... 16
indoleacetic acid in urine .................................................... 16
indoleaceturic acid, chromatographic behavior ........................... 16
N-(indole-3-acetyl)-α-alanine, chromatographic behavior ................ 16
N-(indole-3-acetyl)-β-alanine, chromatographic behavior ................ 16

190

LOCKHEED MISSILES & SPACE COMPANY
<table>
<thead>
<tr>
<th>Compound</th>
<th>Chromatographic Behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>N-(indole-3-acetyl)-β-aminoisobutyric acid</td>
<td>16</td>
</tr>
<tr>
<td>N-(indole-3-acetyl)-γ-aminobutyric acid</td>
<td>16</td>
</tr>
<tr>
<td>N-(indole-3-acetyl)-asparagine</td>
<td>16</td>
</tr>
<tr>
<td>N-(indole-3-acetyl)-aspartic acid</td>
<td>16</td>
</tr>
<tr>
<td>N-(indole-3-acetyl)-glutamic acid</td>
<td>16</td>
</tr>
<tr>
<td>indoleacetylglutamic acid in urine</td>
<td></td>
</tr>
<tr>
<td>N-(indole-3-acetyl)-glutamine</td>
<td>16</td>
</tr>
<tr>
<td>indoleacetylglutamine in urine</td>
<td></td>
</tr>
<tr>
<td>β-(indole-3-)-acrylic acid</td>
<td>16</td>
</tr>
<tr>
<td>indoleacrylic acid in urine</td>
<td>16</td>
</tr>
<tr>
<td>indole-3-carboxaldehyde</td>
<td>16</td>
</tr>
<tr>
<td>indole-3-carboxylic acid</td>
<td>16</td>
</tr>
<tr>
<td>indole-3-carboxylic acid in urine</td>
<td>16</td>
</tr>
<tr>
<td>indoleglycolic acid in urine</td>
<td>16</td>
</tr>
<tr>
<td>indole-3-glyoxylamide</td>
<td>16</td>
</tr>
<tr>
<td>indole-3-glyoxylic acid</td>
<td>16</td>
</tr>
<tr>
<td>β-(indole-3-)-lactic acid</td>
<td>16</td>
</tr>
<tr>
<td>indolelactic acid in urine</td>
<td>16, 293</td>
</tr>
<tr>
<td>β-(indole-3-)-propionic acid</td>
<td>16</td>
</tr>
<tr>
<td>β-(indole-3-)-pyruvic acid</td>
<td>16</td>
</tr>
<tr>
<td>indole-pyruvic acid in urine</td>
<td>472</td>
</tr>
<tr>
<td>β-(indole-3-)-pyruvic acid oxime</td>
<td>16</td>
</tr>
<tr>
<td>indolylacetamide, chromatographic behavior</td>
<td>16</td>
</tr>
<tr>
<td>indolylacetylglutamic acid, chromatographic behavior</td>
<td>16</td>
</tr>
<tr>
<td>indolylacrylic acid, chromatographic behavior</td>
<td>16</td>
</tr>
<tr>
<td>indolylacrylic acid, chromatographic behavior</td>
<td>16</td>
</tr>
<tr>
<td>N-(β-indolyl-3-acryloyl)-glycine in urine, determination</td>
<td>295</td>
</tr>
<tr>
<td>indol-3-ylcarboxylic acid, chromatographic behavior</td>
<td>16</td>
</tr>
<tr>
<td>indolylglycollic acid, chromatographic behavior</td>
<td>16</td>
</tr>
<tr>
<td>indoxyl-potassium-sulfate in urine</td>
<td>219</td>
</tr>
<tr>
<td>inositol PO₄ in urine</td>
<td>223</td>
</tr>
<tr>
<td>insulin hypoglycemia, effects on sweat composition</td>
<td>216</td>
</tr>
</tbody>
</table>

191

LOCKHEED MISSILES & SPACE COMPANY
<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>insulin in urine</td>
<td>548</td>
</tr>
<tr>
<td>insulin in urine, determination</td>
<td>238</td>
</tr>
<tr>
<td>intrinsic factor in urine, determination</td>
<td>138</td>
</tr>
<tr>
<td>insulin in plasma and urine, determination</td>
<td>164</td>
</tr>
<tr>
<td>invertase, inactivation by urea</td>
<td>86</td>
</tr>
<tr>
<td>iron in sweat</td>
<td>434,510</td>
</tr>
<tr>
<td>irradiation, effects on urinary β-aminooiso-butyric acid</td>
<td>448</td>
</tr>
<tr>
<td>irradiation, urinary deoxyoctidine following</td>
<td>404</td>
</tr>
<tr>
<td>isonicotinyl acid hydraxide in urine, determination</td>
<td>491</td>
</tr>
<tr>
<td>isolucine metabolites in urine</td>
<td>541</td>
</tr>
<tr>
<td>Jamaicans, urinary steroid excretion</td>
<td>43</td>
</tr>
<tr>
<td>jaundice, urinary bilirubin</td>
<td>463</td>
</tr>
<tr>
<td>kallidin, relation to kinin</td>
<td>177</td>
</tr>
<tr>
<td>kallikrein in urine</td>
<td>383</td>
</tr>
<tr>
<td>kallikrein in urine, determination</td>
<td>245</td>
</tr>
<tr>
<td>11-ketoandrostosterone in urine</td>
<td>184,592</td>
</tr>
<tr>
<td>keto compounds in urine, determination</td>
<td>532</td>
</tr>
<tr>
<td>11-ketoetiocholanolone in urine</td>
<td>592</td>
</tr>
<tr>
<td>11-ketoetiocholonone in urine, determination</td>
<td>184</td>
</tr>
<tr>
<td>ketogenic activity of urine extracts</td>
<td>85</td>
</tr>
<tr>
<td>11-ketogenic steroids in urine</td>
<td>43,187,381,420</td>
</tr>
<tr>
<td>17-ketogenic steroids in urine, determination</td>
<td>194,505</td>
</tr>
<tr>
<td>ketogenic steroids in urine, diurnal rhythms</td>
<td>482</td>
</tr>
<tr>
<td>17-ketogenic steroids in urine, effects of heat and stress</td>
<td>433</td>
</tr>
<tr>
<td>ketogenic substances in urine</td>
<td>148</td>
</tr>
</tbody>
</table>
γ-ketoglutarate in urine ........................................ 283
α-ketolic catabolites in urine .................................. 436
ketone bodies in urine ........................................... 275
ketone bodies in urine, determination ....................... 541
ketones in urine, environmental and nutritional effects .. 455
ketonic extracts in urine ........................................ 50
17-ketosteroid glucuronides in urine, determination ....... 288,408
ketosteroids in urine ............................................ 34,43,48,51,52,145,210,242,420,559,592
ketosteroids in urine, age factors .............................. 62
ketosteroids in urine, altitude effects ....................... 454
ketosteroids in urine, determination .......................... 82,93,184,251,267,268,317,378,475,488,489,513
ketosteroids in urine, diurnal rhythms ....................... 482
ketosteroids in urine, effects of heat ......................... 78
ketosteroids in urine, effects of heat and exercise ........ 433
ketosteroids in urine, effects of work and climate ......... 514
ketosteroids in urine, relation to body weight ............. 345
ketosteroids in urine, variations among ethnic groups .... 52
kinin in urine ..................................................... 177,244,245
kynurenic acid in urine .......................................... 67,425,426
kynurenic acid in urine, determination ...................... 457
kynurenine, urinary .............................................. 67,425,426
kynurenine metabolites in urine, determination ............. 537

- L -
lactates in sweat ................................................ 216
lactic acid in sweat .............................................. 434
lactic acid in urine, determination ........................... 315
lactone esters in urine .......................................... 153
lactose in urine, determination ................................ 282

193

LOCKHEED MISSILES & SPACE COMPANY
lead in urine, effects of EDTA ........................................ 411
Lead in urine, relation to specific gravity .......................... 335
leucine, urinary ......................................................... 330
leucine aminopeptidase in urine, determination ................. 185
leucine metabolites in urine .................................. 529
leukemia, urinary orminoglutamic acid excretion ............. 239
leukemia, urinary vitamin B$_{12}$ content .................... 143
leukocytes in urine .................................................. 247, 292, 401
lipase in urine .......................................................... 396
lipase in urine, determination ..................................... 391
lipids in urine .......................................................... 296
lipids in urine, determination ..................................... 576
lipoids in urine .......................................................... 9
lipoids in urine, effects of water deprivation ................ 543
lipoproteins in urine .................................................. 196, 445, 470
liver disease, catecholamine excretion .......................... 81
lysine, dietary, and urinary N-methylnicotinamide .......... 525
lysine in urine .......................................................... 161
lysine metabolites in urine ........................................ 550

- M -
magnesium in urine ................................................ 29, 219, 255, 412, 497
magnesium in urine, effects of water deprivation .......... 542
magnesium in urine, effects of NH$_4$Cl and NaHCO$_3$ .... 357
Malayans, urinary 17-ketosteroids and creatinine .......... 345
maltose in urine, determination ................................ 282
mammotropic factors in urine ................................... 203, 478
manganese in sweat .................................................. 434
manganese in urine, effects of EDTA ......................... 411
mannose in urine, determination ................................. 282
mesoinositol in urine ........................................ 97, 223, 349
metals, trace, in urine ........................................ 411
metanephrine in urine .......................................... 322
methane in feces ................................................ 183
methionine, bacteriostatic and acidifying effects in urine ........ 388
methionine, dietary, and urinary N-methylnicotinamide .......... 525
γ-methylisocitric acid metabolite in urine, determination ......... 541
N-4-methylbenzyloufonyl-N-butyl urea metabolic products in urine ........................................................................ 588
methylethylketone in urine, determination .......................... 541
methylfurancarboxylic acid in urine ................................ 529
methylguanamine in urine, determination ............................. 578, 579
N-methylhistamine in urine ........................................ 285
1-methylhypoxanthine in urine, determination ......................... 578, 579
methylmalonic acid in urine ....................................... 528
methylmercaptan in feces ........................................... 193
2-methyl-1:4-naphthoquinone metabolites in urine ................... 215
N¹-methylnicotinamide in sweat ...................................... 272
N¹-methylnicotinamide in urine ..................................... 246, 525, 545
N¹-methylnicotinamide in urine, determination ...................... 418
2-methyl-1:4-pentane diol in urine, determination ................... 257
N-methylpiperidyl-3-methylphenothiazine in urine ................. 183
N-methyl-2-pyridone-5-carboxamide in urine ........................ 67, 68, 425, 426, 545
N-methyl-2-pyridone-5-carboxylic acid in urine ..................... 336
methylsuccinic acid in urine ....................................... 529
methylxanthine in urine, determination ................................ 578
3-methoxy-4-hydroxymandelic acid in urine, determination ..... 590
3-methoxy-4-hydroxyphenylacids in urine, effects of coffee ...... 487
5-methoxyindole-3-acetic acid, chromatographic behavior .......... 16
5-methoxyindole-2-carboxylic acid, chromatographic behavior ... 16
β-(5-methoxyindole-2)-lactic acid, chromatographic behavior ...... 16
5-methoxytryptophan, chromatographic behavior ..................... 16

195

LOCKHEED MISSILES & SPACE COMPANY
milk-clotting factor in urine
molybdenum in urine, effects of EDTA
mucoids in urine
mucopolysaccharides in urine
mucoproteins in urinary calculi
mucoproteins in urine
mucosubstances in urine
mucus in feces
muscle fibers in feces
Negritos, urinary 17-ketosteroids and creatinine
Negroes, urinary steroid excretion
neomycin, effects on urinary urea
nephritis, urinary nitrogen
nephrotic syndrome, urinary metabolites and electrolytes
niacin in urine
niacin metabolites in urine
nickel in urine, effects of EDTA
nicotinamide, dietary, and urinary metabolites
nicotinamide in sweat
nicotinic acid, dietary, and urinary pyridones
nicotinic acid metabolites in urine
nicotinic acid in sweat
nicotinic acid in urine
nicotinuric acid in sweat
nitrogen compounds in sweat
nitrogen compounds in urine
nitrogen compounds in urine, effect of water intake
nitrogen compounds in urine during cold exposure
Nigerians, urea excretion
<table>
<thead>
<tr>
<th>Topic</th>
<th>Page Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>nondialysable carbohydrate-protein complexes in urine</td>
<td>176</td>
</tr>
<tr>
<td>nondialysable solids in urine</td>
<td>54, 55, 296, 367</td>
</tr>
<tr>
<td>nondialysable solids in urine, determination</td>
<td>297, 298, 300</td>
</tr>
<tr>
<td>noradrenaline, effect on urine formation rate</td>
<td>324</td>
</tr>
<tr>
<td>noradrenaline in urine</td>
<td>286, 322</td>
</tr>
<tr>
<td>noradrenaline in urine, determination</td>
<td>99, 120, 130, 149, 390, 414, 503, 563, 564, 573</td>
</tr>
<tr>
<td>noradrenaline in urine, effects of stress</td>
<td>370, 500</td>
</tr>
<tr>
<td>noradrenaline in urine, factors involved in</td>
<td>139</td>
</tr>
<tr>
<td>noradrenaline in urine during simulated flight</td>
<td>533</td>
</tr>
<tr>
<td>19-norandrosterone in urine</td>
<td>140</td>
</tr>
<tr>
<td>norepinephrine (see Noradrenaline)</td>
<td></td>
</tr>
<tr>
<td>19-noretiocholan-3-ol-17-one in urine</td>
<td>140</td>
</tr>
<tr>
<td>19-nortestosterone, urinary metabolites after administering</td>
<td>140</td>
</tr>
<tr>
<td>nucleic acid adenine metabolites in urine</td>
<td>580</td>
</tr>
<tr>
<td>nucleic acid guanine metabolites in urine</td>
<td>580</td>
</tr>
<tr>
<td>nucleic acids in urine, effects of water deprivation</td>
<td>543</td>
</tr>
<tr>
<td>nuts, residue in feces</td>
<td>193</td>
</tr>
<tr>
<td>onions, residue in feces</td>
<td>193</td>
</tr>
<tr>
<td>organic anions in urine</td>
<td>509</td>
</tr>
<tr>
<td>organic peroxides, effects on urinary indole</td>
<td>486</td>
</tr>
<tr>
<td>17-oxosteroids in urine</td>
<td>140</td>
</tr>
<tr>
<td>orosomucoids in urine</td>
<td>231</td>
</tr>
<tr>
<td>osmotic pressure of sweat</td>
<td>3</td>
</tr>
<tr>
<td>osmotic pressure of urine</td>
<td>374, 441, 442</td>
</tr>
<tr>
<td>oxalate in urine, precipitation techniques</td>
<td>124, 125</td>
</tr>
<tr>
<td>oxalic acid in urine</td>
<td>219</td>
</tr>
<tr>
<td>17-oxogenic steroids in urine</td>
<td>30, 74</td>
</tr>
<tr>
<td>γ-oxoglutaric acids in urine, determination</td>
<td>386</td>
</tr>
</tbody>
</table>
17-oxosteroid S O\textsubscript{4} in urine ........................................ 30
17-oxosteroids in urine, determination .................................... 269
17-oxyocorticoids in urine, determination .................................. 333
11-oxyocorticoids in urine during sensory deprivation ................. 385
17-oxyhydrocorticosteroids in urine .................................... 88, 89, 162
oxytocic activity of urine .................................................. 177, 189, 567
ozone, effects on urinary indole and phenol acids ................. 486

\[P\]
pancreatic cystic fibrosis, chlorides in sweat and urine .............. 517
pancreatic cystic fibrosis, sweat composition ............................ 90, 113
pancreatic disease, urinary lipase ....................................... 336
pancreatic lipase in urine .................................................. 351
pancreozymin activity of urine ........................................... 531
pantothenic acid in urine .................................................. 192
paracresol in feces ......................................................... 193
para-oxyphenyl-propionic acid in feces ................................... 193
parasites in urinary sediments .............................................. 21
parathyroid regulation of urinary phosphorus ........................... 191
peptidase in urine, determination ....................................... 185
peptides in feces ............................................................... 183
peptides in urine ............................................................... 212
peptones in feces ............................................................... 183
perceptual deprivation (see Sensory Deprivation) .................... 28
pH of urine, effects of respiratory acidosis and alkalosis ........... 28
phenolic acids in urine .................................................... 15, 17, 314, 549
phenolic acids in urine, determination ................................... 496, 535, 536
phenolic steroids in urine .................................................. 261
phenolic steroids in urine, determination ............................... 101, 260
phenols in sweat ............................................................... 494

198

LOCKHEED MISSILES & SPACE COMPANY
phenols in urine ........................................... 219, 293, 487
phenols in urine, determination .............................. 535, 537
phenols in urine, dietary influence .......................... 487
phenothiazine metabolites in urine, determination .......... 163
phenothiazine in urine, determination ......................... 85
phenylalanine metabolites in urine ........................... 550
phenylalanine in urine ....................................... 330
phenyl-lactic acid in urine .................................. 293
phenylpyruvic acid in urine .................................. 227, 371, 372
pheochromocytoma, urinary catecholamines .................. 228, 366, 414, 503, 593
pheochromocytoma, urinary phenolic acids .................. 314
pH of feces ................................................ 193, 361
pH of sweat ................................................. 303, 361
pH of urine ................................................ 60, 121, 122, 361, 377, 388
pH of urine, effects of dietary phosphate .................... 305
pH of urine, effects of dietary sulfur ......................... 250
pH of urine, effects of posture ................................ 530
pH of urine, mechanism of acidification ....................... 60
phosphatase inhibitor in urine ................................ 569
phosphatase in urine ......................................... 308
phosphate crystals in feces ................................... 193
phosphate rich diet, effect on urinary urea, ammonia, and pH 305
phosphates in urine .......................................... 28, 191, 215
phosphates in urine, effects of NH₄Cl₃ and NaHCO₃ ........... 357
phosphates in urine, effects of posture ....................... 531
phosphates in urine, effects of water deprivation ............ 542
phosphates in urine, flow-volume effects ...................... 441
phosphatides in urine ........................................ 470
phosphoric acid in sweat ..................................... 589
phosphorylase in sweat ...................................... 589
phosphorylase in urine ...................................... 206
<table>
<thead>
<tr>
<th>Topic</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pickles, residue in feces</td>
<td>193</td>
</tr>
<tr>
<td>Pirestasin, urinary response</td>
<td>142</td>
</tr>
<tr>
<td>Pituitary gonadotropins in urine, determination</td>
<td>342, 343</td>
</tr>
<tr>
<td>Pituitary gonadotropins in urine, recovery</td>
<td>5, 6</td>
</tr>
<tr>
<td>Pituitary hormones, effects on urinary calcium</td>
<td>170</td>
</tr>
<tr>
<td>Plasminogen activator in urine</td>
<td>417</td>
</tr>
<tr>
<td>Polyhydroxy phenolic acids in urine, determination</td>
<td>536</td>
</tr>
<tr>
<td>Polynucleotide phosphorylase in urine</td>
<td>206</td>
</tr>
<tr>
<td>Polypeptides in urine</td>
<td>567</td>
</tr>
<tr>
<td>Polysaccharides in urine</td>
<td>449</td>
</tr>
<tr>
<td>Polyvinylpyrrolidone in urine</td>
<td>221</td>
</tr>
<tr>
<td>Porphyrins in urine, determination</td>
<td>87, 117, 119, 431, 556</td>
</tr>
<tr>
<td>Posture, effects on urinary water and electrolytes</td>
<td>530</td>
</tr>
<tr>
<td>Posture, effects on urine composition</td>
<td>80, 118</td>
</tr>
<tr>
<td>Potassium, dietary effects on urine flow rate</td>
<td>476</td>
</tr>
<tr>
<td>Potassium in sweat</td>
<td>31,33,494,113</td>
</tr>
<tr>
<td>Potassium in sweat, effects of heat</td>
<td>70</td>
</tr>
<tr>
<td>Potassium in urine</td>
<td>28, 116, 208, 219, 597</td>
</tr>
<tr>
<td>Potassium in urine, determination</td>
<td>331</td>
</tr>
<tr>
<td>Potassium in urine, effects of cooling</td>
<td>254, 479</td>
</tr>
<tr>
<td>Potassium in urine, effects of heat and exercise</td>
<td>433</td>
</tr>
<tr>
<td>Potassium in urine, effects of posture</td>
<td>118, 530</td>
</tr>
<tr>
<td>Potassium in urine, effects of water deprivation</td>
<td>542</td>
</tr>
<tr>
<td>Potassium in urine, effects of work and climate</td>
<td>514</td>
</tr>
<tr>
<td>Potassium in urine, relation to volume</td>
<td>332, 441</td>
</tr>
<tr>
<td>Prednisone, influence on urinary coumarins</td>
<td>549</td>
</tr>
<tr>
<td>Prednisolone, urinary metabolic products</td>
<td>198</td>
</tr>
<tr>
<td>Pregnenediol in feces</td>
<td>306</td>
</tr>
<tr>
<td>Pregnenediol in urine</td>
<td>236, 584</td>
</tr>
<tr>
<td>Pregnenediol in urine, determination</td>
<td>100, 132, 246, 262, 516, 555</td>
</tr>
</tbody>
</table>

200

LOCKHEED MISSILES & SPACE COMPANY
pregnanetrol in urine .............................................. 242
pregnanetriol in urine ........................................ 159, 539, 540, 584
pregnanetriol in urine, determination .................. 98, 150, 187, 234, 378, 516
pregnanetriolone in urine ....................................... 198, 242
preservation of urine ........................................... 392
pressor factor in urine ......................................... 211
progesterone in urine, reaction to serum albumin .... 496
proline in urine .................................................. 161
promethazine in urine, determination .................. 163
protein-carbohydrate complexes in urine ............. 176
proteins, denaturation by urea ................................ 358
proteins, dietary, and urine composition ................ 32, 142, 195, 211, 280, 402, 525
proteins in sweat ................................................ 266
proteins in urine ................................................. 54, 196, 231, 296, 367
proteins in urine, determination ......................... 256, 258, 287, 333, 344, 588
proteoses in feces ............................................... 193
protoplast formation in urine ............................... 56
pseudopyridoxine in sweat and urine .................. 270
purines in urine .................................................. 219, 424
purines in urine, determination ........................... 110, 578, 579
pyridine in blood, relation to urinary methylpyridone corboxamide ........ 68
pyridones in urine ............................................... 336
4-pyridoxic acid in sweat ..................................... 270
4-pyridoxic acid in urine ..................................... 270, 429
pyridoxine hydrochloride dose, effect on urinary 4-pyridoxic acid .... 429
pyridoxine in urine and sweat .............................. 270
pyrrolecarboxylic acid, chromatographic behavior .... 16
pyruvic acid in urine ........................................... 472
pyruvic acid in urine, determination .................... 386

201

LOCKHEED MISSILES & SPACE COMPANY
### Q

- **Quinoidal acid in urine**: 67
- **4-quinolone in urine**: 83

### R

- **Red blood cells in urine**: 292
- **Redox potential of sweat**: 546
- **Reducing substances in urine**: 40, 153, 158
- **Relative humidity, effects on sweat composition**: 33
- **Relative humidity, effects on sweating rate**: 57
- **Respiratory alkalosis and acidosis effects on urinary pH**: 28
- **$R_F$-values of urinary amino acids**: 38
- **Rhamnose in urine, determination**: 282
- **Rheumatoid arthritis, urinary 11-hydroxyaetiocholanolone**: 415
- **Riboflavin in urine**: 222
- **Riboflavin in urine, determination**: 356, 418
- **Ribonuclease denaturation by urea**: 156
- **Ribonuclease in urine**: 205
- **Ribonuclease in urine, purification**: 107
- **Ribose in urine, determination**: 282
- **5-ribosyluracil in urine**: 4
- **RS-1 fraction in urine**: 54

### S

- **Saliva, solids in**: 144
- **Salt (see the specific salt)**
- **Sarcosine metabolites in urine**: 550
- **Schizophrenia, urinary tetrahydrocortisol and tetrahydrocortisone**: 439
- **Scyllitol in urine**: 349
<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sebaceous glands, secretions</td>
<td>304</td>
</tr>
<tr>
<td>Sebum in sweat</td>
<td>304</td>
</tr>
<tr>
<td>Sedimentation in urine</td>
<td>393</td>
</tr>
<tr>
<td>Sediments (see Solids)</td>
<td></td>
</tr>
<tr>
<td>Senoi, urinary 17-ketosteroids and creatinine</td>
<td>345</td>
</tr>
<tr>
<td>Sensory deprivation, effects on urinary corticoid excretion</td>
<td>385</td>
</tr>
<tr>
<td>Sensory deprivation, urinary catechol amines</td>
<td>370</td>
</tr>
<tr>
<td>Serotonin in urine, determination</td>
<td>178</td>
</tr>
<tr>
<td>Serum, comparison with sweat and urine</td>
<td>3</td>
</tr>
<tr>
<td>Sialic acid in urine</td>
<td>296</td>
</tr>
<tr>
<td>Siderophilin in urine</td>
<td>445</td>
</tr>
<tr>
<td>Silber-Porter chromogens in urine</td>
<td>583</td>
</tr>
<tr>
<td>Silver in urine, effects of EDTA</td>
<td>411</td>
</tr>
<tr>
<td>Skatole, chromatographic behavior</td>
<td>16</td>
</tr>
<tr>
<td>Skatole in feces</td>
<td>193</td>
</tr>
<tr>
<td>Smog, effects on urinary indole and phenol acids</td>
<td>486</td>
</tr>
<tr>
<td>Soaps in feces</td>
<td>193</td>
</tr>
<tr>
<td>Sodium, dietary, and urinary aldosterone</td>
<td>233</td>
</tr>
<tr>
<td>Sodium, relation to sweat and urine formation</td>
<td>346</td>
</tr>
<tr>
<td>Sodium bicarbonate dietary, effects on electrolytes in sweat</td>
<td>303</td>
</tr>
<tr>
<td>Sodium bicarbonate, dietary, effects on urinary ( \text{Mg}^+, \text{C}2, \text{PO}_4^- )</td>
<td>357</td>
</tr>
<tr>
<td>Sodium chloride in sweat</td>
<td>434</td>
</tr>
<tr>
<td>Sodium chloride in sweat, influence of heat</td>
<td>350</td>
</tr>
<tr>
<td>Sodium chloride in urine</td>
<td>219</td>
</tr>
<tr>
<td>Sodium in sweat</td>
<td>31, 33, 113, 434</td>
</tr>
<tr>
<td>Sodium in sweat, effects of heat</td>
<td>70</td>
</tr>
<tr>
<td>Sodium in urine</td>
<td>116, 208, 219, 597</td>
</tr>
<tr>
<td>Sodium in urine, determination</td>
<td>331</td>
</tr>
<tr>
<td>Sodium in urine, effects of cold exposure</td>
<td>254, 479</td>
</tr>
<tr>
<td>Sodium in urine, effects of heat and exercise</td>
<td>433, 514</td>
</tr>
<tr>
<td>Sodium in urine, effects of posture</td>
<td>118, 530, 531</td>
</tr>
</tbody>
</table>
steroids in urine, exercise and head effects ........................................ 433
steroids in urine, flow-volume effects ........................................... 65
steroids in urine, reaction with serum albumin .................................. 496
steroids in urine, relation to body weight ...................................... 345
streptococcus faecalis for assaying folic acid in serum ........................ 26
stress (see also Cooling, Heat Stress, Sensory Deprivation, and Visual
Deprivation)

stress, effects on sweat composition ............................................ 33, 70, 71, 216, 226, 303, 510, 598
stress, effects on sweating rates ................................................... 57, 58, 59, 341, 346
stress, effects on urinary antidiuretic substance excretion .................. 224
stress, effects on urinary aromatic compounds .................................. 502
stress, effects on urinary catecholamines ....................................... 370, 500
stress, effects on urinary corticosteroids . ..................................... 78, 225, 385, 433, 514
stress, effects on urinary metabolites ........................................... 497, 498, 499
stress, effects on urinary pepsinogen excretion ................................ 278
stress, effects on urinary thionane ............................................... 380
stress, effects on urinary vallic acid ............................................ 500, 501
stress, effects on uropepsin excretion .......................................... 49

sulfanilamide in urine ...................................................................... 218
sulfates in sweat ............................................................................... 434
sulfates in urine ............................................................................... 215, 219, 290, 582, 597
sulfates in urine, determination ...................................................... 101, 288
sulfonamides in sweat ........................................................................ 519
sulfur, dietary, and urine acidity ..................................................... 250
sweat, amino acids in ........................................................................ 361, 434
sweat, ammonia in ............................................................................ 361
sweat; amylase, γ-glucosidase, and phosphorylases in ......................... 589
sweat, calcium in ............................................................................... 406
sweat, chloride content ...................................................................... 226, 271, 361, 422, 444
sweat, chloride determination .......................................................... 517

LOCKHEED MISSILES & SPACE COMPANY
sweat, colligative properties and composition ........................................... 157
sweat, creatinine in ................................................................. 434
sweat, electrolyes in .............................................................. 45, 70, 123, 152, 216, 303, 434
sweat, folic acid in ................................................................. 273
sweat, glycogen contest ............................................................... 515
sweat, histamine in ................................................................. 434
sweat, iron content ................................................................. 510
sweat, lactate content ............................................................... 216
sweat, lactic acid in ................................................................. 434
sweat, N\textsubscript{1}-methylnicotinamide in ........................................ 272
sweat, mucoproteins in .............................................................. 265
sweat, nicotinamide in ............................................................... 272
sweat, nicotinic acid in ............................................................. 272
sweat, nicotinuric acid in ......................................................... 272
sweat, nitrogen compounds in ..................................................... 104, 190, 361
sweat, osmotic pressure of ......................................................... 3
sweat, oxidation-reduction potential ............................................... 546
sweat, pH of ............................................................................. 361
sweat, pherol in ....................................................................... 434
sweat, proteins in .................................................................... 266
sweat, sodium chloride excretion in tropics ....................................... 350
sweat, solids in ....................................................................... 361
sweat, sugars in ...................................................................... 361, 434
sweat, sulfates in .................................................................... 434, 582
sweat, sulfonamides in ................................................................. 519
sweat, urea in ........................................................................ 71, 434
sweat, uric acid in ................................................................. 434
sweat, urocanic acid in ............................................................... 316
sweat, vitamin B in .................................................................... 273
sweat composition, comparison with serum and urine ....................... 3
sweat composition, general .......................................................... 3, 31, 90, 95, 598
<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>sweat glands, temperature and action</td>
<td>341</td>
</tr>
<tr>
<td>sweat glands, action and secretory potential</td>
<td>340</td>
</tr>
<tr>
<td>sweating rates</td>
<td>57, 58, 59, 103, 235, 309, 361, 413, 447</td>
</tr>
<tr>
<td>tables on determination of compounds in urine</td>
<td>566</td>
</tr>
<tr>
<td>taurine metabolites in urine</td>
<td>550</td>
</tr>
<tr>
<td>taurine in urine</td>
<td>161, 389, 410</td>
</tr>
<tr>
<td>taurine in urine, determination</td>
<td>337, 409, 471</td>
</tr>
<tr>
<td>taurocyamine in urine</td>
<td>550</td>
</tr>
<tr>
<td>testosterone in urine, reaction with serum albumin</td>
<td>498</td>
</tr>
<tr>
<td>tetrahydrocortisol in urine</td>
<td>225, 242, 440</td>
</tr>
<tr>
<td>tetrahydrocortisol in urine, determination</td>
<td>439</td>
</tr>
<tr>
<td>tetrahydrocortisone in urine</td>
<td>225, 242, 440</td>
</tr>
<tr>
<td>tetrahydrocortisone in urine, determination</td>
<td>439</td>
</tr>
<tr>
<td>tetrahydro-S in urine</td>
<td>539</td>
</tr>
<tr>
<td>tetrahydroxypregnane in urine</td>
<td>440</td>
</tr>
<tr>
<td>tetrahydroxy pregnene in urine</td>
<td>432</td>
</tr>
<tr>
<td>thermal (see Heat)</td>
<td>161, 330</td>
</tr>
<tr>
<td>thiamine in urine, determination</td>
<td>418</td>
</tr>
<tr>
<td>thionine in urine, effects of fatigue</td>
<td>380</td>
</tr>
<tr>
<td>thionine in urine, precipitation of</td>
<td>147</td>
</tr>
<tr>
<td>thrombophilic diathesis, urinary fibrinolytic factors</td>
<td>451</td>
</tr>
<tr>
<td>thrombophilebitis, urinary fibrinolytic factors</td>
<td>451</td>
</tr>
<tr>
<td>thromboplastic material in urine</td>
<td>565</td>
</tr>
<tr>
<td>thymine, effects on urinary β-aminoisobutyric acid</td>
<td>180</td>
</tr>
<tr>
<td>thyroid products in urine, determination</td>
<td>485</td>
</tr>
<tr>
<td>thyrotropin releasing principle in urine</td>
<td>452</td>
</tr>
<tr>
<td>tin in urine, effects of EDTA</td>
<td>411</td>
</tr>
<tr>
<td>tissure remnants in feces</td>
<td>193</td>
</tr>
<tr>
<td>γ-tocopherol metabolites in urine</td>
<td>494</td>
</tr>
<tr>
<td>tocopherylmethylsuccinate in urine</td>
<td>494</td>
</tr>
<tr>
<td>trace metals in urine</td>
<td>411</td>
</tr>
</tbody>
</table>

LOCKHEED MISSILES & SPACE COMPANY
trichloroacetic acid in urine, determination ........................................... 481
trichloroethanol in urine, determination ................................................. 481
trichloroethylene in urine, determination .................................................. 481
trigonelline, dietary, and urinary pyridones .............................................. 336
tryptamine in urine, determination .......................................................... 485
tryptamine-like compounds in urine .......................................................... 435
tryptamine, autolysis in presence of urea .................................................. 94
trypsin inhibitor in urine ................................................................. 145, 146
tryptophan, chromatographic behavior ...................................................... 16
tryptophan metabolites in urine ............................................................... 67, 68, 93, 246, 364, 425, 525
tryptophan metabolites in urine, determination ........................................ 495, 537
tryptophan in urine ................................................................................. 246, 330
TSH inhibitor in urine, determination ......................................................... 329
twins, comparison of urinary amino acids .................................................... 13
tyrosine metabolites in urine .................................................................... 550
tyrosine in urine .......................................................................................... 330
— U —
umbelliferone in urine, determination .......................................................... 549
urate in urine ............................................................................................... 202
urea, determination .................................................................................... 37
urea, dietary, and urine composition ............................................................ 142
urea, effects on flavocytochrome b2 ............................................................ 47
urea, effects on hemoglobin ........................................................................ 443
urea, effects on proteins ............................................................................. 358
urea, effects on trypsin ............................................................................... 94
urea in sweat .................................................................................................. 31, 33, 71, 113, 361, 434
urea in urine ................................................................................................ 44, 208, 219, 402, 597
urea in urine, determination ...................................................................... 229, 282, 302, 570
urea in urine, effects of exercise and diet ................................................... 32

208

LOCKHEED MISSILES & SPACE COMPANY
urea in urine, effects of neomycin ........................................ 568
urea in urine, effect of phosphate rich diet .............................. 305
urea in urine, effects of protein rich diets .................................. 32
urea in urine, effects of water deprivation .................................. 542
urea in urine, flow-volume effects ........................................... 181, 332, 441, 465
urea-creatinine excretion relationship ....................................... 44
urease decomposition of urea .................................................. 23, 86
\( \beta \)-ureidolysobutyric acid, effects on urinary \( \beta \)-aminoisobutyric acid ........................................ 180
uric acids, metabolic degradation ............................................. 506
uric acids in sweat ............................................................. 434
uric acids in urine ............................................................... 169, 208, 219, 424, 596
uric acids in urine, determination ........................................... 110, 135, 282, 348
uridine in urine ................................................................. 4
urinary calculi, analysis ......................................................... 301
urinary factor Z .................................................................. 318
urinary sediments ................................................................. 79, 312, 379
urine, hypotonic .................................................................. 214
urine, pH ........................................................................ 60, 121, 122, 250, 305, 361, 377, 388, 530
urine analysis, general ........................................................... 46, 91, 175, 220, 241, 253, 423
urine composition (see the specific component)

urine preservative ................................................................. 332, 334, 392, 477, 483, 530, 548, 587
ubrobilinogen in urine, determination ......................................... 151
urocanic acid in sweat, determination ......................................... 316
urocathepsin in urine ............................................................... 552
urocholocystokinin in urine ......................................................... 522
urokinase in urine ................................................................. 417
uromucoids ........................................................................ 55, 231, 367, 368
uronic acids in urine ............................................................... 449
uropepsin, urinary content ......................................................... 162, 199, 369, 552
uropepsin, effects of stress on urinary content ............................ 49
uropepsinogen, urinary content ................................................. 278, 577
uropepsin, effects of stress on urinary content ........................................... 49
uropepsinogen, urinary content ...................................................................... 278, 577
uroporphyrin, urinary determination ............................................................... 87, 119

- V -
valine, dietary, and urinary N-methyl-nicotinamide ........................................ 525
valine in urine .............................................................................................. 330
vanadium in urine, effects of EDTA .............................................................. 411
vanillic acid in urine ................................................................................... 112, 487
vapor barrier, effects on sweating rate ............................................................ 33
vasoactive substances in urine ...................................................................... 456
visual deprivation (see also Stress)
visual deprivation, effects on uropepsin excretion ........................................ 49
vitamin $B_6$ deficiency, urinary xanthurenic acid excretion ................. 92, 364
vitamin B in sweat ........................................................................................ 273
vitamin B in urine ....................................................................................... 212, 273
vitamin B in urine, determination ................................................................. 25, 143, 365, 418
vitamin E, dietary, urinary metabolites .......................................................... 494
volatile amines in urine ............................................................................... 243

- W -
water excretion, general ............................................................................... 558
water loading, effect on urine composition .................................................. 141, 142, 467
white blood cells in urine ............................................................................ 247, 292, 401

- X -
xanthine in urine, determination .................................................................. 110, 578, 579
xanthurenic acid in urine .............................................................................. 67, 425, 426, 457
xanthurenic acid in urine, determination ..................................................... 92, 364
xylose in urine, determination ..................................................................... 282

- Z -
zinc in urine, effects of EDTA ..................................................................... 411

210

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