EVALUATION OF SHORT-TERM BIOSAYS TO PREDICT FUNCTIONAL IMPAIRMENT

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EVALUATION OF SHORT-TERM BIOASSAYS
TO PREDICT FUNCTIONAL IMPAIRMENT

DEVELOPMENT OF RENAL BIOASSAYS
IN LABORATORY ANIMALS

DIRECTORY OF INSTITUTIONS/INDIVIDUALS
Final Report

Purna Greenaway, Awadh Singh

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Glomerular function  Compounds tested

**ABSTRACT** (Continue on reverse side if necessary and identify by block number)

MITRE has been requested by the U.S. Army Medical Bioengineering Research and Development Laboratory to identify and evaluate short-term bioassays which have demonstrated ability to evaluate and predict renal impairment resulting from toxicant exposures. This directory is a companion to Selected Short-Term Renal Toxicity Tests, which describes the available renal testing protocols and assesses their suitability for a screening program. This directory catalogues the organizations currently engaged in renal bioassay utilization or development and provides information concerning...
specific measurements performed, test systems employed, compounds tested, requirements for anesthesia and terminal nature of the test.

The companion report to this directory reviews the literature on test procedures for determining effects on the kidneys and other components of the renal system. The procedures are discussed in sections on morphology, glomerular function, tubular function, intrarenal hemodynamics, and biochemistry. Criteria for evaluating these procedures are given, and a two-tiered testing system is recommended for a chemical renal toxicity screening program.
The MITRE Corporation, Metrek Division is currently assisting the United States Army Medical Bioengineering Research and Development Laboratory (USAMBRDL) in the development of a hierarchical short-term testing scheme to screen substances for functional or morphological impairment in animal test systems. Effects in four organ systems—pulmonary, hepatic, renal and cardiovascular—are being considered.

As part of this effort, Metrek has been asked to prepare directories of organizations and individuals presently involved in the development and/or utilization of tests applicable to toxicity screening. This directory serves as a companion document to the report, Evaluation of Short-Term Bioassays to Predict Functional Impairment: Selected Short-Term Renal Toxicity Tests, which presents information on the available tests for the renal system and recommends those tests which are suitable for use in a screening program.

Entries in each directory for several organizations currently involved in the organ bioassay use or development include at least one contact individual's name, which appears under the organization name and address at the top of the page. These are the people who, during the process of directory compilation, described either their activities or the activities of their group regarding organ toxicity testing, and thereby provided the information presented in the entry.
The information provided includes the specific tests and observations performed; the test systems utilized (e.g., experimental animals or tissues in vitro); the substances administered or conditions established to elicit toxic response (e.g., stress); the use of anesthesia, and the terminal nature of the tests conducted.

In order to facilitate use and the processes of amending and adding to the directory, it has been arranged in alphabetical order by organization. In order to further simplify use of the directory, three indexes have been prepared and are included as appendices. The first, Appendix A, is an alphabetical index of tests performed by each organization engaged in developing, performing or refining the tests noted. Appendix B is an alphabetical index of species utilized and all the organizations employing each test system. These are further divided by tests performed. In this way it is possible to ascertain which organizations perform particular bioassays in a specific test system. Appendix C is an alphabetical index of the individuals mentioned in the directory, and the organization with which they were affiliated when contacted.

The objective of this directory is to provide a readily usable guide to that segment of the scientific community currently active in organ system toxicity testing in animals. Because research associate and graduate student positions are often temporary in nature, a deliberate attempt was made to exclude these individuals from the directory. Their efforts, however, are likely to be
represented by activities associated with their organization, as in most cases these individuals are conducting research under the auspices of someone more senior and more permanently allied with the organization, who was included in the directory. In addition, there are individuals who were active in toxicity testing at one time but are no longer; these have also been omitted from the directory. The efforts of many of those who are not currently active, but were involved over a period of many years and distinguished themselves in the fields, are reflected in the report Selected Short-Term Renal Toxicity Tests.

Some of the entries in the directory may be less detailed than others, and less specific in the detail that is presented. In addition, the information presented for an organization may not be reflective of all the ongoing efforts at the organization. This is due largely to the reluctance of some individuals contacted to communicate the information and, in small part, to an inability to contact a few individuals at the time this directory was being compiled. The information in the directory was selected to provide an immediate indication of the practices of each organization concerning some issues of importance when designing a screening program. Much of this information is discussed in greater detail in the report Selected Short-Term Renal Toxicity Tests.
FOREWORD

This Directory was compiled by MITRE staff by means of a survey of the recent literature, and by discussions with leaders in the field and other personal contacts. We are grateful to all those who responded so patiently to our questions regarding their activities. All of the "contact persons" were given an opportunity to review the information relating to their organization. We recognize there may be inadvertent omissions for which we offer our sincere apologies.

Citations of organizations and trade names in this report do not constitute an official Department of the Army endorsement or approval of the products or services of these organizations.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>EXECUTIVE SUMMARY</td>
<td>1</td>
</tr>
<tr>
<td>FOREWORD</td>
<td>5</td>
</tr>
<tr>
<td>DIRECTORY OF ORGANIZATIONS PRESENTLY INVOLVED IN UTILIZATION OR DEVELOPMENT OF RENAL TESTS IN LABORATORY ANIMALS</td>
<td>9</td>
</tr>
<tr>
<td>APPENDIX A - TESTS PERFORMED BY EACH ORGANIZATION</td>
<td>57</td>
</tr>
<tr>
<td>APPENDIX B - TEST SYSTEMS UTILIZED BY EACH ORGANIZATION</td>
<td>69</td>
</tr>
<tr>
<td>APPENDIX C - INDEX OF INDIVIDUALS IN THE DIRECTORY</td>
<td>87</td>
</tr>
</tbody>
</table>
DIRECTORY OF ORGANIZATIONS PRESENTLY INVOLVED IN UTILIZATION OR DEVELOPMENT OF RENAL TESTS IN LABORATORY ANIMALS
TESTS PERFORMED:

MORPHOLOGICAL MEASUREMENT: LIGHT MICROSCOPY
TUBULAR FUNCTION:
  SECRETIVE TEST
  IN VITRO EVALUATION OF RENAL TRANSPORT (CORTICAL SLICE TECHNIQUE)
RENAL HEMODYNAMICS: RENAL BLOOD FLOW MEASUREMENT
BIOCHEMICAL DAMAGE INDICATORS:
  DRUG METABOLIC STUDIES
  RENAL TISSUE HOMOGENATE PREPARATIONS
  URINARY ENZYME ACTIVITY

TEST SYSTEMS UTILIZED:

MICE, RATS, GOLDEN HAMSTERS

COMPOUNDS TESTED:

2-SUBSTITUTED FURANS AND THIOPHENES, INCLUDING FUROSEMIDE AND CEPHALORIDINE, VARIOUS DRUGS AND AROMATIC AND ALIPHATIC ENVIRONMENTAL TOXICANTS

TERMINAL:

BOTH SERIAL AND TERMINAL TESTS ARE PERFORMED
ORGANIZATION:

DARTMOUTH MEDICAL SCHOOL
DEPARTMENT OF INTERNAL MEDICINE
HANOVER, NEW HAMPSHIRE 03755

H. VALTIN
PROFESSOR OF MEDICINE
(603) 646-2207

TESTS PERFORMED:

A WIDE VARIETY OF FUNCTIONAL TESTS

TEST SYSTEMS UTILIZED:

UNANESTHETIZED RATS

COMPOUNDS TESTED:

VARIOUS DRUGS

TERMINAL:

BOTH SERIAL AND TERMINAL
TESTS PERFORMED:

GLOMERULAR FUNCTION: GLOMERULAR FILTRATION RATE (INULIN AND CREATININE CLEARANCE; DISAPPEARANCE OF RADIOACTIVE SUBSTANCES)
RENAL HEMODYNAMICS: RENAL BLOOD FLOW (PAH CLEARANCE)
TUBULAR FUNCTION: URINARY CONCENTRATING ABILITY (OSMOLALITY) SECRETIVE TEST (URINARY EXCRETION OF ELECTROLYTES)
BIOCHEMICAL DAMAGE INDICATORS:
  DRUG METABOLIC STUDIES
  RENAL TISSUE HOMOGENATE PREPARATIONS

TEST SYSTEMS UTILIZED:

MICE, RATS, GUINEA PIGS, HAMSTERS, DOGS

COMPOUNDS TESTED:

VARIOUS DRUGS, RADIOPAQUE AGENTS

TERMINAL:

BOTH SERIAL AND TERMINAL
ORGANIZATION:

DARTMOUTH MEDICAL SCHOOL
DEPARTMENT OF ANATOMY
HANOVER, NEW HAMPSHIRE 03755

W. M. LAYTON, JR.
PROFESSOR OF ANATOMY
(603) 636-2732

TESTS PERFORMED:

MORPHOLOGICAL MEASUREMENTS: LIGHT MICROSCOPY AND ELECTRON MICROSCOPIC STRUCTURAL STUDIES

GLOMERULAR FUNCTION:
- GLOMERULAR FILTRATION RATE (UREA CLEARANCE)
- GLOMERULAR DYSFUNCTION (PHENOSULFONEPTALEIN [PSP] AND URINARY PROTEIN MEASUREMENT)

TUBULAR FUNCTION:
- SECRETIVE TEST (PAH TRANSPORT MAXIMUM MEASUREMENT)
- URINARY CONCENTRATING ABILITY (OSMOLALITY)

TESTS SYSTEMS UTILIZED:

RATS, DOGS

COMPOUNDS TESTED:

VARIOUS DRUGS

TERMINAL:

BOTH SERIAL AND TERMINAL
ORGANIZATION:

DEPARTMENT OF HEALTH AND WELFARE
HEALTH PROTECTION BRANCH
VANCOUVER 1, B.C., CANADA

G. H. HIRSCH
CHIEF, DRUG LABORATORIES
(604) 666-3802

TESTS PERFORMED:

GLOMERULAR FUNCTION: GLOMERULAR FILTRATION RATE (CREATININE AND UREA CLEARANCE)
TUBULAR FUNCTION:
  SECRETIVE TEST
  IN VITRO EVALUATION OF RENAL TRANSPORT (CORTICAL SLICE TECHNIQUE)

TEST SYSTEMS UTILIZED:

RATS, RABBITS, GUINEA PIGS, DOGS

COMPOUNDS TESTED:

URANYL NITRATE, POTASSIUM DICHROMATE, GENTAMICIN, TETRAMYCIN, SEVERAL HEAVY METALS, HALOGENATED HYDROCARBONS, VARIOUS DRUGS

TERMINAL:

MOSTLY TERMINAL TYPE OF EXPERIMENTS
ORGANIZATION:

DEPARTMENT OF HEALTH AND WELFARE
HEALTH PROTECTION BRANCH
FOOD DIRECTORATE
TUNNEY'S PASTURE - NEW RESEARCH CENTER
OTTAWA, ONTARIO, CANADA

I. C. MUNRO
DIRECTOR, BUREAU OF CHEMICAL SAFETY
(613) 593-4871

TESTS PERFORMED:

MORPHOLOGICAL MEASUREMENT: LIGHT MICROSCOPY
GLOMERULAR FUNCTION: GLOMERULAR DYSFUNCTION (URINARY PROTEIN MEASUREMENT)
TUBULAR FUNCTION:
SECRETIVE TEST (URINARY EXCRETION OF ELECTROLYTES)
GENERAL TUBULAR DAMAGE (MICROCRYSTALS AND OTHER URINARY SEDIMENT EXAMINATION)

TEST SYSTEMS UTILIZED:

RATS

COMPOUNDS TESTED:

SODIUM AND CALCIUM SACCHARIN, SODIUM CYCLAMATE

TERMINAL:

BOTH SERIAL AND TERMINAL

REMARKS:

IN ADDITION TO I. C. MUNRO, D. L. ARNOLD, B. STAIVRIC, B. T. COLLINS AND P. F. McGUIRE ARE INVOLVED IN RENAL TESTING RESEARCH PROGRAMS AT THIS INSTITUTION
ORGANIZATION:

DUKE UNIVERSITY MEDICAL CENTER
DIVISION OF NEPHROLOGY
DURHAM, NORTH CAROLINA 27706

V. W. DENNIS
ASSOCIATE PROFESSOR
(919) 684-5414

TESTS PERFORMED:

GLOMERULAR FUNCTION:
  GLOMERULAR FILTRATION RATE (INULIN AND CREATININE CLEARANCE)
  GLOMERULAR DYSFUNCTION (BLOOD UREA NITROGEN [BUN] AND URINARY
  PROTEIN MEASUREMENT)

TUBULAR FUNCTION:
  URINARY CONCENTRATING ABILITY (URINE OSMOLALITY)
  SECRETIVE TEST (URINARY EXCRETION OF ELECTROLYTES)
  BIOCHEMICAL DAMAGE INDICATOR: PLASMA RENIN MEASUREMENT

TEST SYSTEMS UTILIZED:

RATS, RABBITS, HUMANS

COMPOUNDS TESTED:

HEAVY METALS ESPECIALLY MERCURY COMPOUNDS; CLINICAL TESTING IN
HUMANS IS ALSO PERFORMED

TERMINAL:

BOTH SERIAL AND TERMINAL

REMARKS:

IN ADDITION TO V. W. DENNIS, R. R. ROBINSON, R. A. GUNMAN AND
J. R. CLAPP ARE ALSO INVOLVED IN RENAL TESTING RESEARCH PROGRAMS
AT THIS INSTITUTION
TESTS PERFORMED:

TUBULAR FUNCTION:
SECRETIVE TESTS (URINARY DISTRIBUTION AND EXCRETION OF ELECTROLYTES)
IN VITRO EVALUATION OF RENAL TRANSPORT (CORTICAL SLICE TECHNIQUE AND ISOLATED PERFUSED TUBULES)
URINARY CONCENTRATING ABILITY (URINE OSMOLALITY)
RENAL HEMODYNAMICS: RENAL PLASMA FLOW
BIOCHEMICAL DAMAGE INDICATORS:
RENAL METABOLIC STUDIES
URINARY ENZYME ACTIVITY

TEST SYSTEMS UTILIZED:

RATS

COMPOUNDS TESTED:

VARIOUS HERBICIDES AND INSECTICIDES

TERMINAL:

BOTH SERIAL AND TERMINAL
TESTS PERFORMED:

MORPHOLOGICAL MEASUREMENTS: LIGHT AND ELECTRON MICROSCOPY

GLOMERULAR FUNCTION:
GLOMERULAR FILTRATION RATE (CREATININE AND INULIN CLEARANCE)
GLOMERULAR DYSFUNCTION (BUN AND URINARY PROTEIN MEASUREMENT)

TUBULAR FUNCTION:
SECRETIVE TEST
IN VITRO EVALUATION OF RENAL TRANSPORT (CORTICAL SLICE TECHNIQUE)
URINARY CONCENTRATING ABILITY (OSMOLALITY AND SPECIFIC GRAVITY)

RENAL HEMODYNAMICS: RENAL BLOOD FLOW (PAH CLEARANCE)
BIOCHEMICAL DAMAGE INDICATOR: URINARY ENZYME ACTIVITY

TEST SYSTEMS UTILIZED:

MICE, RATS, GUINEA PIGS, DOGS, MONKEYS, HUMAN (ADULTS AND CHILDREN) BIOPSIES

COMPOUNDS TESTED:

VARIOUS DRUGS, CANCER CAUSING AGENTS, HEAVY METALS (e.g., MERCURY, CHLORIDE)

TERMINAL:

BOTH SERIAL AND TERMINAL

REMARKS:

BESIDES G. E. SCHREINER, H. PREUSES, W. P. ARGY, JR., L. DIAMOND AND J. WINCHESTER ARE ALSO INVOLVED IN RENAL TESTING PROGRAMS AT THIS INSTITUTION
ORGANIZATION:

HARVARD MEDICAL SCHOOL
BOSTON, MASSACHUSETTS 02115

A. L. LAGE
ASSISTANT PROFESSOR OF VETERINARY MEDICINE
(617) 732-1000

TESTS PERFORMED:

MORPHOLOGICAL MEASUREMENT: LIGHT MICROSCOPY
GLOMERULAR FUNCTION:
  GLOMERULAR FILTRATION RATE (CREATININE CLEARANCE)
  GLOMERULAR DYSFUNCTION (PSP EXCRETION)
TUBULAR FUNCTION: URINARY CONCENTRATING ABILITY (OSMOLALITY AND
  SPECIFIC GRAVITY)

TEST SYSTEMS UTILIZED:

RATS, GUINEA PIGS, RABBITS, MONKEYS

COMPOUNDS TESTED:

MOSTLY UNANESTHESIZED ANIMALS ARE USED FOR THESE TESTS; HOWEVER,
  A FEW STUDIES ARE BEING DONE WITH ANESTHESIZED ANIMALS

TERMINAL:

SERIAL; HOWEVER, SOME MONKEYS ARE TERMINATED AND LIGHT MICRO-
  SCOPY IS PERFORMED
ORGANIZATION:

ICI AMERICAS, INC.
BIOMEDICAL RESEARCH DEPARTMENT
WILMINGTON, DELAWARE 19897

S. T. KAU
HEAD, RENAL PHARMACOLOGY SECTION
(302) 575-2501

TESTS PERFORMED:

GLOMERULAR FUNCTION: GLOMERULAR FILTRATION RATE (INULIN CLEARANCE)
TUBULAR FUNCTION:
SECRETIVE TEST (URINARY EXCRETION OF ELECTROLYTES)
IN VITRO EVALUATION OF RENAL TRANSPORT (ISOLATED PERFUSED TUBULES)
URINARY CONCENTRATING ABILITY (OSMOLALITY)
RENAI HEMODYNAMICS: RENAL BLOOD FLOW (PAH CLEARANCE)
BIOCHEMICAL DAMAGE INDICATORS: MEASUREMENTS OF ARTERIAL PCO₂ AND CORRELATIONS WITH CARBONURIA

TEST SYSTEMS UTILIZED:

MICE, RATS, RABBITS, DOGS

COMPOUNDS TESTED:

VARIOUS DRUGS AND COMPOUNDS

TERMINAL:

ONLY SERIAL
ORGANIZATION:

INDIANA UNIVERSITY
SCHOOL OF MEDICINE
DEPARTMENT OF NEUROPATHOLOGY
INDIANAPOLIS, INDIANA 46202

V. PATEL
ASSOCIATE PROFESSOR
(317) 264-4662

TESTS PERFORMED:

MORPHOLOGICAL MEASUREMENTS: LIGHT AND ELECTRON MICROSCOPY
GLOMERULAR FUNCTION:
  GLOMERULAR FILTRATION RATE (CREATININE AND UREA CLEARANCE)
  GLOMERULAR DYSFUNCTION (URINARY PROTEIN MEASUREMENT)
TUBULAR FUNCTION: URINARY CONCENTRATING ABILITY (OSMOLALITY)
BIOCHEMICAL DAMAGE INDICATOR: URINARY ENZYME ACTIVITY

TEST SYSTEMS UTILIZED:

RATS

COMPounds TESTed:

GENTAMICIN, MERCURY

TERMINAL:

BOTH SERIAL AND TERMINAL

REMARKS:

IN ADDITION TO V. PATEL, F. C. LUFT, W. ZEMAN AND S. A. KLEIT
ARE INVOLVED IN RENAL TESTING AT THIS INSTITUTION
ORGANIZATION:

MEDICAL COLLEGE OF VIRGINIA
DEPARTMENT OF MEDICINE
RICHMOND, VIRGINIA 23298

D. E. OKEN
PROFESSOR OF MEDICINE
(804) 786-9682

TESTS PERFORMED:

MORPHOLOGICAL MEASUREMENT: HISTOPATHOLOGY
GLOMERULAR FUNCTION:
  GLOMERULAR FILTRATION RATE (INULIN AND UREA CLEARANCE)
  GLOMERULAR BLOOD FLOW
  GLOMERULAR DYSFUNCTION (URINARY PROTEIN MEASUREMENT)
BIOCHEMICAL DAMAGE INDICATOR: URINARY ENZYME ACTIVITY

TEST SYSTEMS UTILIZED:

RATS

COMPOUNDS TESTED:

MOSTLY HEAVY METALS SUCH AS MERCURY CHLORIDE, SODIUM DICHROMATE, ETC.

TERMINAL:

BOTH SERIAL AND TERMINAL
TESTS PERFORMED:

GLomerular Function:
- Glomerular Filtration Rate (Creatinine and Urea Clearance)
- Glomerular Dysfunction (BUN, Urinary Protein and PSP Measurement)

Tubular Function:
- Secretive Test
  - In Vitro Evaluation of Renal Transport (Cortical Slice Technique)
- Urinary Concentrating Ability (Osmolality)

Test Systems Utilized:

Mice, Rats

Compounds Tested:

Various Nephrotoxic Agents

Terminal:

Both Serial and Terminal

Remarks:

In addition to J. B. Hook, K. M. McCormack, D. E. Rickert and V. L. Sanger are also involved in renal testing programs at this institution
ORGANIZATION:

MOUNT DESERT ISLAND BIOLOGICAL LABORATORIES
P.O. BOX 25
SALISBURY COVE, MAINE 04672

B. SCHMIDT-NIELSEN
DEPUTY DIRECTOR
(207) 288-4690

TESTS PERFORMED:

MORPHOLOGICAL MEASUREMENTS: LIGHT AND ELECTRON MICROSCOPY
TUBULAR FUNCTIONS

TEST SYSTEMS UTILIZED:

RATS, GOLDEN HAMSTERS

COMPOUNDS TESTED:

LISAMINE GREEN DYE

TERMINAL:

BOTH SERIAL AND TERMINAL
TESTS PERFORMED:

GLOMERULAR FUNCTION: GLOMERULAR FILTRATION RATE (INULIN CLEARANCE)
TUBULAR FUNCTION:
SECRETIVE TEST
IN VITRO EVALUATION OF RENAL TRANSPORT (CORTICAL SLICE TECHNIQUE AND ISOLATED PERFUSED TUBULES)
BIOCHEMICAL DAMAGE INDICATOR: URINARY ENZYME ACTIVITY

TEST SYSTEMS UTILIZED:

RABBITS

COMPOUNDS TESTED:

ORGANIC ACIDS AND BASES, ELECTROLYTES

TERMINAL:

PROCEDURES USED ARE TERMINAL EXCEPT URINALYSIS AND INULIN CLEARANCE TESTS

REMARKS:

ISOLATED PERFUSED SINGLE TUBULE TECHNIQUE IS NOT SUITABLE FOR ROUTINE OR SCREENING PURPOSES
ORGANIZATION:
NATIONAL INSTITUTE OF ENVIRONMENTAL HEALTH SCIENCES
NATIONAL TOXICOLOGY PROGRAM
RESEARCH TRIANGLE PARK, NORTH CAROLINA 27709

W. M. KLUWE
STAFF FELLOW
(919) 541-2690

TESTS PERFORMED:

MORPHOLOGICAL MEASUREMENT: HISTOPATHOLOGY
GLomerular Function: Measurement of Glomerular Filtration Rate
(creatinine clearance)
Tubular Function:
Secretive Test
In vitro Evaluation of Renal Transport (cortical slice technique)
Urinary concentrating ability (osmolality and specific gravity)
Biochemical Damage Indicator: Urinary Enzyme Activity

TEST SYSTEMS UTILIZED:
Mice, Rats

COMPOUNDS TESTED:
Heavy Metals, Halogenated Hydrocarbons

TERMINAL:
Both serial and terminal

REMARKS:

Histopathologic examination of the renal tissues is the best determinant of renal damage; however, it provides little information concerning renal function. Gamma-glutamyl transpeptidase is present in sufficient amounts in the urine of rodents to indicate renal damage.
ORGANIZATION:

NATIONAL INSTITUTE OF ENVIRONMENTAL HEALTH SCIENCES
LABORATORY OF ENVIRONMENTAL TOXICOLOGY
P.O. BOX 12233
RESEARCH TRIANGLE PARK, NORTH CAROLINA 27709

B. A. FOWLER
RESEARCH BIOLOGIST AND HEAD OF RENAL AND
INTERCELLULAR FUNCTION AND TOXICOLOGY GROUP
(919) 541-3269

TESTS PERFORMED:

MORPHOLOGICAL MEASUREMENTS: LIGHT AND ELECTRON MICROSCOPY
GLOMERULAR FUNCTION:
  GLOMERULAR FILTRATION RATE (CREATINE AND UREA CLEARANCE)
  GLOMERULAR DYSFUNCTION (URINARY PROTEIN AND Porphyrin
  MEASUREMENT)
BIOCHEMICAL DAMAGE INDICATOR: URINARY ENZYME ACTIVITY

TEST SYSTEMS UTILIZED:

MICE, RATS, RABBITS

COMPOUNDS TESTED:

MOSTLY HEAVY METALS SUCH AS MERCURY, CADMIUM, LEAD, ARSENIC,
ETC.

TERMINAL:

BOTH SERIAL AND TERMINAL

REMARKS:

BESIDES B. A. FOWLER, J. S. WOODS IS ALSO ACTIVELY INVOLVED
IN RENAL TESTING PROGRAMS.
ORGANIZATION:

NATIONAL INSTITUTE OF ENVIRONMENTAL HEALTH SCIENCES
P.O. BOX 12233
RESEARCH TRIANGLE PARK, NORTH CAROLINA 27709

R. GOYER
DEPUTY DIRECTOR
(919) 541-3201

TESTS PERFORMED:

MORPHOLOGICAL MEASUREMENTS: LIGHT AND ELECTRON MICROSCOPY
GLOMERULAR FUNCTION:
  GLOMERULAR FILTRATION RATE (CREATININE CLEARANCE)
  GLOMERULAR DYSFUNCTION (URINARY PROTEIN MEASUREMENT)
BIOCHEMICAL DAMAGE INDICATORS

TEST SYSTEMS UTILIZED:

MICE, RATS

COMPUNDS TESTED:

CADMIUM AND ZINC CHLORIDES, CADMIUM METALLOTHEONEIN

TERMINAL:

BOTH SERIAL AND TERMINAL
ORGANIZATION:

NORTH CAROLINA CENTRAL UNIVERSITY
DEPARTMENT OF BIOLOGY
DURHAM, NORTH CAROLINA 27707

V. CLARK
ASSOCIATE PROFESSOR
(919) 683-6248

TESTS PERFORMED:

GLOMERULAR FUNCTION: GLOMERULAR FILTRATION RATE (URINARY PROTEIN MEASUREMENT)
TUBULAR FUNCTION: URINARY CONCENTRATING ABILITY
BIOCHEMICAL DAMAGE INDICATOR: URINARY ENZYME ACTIVITY

TEST SYSTEMS UTILIZED:

RATS

COMPOUNDS TESTED:

HEAVY METALS, ESPECIALLY CADMIUM

TERMINAL:

ONLY SERIAL
ORGANIZATION:

OHIO STATE UNIVERSITY
COLLEGE OF VETERINARY MEDICINE
DEPARTMENT OF VETERINARY PHYSIOLOGY AND PHARMACOLOGY
COLUMBUS, OHIO 43210

R. C. GARG
ADJUNCT ASSISTANT PROFESSOR AND SENIOR
RESEARCH ASSOCIATE
(614) 422-0492

TESTS PERFORMED:

GLOMERULAR FUNCTION: GLOMERULAR FILTRATION RATE
\((^{125}\text{I})\)-IOTHALAMATE DISAPPEARANCE)
RENAL HEMODYNAMICS: RENAL BLOOD FLOW \((^{131}\text{I})\) SODIUM
IODOHIPPURATE CLEARANCE

TEST SYSTEMS UTILIZED:

DOGS, CATS, COWS

COMPOUNDS TESTED:

MOSTLY UNTREATED ANIMALS ARE USED

TERMINAL:

ONLY SERIAL

REMARKS:

IN ADDITION TO R. C. GARG, T. E. POWERS AND J. D. POWERS ARE
ACTIVELY INVOLVED IN RENAL TESTING PROGRAMS AT THIS INSTITUTION.
ORGANIZATION:

SCHERING-PLough CORPORATION
P.O. BOX 32
LAFAYETTE, NEW JERSEY 07848

L. E. ARTHAUD
PRINCIPAL TOXICOLOGIST
(201) 383-3211

TESTS PERFORMED:

MORPHOLOGICAL MEASUREMENTS: LIGHT AND ELECTRON MICROSCOPY
GLOMERULAR FUNCTION: GLOMERULAR DYSFUNCTION (BUN AND URINARY
PROTEIN MEASUREMENT)
TUBULAR FUNCTION: URINARY CONCENTRATING ABILITY (OsmOLALITY)

TEST SYSTEMS UTILIZED:

RATS, DOGS

COMPOUNDS TESTED:

Bromoethylamine, Methoxyflurane

TERMINAL:

BOTH SERIAL AND TERMINAL
ORGANIZATION:

SMITH KLINE AND FRENCH LABORATORIES
PHILADELPHIA, PENNSYLVANIA 19101

F. T. BRENNAN
SENIOR PHARMACOLOGIST
(215) 854-4000  Ext. 5510

TESTS PERFORMED:

MORPHOLOGICAL MEASUREMENT: LIGHT MICROSCOPY
GLomerular function: Glomerular filtration rate (Inulin and creatinine clearance)
Tubular function: Secretive test (urinary excretion of electrolytes)
Renal hemodynamics: Renal plasma flow (PAH clearance)

TEST SYSTEMS UTILIZED:

RATS, DOGS, MONKEYS

COMPOUNDS TESTED:

TRIAMTERENE, HYDROCHLOROTHIAZIDE, Furosemide, ACETAZOLEAMIDE, DOPAMINE, BULBOCAPNINE, VARIOUS DRUGS

TERMINAL:

BOTH SERIAL AND TERMINAL

REMARKS:

BESIDES F. T. BRENNAN, V. D. WIEBELHAUS IS INVOLVED IN RENAL TESTING PROGRAMS AT THIS INSTITUTION
TESTS PERFORMED:

MORPHOLOGICAL MEASUREMENT: LIGHT MICROSCOPY
GLOMERULAR FUNCTION: GLOMERULAR DYSFUNCTION (URINARY PROTEIN MEASUREMENT)
BIOCHEMICAL DAMAGE INDICATORS

TEST SYSTEMS UTILIZED:

RATS

COMPOUNDS TESTED:

CADMIUM, ZINC

TERMINAL:

BOTH SERIAL AND TERMINAL
ORGANIZATION:

THE SQUIBB INSTITUTE FOR MEDICAL RESEARCH  
DEPARTMENT OF DRUG METABOLISM  
NEW BRUNSWICK, NEW JERSEY 08903

S. M. SINGHVI  
RESEARCH GROUP LEADER  
(201) 545-1300

TESTS PERFORMED:

MORPHOLOGICAL MEASUREMENT: LIGHT MICROSCOPY
GLOMERULAR FUNCTION:  
  GLOMERULAR FILTRATION RATE (CREATININE AND UREA CLEARANCE)  
  GLOMERULAR DYSFUNCTION (BUN MEASUREMENT)  
TUBULAR FUNCTION: SECRETIVE TEST (PAH TRANSPORT MAXIMUM MEASUREMENT)
RENAL HEMODYNAMICS: RENAL BLOOD FLOW (PAH CLEARANCE)  
BIOCHEMICAL DAMAGE INDICATOR: URINARY ENZYME ACTIVITY

TEST SYSTEMS UTILIZED:

RATS, DOGS, MONKEYS

COMPOUNDS TESTED:

URANYL NITRATE, MERCURIC CHLORIDE, CARBON TETRACHLORIDE

TERMINAL:

BOTH SERIAL AND TERMINAL

REMARKS:

IN ADDITION TO S. M. SINGHVI, L. T. DIFAZIO AND J. W. POUTSIAKA  
ARE INVOLVED IN RENAL TESTING PROGRAMS AT THIS INSTITUTION
ORGANIZATION:

STANFORD UNIVERSITY
SCHOOL OF MEDICINE
DEPARTMENT OF CLINICAL PATHOLOGY
STANFORD, CALIFORNIA 94305

J. C. KOSEK
PROFESSOR OF CLINICAL PATHOLOGY
(415) 493-5000  EXT. 5753

TESTS PERFORMED:

MORPHOLOGICAL MEASUREMENTS: LIGHT AND ELECTRON MICROSCOPY
TUBULAR FUNCTION: SECRETIVE TEST (URINARY EXCRETION OF
ELECTROLYTES)
BIOCHEMICAL DAMAGE INDICATORS

TEST SYSTEMS UTILIZED:

MICE, RATS, RABBITS, GUINEA PIGS

COMPOUNDS TESTED:

GENTAMICIN AND OTHER AMINOGLYCOSIDES

TERMINAL:

BOTH SERIAL AND TERMINAL

REMARKS:

IN ADDITION TO J. C. KOSEK, M. J. COUSINS IS INVOLVED IN RENAL
TESTING PROGRAMS AT THIS INSTITUTION
ORGANIZATION:

STANFORD UNIVERSITY
SCHOOL OF MEDICINE
DEPARTMENT OF ANESTHESIOLOGY
STANFORD, CALIFORNIA 94305

R. I. MAZZE
ASSISTANT CHAIRMAN
(415) 497-6411

TESTS PERFORMED:

MORPHOLOGICAL MEASUREMENTS: LIGHT AND ELECTRON MICROSCOPY
GLOMERULAR FUNCTION:
  GLOMERULAR FILTRATION RATE (CREATININE AND UREA CLEARANCE)
  GLOMERULAR DYSFUNCTION (BUN AND URINARY PROTEIN MEASUREMENT)
TUBULAR FUNCTION:
  URINARY CONCENTRATING ABILITY (OSMOLALITY)
  SECRETIVE TEST (URINARY EXCRETION OF ELECTROLYTES)
BIOCHEMICAL DAMAGE INDICATORS

TEST SYSTEMS UTILIZED:

MICE, RATS

COMPOUNDS TESTED:

METHOXYFLURANE, FLUORIDE

TERMINAL:

BOTH SERIAL AND TERMINAL
ORGANIZATION:

STATE UNIVERSITY OF NEW YORK, STONY BROOK
DEPARTMENT OF NEPHROLOGY
STONY BROOK, LONG ISLAND
NEW YORK 11794

G. J. KALOYANIDES
CHAIRMAN
(516) 246-2038

TESTS PERFORMED:

MORPHOLOGICAL MEASUREMENTS: LIGHT AND ELECTRON MICROSCOPY
GLOMERULAR FUNCTION:
  GLOMERULAR DYSFUNCTION (URINARY PROTEIN MEASUREMENT)
  GLOMERULAR FILTRATION RATE (INULIN AND CREATININE CLEARANCE)
TUBULAR FUNCTION:
  SECRETIVE TEST
    IN VITRO EVALUATION OF RENAL TRANSPORT (CORTICAL SLICE TECHNIQUE)
BIOCHEMICAL DAMAGE INDICATORS

TEST SYSTEMS UTILIZED:

RATS

COMPOUNDS TESTED:

VARIOUS ANTIBIOTICS

TERMINAL:

BOTH SERIAL AND TERMINAL
ORGANIZATION:
UNIVERSITY OF ARKANSAS
SCHOOL FOR MEDICAL SCIENCES
DEPARTMENT OF PATHOLOGY
4306 WEST MARKHAM STREET
LITTLE ROCK, ARKANSAS 72201

L. W. CHANG
ASSOCIATE PROFESSOR
(501) 661-5171

TESTS PERFORMED:
MORPHOLOGICAL MEASUREMENTS: LIGHT AND ELECTRON MICROSCOPY
GLOMERULAR FUNCTION: GLOMERULAR DYSFUNCTION (URINARY PROTEIN MEASUREMENT)
TUBULAR FUNCTION: SECRETIVE TEST (URINARY EXCRETION OF ELECTROLYTES)
BIOCHEMICAL DAMAGE INDICATOR: URINARY ENZYME ACTIVITY

TEST SYSTEMS UTILIZED:
MICE, RATS, GOLDEN HAMSTERS

COMPAGNDS TESTED:
MOSTLY HEAVY METALS - LEAD, CADMIUM, MERCURIC, BICHLORIDE,
METHYLMERCURIC CHLORIDE

TERMINAL:
BOTH SERIAL AND TERMINAL; HOWEVER, MOSTLY ANIMALS ARE TERMINATED FOR MICROSCOPIC STUDIES.
ORGANIZATION:

UNIVERSITY OF CINCINNATI MEDICAL CENTER
DEPARTMENT OF ENVIRONMENTAL HEALTH
3223 EDEN AVENUE
CINCINNATI, OHIO 45267

D. R. JOHNSON
ASSOCIATE PROFESSOR AND HEAD OF GRADUATE STUDIES
(513) 872-5759

TESTS PERFORMED:

MORPHOLOGICAL MEASUREMENTS: GROSS APPEARANCE AND LIGHT
MICROSCOPY

GLOMERULAR FUNCTION: GLOMERULAR FILTRATION RATE (CREATININE
AND INULIN CLEARANCE)

TUBULAR FUNCTION:
SECRETIVE TESTS (URINARY EXCRETION OF ELECTROLYTES)
IN VITRO EVALUATION OF RENAL TRANSPORT (CORTICAL SLICE
TECHNIQUE)

RENAL HEMODYNAMICS: RENAL PLASMA FLOW (PAH CLEARANCE)

TEST SYSTEMS UTILIZED:

RATS

COMPARTMENTS TESTED:

HEAVY METALS – LEAD, MERCURY, ETC.

TERMINAL:

BOTH SERIAL AND TERMINAL

REMARDS:

IN ADDITION TO D. R. JOHNSON, L. I. KLEINMAN IS ENGAGED IN THE
RENAL TESTING PROGRAM AT THIS INSTITUTION

40
ORGANIZATION:

UNIVERSITY OF HOUSTON
COLLEGE OF PHARMACY
DIVISION OF CARDIOVASCULAR RESEARCH
HOUSTON, TEXAS

J. P. BUCKLEY
DEAN
(713) 749-4106

TESTS PERFORMED:

MORPHOLOGICAL MEASUREMENTS: LIGHT AND ELECTRON MICROSCOPY
TUBULAR FUNCTION: SECRETIVE TEST (URINARY EXCRETION OF ELECTROLYTES)

TEST SYSTEMS UTILIZED:

DOGS, CATS

COMPOUNDS TESTED:

ANGIOTENSIN II

TERMINAL:

BOTH SERIAL AND TERMINAL, BUT MOST OF THE ANIMALS ARE TERMINATED FOR MICROSCOPIC EXAMINATION

REMARKS:

IN ADDITION TO J. P. BUCKLEY, M. L. STEENBERG AND B. S. JANDHYALA ARE ACTIVELY INVOLVED IN RENAL TESTING PROGRAMS AT THIS INSTITUTION
TESTS PERFORMED:

GLOMERULAR FUNCTION:
- GLOMERULAR DYSFUNCTION (BUN MEASUREMENT)
- GLOMERULAR FILTRATION RATE (INULIN AND CREATININE CLEARANCE)

TUBULAR FUNCTION:
- SECRETIVE TESTS (URINARY EXCRETION OF ELECTROLYTES)
  - IN VITRO EVALUATION OF RENAL TRANSPORT (CORTICAL SLICE TECHNIQUE AND ISOLATED PERFUSED TUBULES)
  - URINARY CONCENTRATING ABILITY (OSMOLALITY)
- RENAL HEMODYNAMICS: RENAL BLOOD FLOW MEASUREMENT (PAH CLEARANCE)

TEST SYSTEMS UTILIZED:
- RATS, DOGS, RABBITS

COMPENDS TESTED:
- GENTAMICIN AND OTHER AMINOGLYCOSIDES

TERMINAL:
- BOTH SERIAL AND TERMINAL
TESTS PERFORMED:

GLOMERULAR FUNCTION: GLOMERULAR DYSFUNCTION (URINARY PROTEIN)
TUBULAR FUNCTION:
  REABSORPTIVE TEST (GLUCOSE MEASUREMENT IN URINE)
  SECRETIVE TEST
    IN VITRO EVALUATION OF RENAL TRANSPORT (CORTICAL SLICE TECHNIQUE)
  URINARY CONCENTRATING ABILITY (OSMOLALITY)

TEST SYSTEMS UTILIZED:

MICE, RATS, RABBITS, DOGS

COMPPOUNDS TESTED:

HEAVY METALS, HALOGENATED HYDROCARBONS, CITRININ, RADIOPAQUE SUBSTANCES

TERMINAL:

BOTH SERIAL AND TERMINAL
ORGANIZATION:

UNIVERSITY OF MONTREAL
DEPARTMENT OF PHARMACOLOGY
MONTREAL, QUEBEC H3C3J7, CANADA

G. L. PLAÁ
CHAIRMAN
(514) 343-6334

TESTS PERFORMED:

MORPHOLOGICAL MEASUREMENT: LIGHT MICROSCOPY
GLomerular Function: GLomerular DysfUnction (Urinary Protein
And PSP MeasureMent)
TUBULAR FUNCTION:
REABSORPTIVE TEST (GLUCOSE MEASUREMENT IN URINE)
SECRETIVE TEST
IN VITRO EVALUATION OF RENAL TRANSPORT (CORTICAL SLICE
TECHNIQUES)

TEST SYSTEMS UTILIZED:

MICE, RATS, RABBITS

COMPpounds TESTED:

MIREX, CHLOROFORM, MERCURY, CHROMATE, ANTIBIOTICS

TERMINAL:

BOTH SERIAL AND TERMINAL; HOWEVER, MOSTLY EXPERIMENTAL ANIMALS
ARE TERMINATED FOR EITHER MICROSCOPIC STUDIES OR IN VITRO RENAL
CORTICAL SLICE TECHNIQUE STUDIES
TESTS PERFORMED:

MORPHOLOGICAL MEASUREMENT: LIGHT MICROSCOPY
GLOMERULAR FUNCTION: GLOMERULAR FILTRATION RATE (INULIN CLEARANCE)
TUBULAR FUNCTION: URINARY CONCENTRATING ABILITY (OSMOLALITY)
RENAL HEMODYNAMICS:
RENAL BLOOD FLOW (PAH CLEARANCE)
INTRARENAL DISTRIBUTION OF RENAL BLOOD FLOW (85Kr and 133Xe - WASHOUT MEASUREMENT)

TEST SYSTEMS UTILIZED:

ANESTHETIZED RATS

COMPOUNDS TESTED:

MERCURIC CHLORIDE, BARIUM SULFATE AND VASCULAR SHOCK PRODUCED BY CLAMPING OF THE RENAL ARTERY

TERMINAL:

BOTH SERIAL AND TERMINAL; HOWEVER, MOST OF THE EXPERIMENTAL ANIMALS ARE TERMINATED FOR MICROSCOPIC EXAMINATION
ORGANIZATION:

UNIVERSITY OF NORTH CAROLINA
SCHOOL OF MEDICINE
DIVISION OF NEPHROLOGY
CHAPEL HILL, NORTH CAROLINA  27514

C. W. GOTTschALK
PROFESSOR OF MEDICINE
(919) 966-4567

TESTS PERFORMED:

MORPHOLOGICAL MEASUREMENTS:  LIGHT MICROSCOPY
TUBULAR FUNCTIONS:
  SECRETIVE TEST (URINARY EXCRETION OF ELECTROLYTES)
  URINARY CONCENTRATING ABILITY (OSMOLALITY)

TEST SYSTEMS UTILIZED:

RATS

COMPOUNDS TESTED:

MERCURY, POTASSIUM DICHROMATE

TERMINAL:

BOTH SERIAL AND TERMINAL

REMARKS:

IN ADDITION TO C. W. GOTTschALK, W. E. LASSITER AND W. FINN ARE INVOLVED IN RENAL TESTING PROGRAMS AT THIS INSTITUTION
ORGANIZATION:

UNIVERSITY OF OTTAWA
SCHOOL OF MEDICINE
DEPARTMENT OF PHARMACOLOGY
OTTAWA, ONTARIO, K1N6N5 CANADA

R. L. SINGHAL
PROFESSOR AND HEAD
(613) 231-3238

TESTS PERFORMED:

GLOMERULAR FUNCTION:
GLOMERULAR DYSFUNCTION ( URINARY PROTEIN AND BUN MEASUREMENT)
GLOMERULAR FILTRATION RATE ( CREATININE AND UREA CLEARANCE)
BIOCHEMICAL DAMAGE INDICATOR: RENAL TISSUE HOMOGENATE PREPARATIONS

TEST SYSTEMS UTILIZED:

RATS

COMPOUNDS TESTED:

VARIOUS INSECTICIDES
HEAVY METALS - MERCURY, LEAD, CADMIUM, ETC.

TERMINAL:

BOTH SERIAL AND TERMINAL
TESTS PERFORMED:

GLomerular Function: Glomerular Filtration Rate (Creatinine and Inulin Clearance)
Tubular Function:
  Reabsorptive Test (Glucose Measurement in Urine)
  Secretive Test (Urinary Excretion of Electrolytes)
Renal Hemodynamics: Renal Blood Flow (PAH Clearance)

TEST SYSTEMS UTILIZED

Mice, Rats, Rabbits, Cats, Dogs

COMPUNDs TESTED:

None, Only Normal Animals Are Used

TERMINAL:

Serial Only

REMARKS:

In addition to Z. S. Agus, Stanley Goldforb Is actively involved in renal testing programs at this institution
TESTS PERFORMED:

MORPHOLOGICAL MEASUREMENT: LIGHT MICROSCOPY
TUBULAR FUNCTION:
SECRETIVE TEST
IN VITRO EVALUATION OF RENAL TRANSPORT (ISOLATED PERFUSED TUBULES)
BIOCHEMICAL DAMAGE INDICATOR: RENAL TISSUE HOMOGENATE PREPARATIONS

TEST SYSTEMS UTILIZED:

MICE, RATS, DOGS

COMPOUNDS TESTED:

ELEMENTAL MERCURY VAPOR, METHYL MERCURY, CADMIUM, LEAD AND OTHER HEAVY METALS

TERMINAL:

BOTH SERIAL AND TERMINAL
ORGANIZATION:

UNIVERSITY OF ROCHESTER
SCHOOL OF MEDICINE AND DENTISTRY
DIVISION OF TOXICOLOGY
ROCHESTER, NEW YORK 14642

Z.A. SHAIKH
ASSISTANT PROFESSOR
(716) 275-5383

TESTS PERFORMED:

TUBULAR FUNCTION: PROTEIN AND GLUCOSE MEASUREMENTS IN URINE
HISTOLOGY: KIDNEY, LIVER
BIOLOGICAL INDICATOR OF TOXICITY: METALLOTHIONEIN MEASUREMENTS IN PLASMA AND URINE

TEST SYSTEMS USED:

MICE, RATS, RABBITS
ALSO ASSAY OF METALLOTHIONEIN IN PLASMA AND URINE FROM HUMANS

SUBSTANCES USED:

CADMIUM, MERCURY AND OTHER HEAVY METALS

TERMINAL:

BOTH SERIAL AND TERMINAL
ORGANIZATION:
UNIVERSITY OF TENNESSEE CENTER FOR THE HEALTH SCIENCES
DIVISION OF NEPHROLOGY
MEMPHIS, TENNESSEE 38163

F. E. HATCH
PROFESSOR OF MEDICINE
(901) 528-5765

TESTS PERFORMED:
MORPHOLOGICAL MEASUREMENTS: LIGHT AND ELECTRON MICROSCOPY
GLOMERULAR FUNCTION:
GLOMERULAR DYSFUNCTION (BUN MEASUREMENT)
GLOMERULAR FILTRATION RATE (CREATININE, INULIN AND UREA CLEARANCE)
TUBULAR FUNCTION: URINARY CONCENTRATING ABILITY (OSMOLALITY AND SPECIFIC GRAVITY)

TEST SYSTEMS UTILIZED:
MICE, RATS, RABBITS, DOGS

COMPOUNDS TESTED:
NO SUBSTANCE OR DRUG IS TESTED, BUT NORMAL ANIMALS ARE USED

TERMINAL:
BOTH SERIAL AND TERMINAL

REMARKS:
IN ADDITION TO F. E. HATCH, L. R. CROWE IS INVOLVED IN RENAL TESTING PROGRAMS AT THIS INSTITUTION
ORGANIZATION:

UNIVERSITY OF WASHINGTON
SCHOOL OF MEDICINE
DEPARTMENT OF PHARMACOLOGY
SEATTLE, WASHINGTON 98195

T. A. LOOMIS
PROFESSOR
(206) 543-0169

TESTS PERFORMED:

MORPHOLOGICAL MEASUREMENT: LIGHT MICROSCOPY
TUBULAR FUNCTION: URINARY CONCENTRATING ABILITY (OSMOLALITY)
BIOCHEMICAL DAMAGE INDICATORS

TEST SYSTEMS UTILIZED:

RATS

COMPOUNDS TESTED:

FLUORIDE, METHOXYFLURANE

TERMINAL:

BOTH SERIAL AND TERMINAL
ORGANIZATION:

UNIVERSITY OF WESTERN ONTARIO
DEPARTMENT OF PATHOLOGY
LONDON, ONTARIO, CANADA

G. M. CHERIAN
ASSISTANT PROFESSOR
(519) 679-6743

TESTS PERFORMED:

MORPHOLOGICAL MEASUREMENTS: LIGHT AND ELECTRON MICROSCOPY
GLOMERULAR FUNCTION: GLOMERULAR FILTRATION RATE (INULIN CLEARANCE)
RENAL HEMODYNAMICS: RENAL BLOOD FLOW (PAH CLEARANCE)
BIOCHEMICAL DAMAGE INDICATOR: RENAL TISSUE HOMOGENATE PREPARATIONS

TEST SYSTEMS UTILIZED:

MICE, RATS, RABBITS

COMPOUNDS TESTED:

MERCURY, CADMIUM AND OTHER HEAVY METALS

TERMINAL:

BOTH SERIAL AND TERMINAL
ORGANIZATION:

U. S. ENVIRONMENTAL PROTECTION AGENCY
GENETICS TOXICOLOGY DIVISION
RESEARCH TRIANGLE PARK, NORTH CAROLINA 27711

L. C. KING
RESEARCH BIOLOGIST
(919) 541-3932

TESTS PERFORMED:

MORPHOLOGICAL MEASUREMENTS: SCANNING ELECTRON MICROSCOPIC
STRUCTURAL STUDIES
BIOCHEMICAL DAMAGE INDICATORS:
RENAL METABOLIC STUDIES
URINARY ENZYME ACTIVITY

TEST SYSTEMS UTILIZED:

RATS

COMPOUNDS TESTED:

CADMIUM

TERMINAL:

BOTH SERIAL AND TERMINAL
ORGANIZATION:

VANDERBILT UNIVERSITY
SCHOOL OF MEDICINE
DEPARTMENT OF PHARMACOLOGY
NASHVILLE, TENNESSEE 37232

B.V. RAMA SASTRY
PROFESSOR
(615) 322-2207

TESTS PERFORMED:

GLOMERULAR FUNCTION: GLOMERULAR FILTRATION RATE (INU LIN CLEARANCE)
TUBULAR FUNCTION: SECRETIVE TEST (URINARY EXCRETION OF ELECTROLYTES
RENAL HEMODYNAMICS: RENAL BLOOD FLOW (PAH CLEARANCE)
BIOCHEMICAL DAMAGE INDICATOR: PLASMA RENIN MEASUREMENT

TEST SYSTEMS UTILIZED:

RATS

COMPULDS TESTED:

TRIAMTERENE

TERMINAL:

ONLY SERIAL
APPENDIX A

TESTS PERFORMED BY EACH ORGANIZATION
MORPHOLOGICAL MEASUREMENTS

GENERAL MORPHOLOGY, HISTOPATHOLOGY

Baylor College of Medicine
Dartmouth Medical College
Department of Health and Welfare, Ottawa, Canada
Environmental Protection Agency
Georgetown University
Harvard Medical School
Indiana University
Medical College of Virginia
Mount Desert Island Biological Laboratories
National Institute of Environmental Health Sciences
Schering-Plough Corporation
Smith Kline and French Laboratories
Southern California Edison Power Company
The Squibb Institute for Medical Research
Stanford University
State University of New York, Stony Brook
University of Arkansas
University of Cincinnati Medical Center
University of Houston
University of Montreal
University of North Carolina
University of Ottawa
University of Rochester
University of Tennessee Center for the Health Sciences
University of Washington
University of Western Ontario

GLOMERULAR FUNCTION

Dartmouth Medical School
Department of Health and Welfare, Ottawa, Canada
Duke University Medical Center
Georgetown University
Harvard Medical School
ICI Americas, Inc.
Indiana University
Medical College of Virginia
Michigan State University
National Institute of Health
National Institute of Environmental Health Sciences
North Carolina Central University
Ohio State University
Schering-Plough Corporation
GLOMERULAR FUNCTION (continued)

Smith Kline and French Laboratories
Southern California Edison Power Company
The Squibb Institute for Medical Research
Stanford University
State University of New York, Stony Brook
University of Arkansas
University of Cincinnati Medical Center
University of Iowa
University of Mississippi Medical Center
University of Montreal
University of North Carolina
University of Ottawa
University of Rochester
University of Tennessee Center for the Health Sciences
University of Western Ontario
Vanderbilt University

Glomerular Dysfunction: BUN, Creatinine or Urinary Protein Measurement

Dartmouth Medical School
Department of Health and Welfare, Ottawa, Canada
Georgetown University
Harvard Medical School
Indiana University
Medical College of Virginia
Michigan State University
National Institute of Environmental Health Sciences
North Carolina Central University
Schering-Plough Corporation
Southern California Edison Power Company
The Squibb Institute for Medical Research
Stanford University
State University of New York
University of Arkansas
University of Mississippi Medical Center
University of Montreal
University of Ottawa
University of Rochester

Measurement of Glomerular Filtration Rate

Clearance of Inulin, Creatinine, Iothalamate, Diatrizoate, Urea, etc.
--- (Vitamin B<sub>12</sub>, <sup>3</sup>H Mannitol, <sup>51</sup>Ca Edetic Acid, <sup>13</sup>C Nadolol)

Dartmouth Medical School
Duke University Medical Center
Georgetown University
Harvard Medical School
ICI Americas, Inc.
Indiana University
GLOMERULAR FUNCTION (concluded)

Medical College of Virginia
Michigan State University
National Institutes of Health
National Institute of Environmental Health Sciences
Smith Kline and French Laboratories
Stanford University
State University of New York, Stony Brook
University of Cincinnati Medical Center
University of Iowa
University of North Carolina
University of Ottawa
University of Pennsylvania
University of Tennessee, Center for the Health Sciences
University of Western Ontario
Vanderbilt University

Disappearance of Iothalamate and Diatrizoate

Dartmouth Medical School
Ohio State University
TUBULAR FUNCTION

Baylor College of Medicine
Dartmouth Medical School
Department of Health and Welfare, Ottawa, Canada
Department of Health and Welfare, Vancouver, Canada
Food and Drug Research Laboratories
Georgetown University
Harvard Medical School
ICI Americas, Inc.
Medical College of Virginia
Michigan State University
Mount Desert Island Biological Laboratories
National Institutes of Health
National Institute of Environmental Health Sciences
North Carolina Central University
Schering-Plough Corporation
Smith, Kline and French Laboratories
Stanford University
State University of New York, Stony Brook
University of Arkansas
University of Cincinnati Medical Center
University of Houston
University of Iowa
University of Mississippi Medical Center
University of Montreal
University of North Carolina
University of Pennsylvania
University of Rochester
University of Tennessee Center for the Health Sciences

Reabsorptive Tests

Measurement of Glucose in Urine

Stanford University
University of Mississippi Medical Center
University of Montreal
University of North Carolina
University of Pennsylvania

Secretive Tests

Urinary Acidification Measurement

University of North Carolina

PAH Transport Maximum Measurement

Dartmouth Medical School
The Squibb Institute for Medical Research
TUBULAR FUNCTION (continued)

In Vitro Evaluation of Renal Transport of PAH, NMN, and TEA

Cortical Slice Technique

Baylor College of Medicine
Food and Drug Research Laboratories
Georgetown University
Michigan State University
National Institute of Environmental Health Sciences
Stanford University
State University of New York, Stony Brook
University of Cincinnati Medical Center
University of Iowa
University of Mississippi Medical Center
University of Montreal

Isolated Perfused Tubules

Food and Drug Research Laboratories
ICI, Americas, Inc.
National Institutes of Health
University of Iowa
University of Rochester

Urinary Concentrating and Diluting Ability

Urine Specific Gravity Measurement

Georgetown University
Harvard Medical School
North Carolina Central University
University of Arkansas
University of Tennessee Center for the Health Sciences

Urine Osmolality Measurement

Dartmouth Medical School
Duke University Medical Center
Food and Drug Research Laboratories
Georgetown University
Harvard Medical School
ICI, Americas, Inc.
Michigan State University
National Institute of Environmental Health Sciences
North Carolina Central University
Schering-Plough Corporation
Stanford University
State University of New York, Stony Brook
TUBULAR FUNCTION (concluded)

University of Arkansas
University of Cincinnati Medical Center
University of Iowa
University of Mississippi Medical Center
University of North Carolina
University of Tennessee Center for the Health Sciences
University of Washington

General Tubular Damage (Examination of Urinary Sediments)

Department of Health and Welfare, Ottawa, Canada
MEASUREMENT OF RENAL HEMODYNAMICS

Baylor College of Medicine
Dartmouth Medical School
Duke University Medical Center
Food and Drug Research Laboratories
Georgetown University
ICI, Americas, Inc.
Ohio State University
Smith Kline and French Laboratories
University of Cincinnati Medical Center
University of Iowa
University of North Carolina
University of Pennsylvania
University of Tennessee Center for the Health Sciences
University of Western Ontario
Vanderbilt University

Renal Blood Flow Measurement

Plasma Clearance of PAH, Iodhippurate and Iodopyracet
Dartmouth Medical School
Duke University Medical University
Food and Drug Research Laboratories
Georgetown University
ICI Americas, Inc.
Smith Kline and French Laboratories
The Squibb Institute for Medical Research
University of Cincinnati Medical Center
University of Iowa
University of North Carolina
University of Pennsylvania
University of Tennessee Center for the Health Sciences
University of Western Ontario
Vanderbilt University

Plasma Disappearance of $^{125}$I or $^{131}$I Orthoiodohippurate
Dartmouth Medical School
Food and Drug Research Laboratories
Ohio State University

Measurement of Regional Blood Flow and Intrarenal Distribution of Blood Flow

$^{85}$Kr- and $^{133}$Xe- Washout Measurement
University of North Carolina
BIOCHEMICAL DAMAGE INDICATORS

Baylor College of Medicine
Dartmouth Medical School
Duke University Medical Center
Environmental Protection Agency
Food and Drug Research Laboratories
Georgetown University
ICI Americas, Inc.
Indiana University
Medical College of Virginia
Michigan State University
National Institutes of Health
National Institute of Environmental Health Sciences
North Carolina Central University
Schering-Plough Corporation
Southern California Edison Power Company
Stanford University
State University of New York, Stony Brook
The Squibb Institute for Medical Research
University of Arkansas
University of Ottawa
University of Rochester
University of Washington
University of Western Ontario
Vanderbilt University

Drug Metabolic Studies

Baylor College of Medicine
Dartmouth Medical School

Plasma Renin Measurement

Duke University Medical Center
Vanderbilt University

Renal Tissue Homogenate Preparations

Baylor College of Medicine
Dartmouth Medical School
University of Ottawa
University of Rochester
University of Western Ontario

Urinary Enzyme Activity

Baylor College of Medicine
Environmental Protection Agency
Food and Drug Research Laboratories
Georgetown University
BIOCHEMICAL DAMAGE INDICATORS (concluded)

Urinary Enzyme Activity (concluded)

Indiana University
Medical College of Virginia
Michigan State University
National Institutes of Health
National Institute of Environmental Health Sciences
North Carolina Central University
Schering-Plough Corporation
Southern California Edison Power Company
The Squibb Institute for Medical Research
APPENDIX B

TEST SYSTEMS UTILIZED BY EACH ORGANIZATION
CATS
Ohio State University
University of Houston
University of Pennsylvania

Glomerular Filtration Rate
Ohio State University
University of Pennsylvania

Morphology, Histopathology
University of Houston

Reabsorptive Tests
University of Pennsylvania

Renal Blood Flow
Ohio State University
University of Pennsylvania

Selective Tests
University of Houston
University of Pennsylvania

COWS
Ohio State University

Glomerular Filtration Rate
Ohio State University

Renal Blood Flow
Ohio State University

DOGS
Dartmouth Medical School
Department of Health and Welfare, Vancouver, Canada
Georgetown University
ICI Americas, Inc.
Ohio State University
Schering-Plough Corporation
Smith, Kline and French Laboratories
The Squibb Institute for Medical Research
University of Houston
University of Iowa
University of Mississippi Medical Center
University of Pennsylvania
University of Rochester
University of Tennessee Center for the Health Sciences

71
DOGS (continued)

**Biochemical Damage Indicators**
ICI Americas, Inc.
University of Rochester

**Drug Metabolic Studies**
Dartmouth Medical School

**Glomerular Dysfunction**
Dartmouth Medical School
Georgetown University
Schering-Plough Corporation
The Squibb Institute for Medical Research
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Georgetown University
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ICI Americas, Inc.
Ohio State University
Smith, Kline and French Laboratories
The Squibb Institute for Medical Research
University of Iowa
University of Pennsylvania
DOGS (concluded)

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University of Rochester

Secretive Tests
Dartmouth Medical School
Department of Health and Welfare, Vancouver, Canada
Georgetown University
ICI Americas, Inc.
Smith, Kline and French Laboratories
The Squibb Institute for Medical Research
University of Houston
University of Iowa
University of Mississippi Medical Center
University of Pennsylvania
University of Rochester

Urinary Concentrating and Diluting Ability
Dartmouth Medical School
Georgetown University
ICI Americas, Inc.
Schering-Plough Corporation
University of Iowa
University of Mississippi Medical Center
University of Tennessee Center for the Health Sciences

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Georgetown University
The Squibb Institute for Medical Research

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Department of Health and Welfare, Vancouver, Canada
Georgetown University
Harvard Medical School
Stanford University

Biochemical Damage Indicators
Stanford University

Drug Metabolic Studies
Dartmouth Medical School

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Harvard Medical School
GUINEA PIGS (concluded)

Glomerular Filtration Rate
Dartmouth Medical School
Department of Health and Welfare, Vancouver, Canada
Georgetown University
Harvard Medical School

Morphology, Histopathology
Dartmouth Medical School
Georgetown University
Harvard Medical School
Stanford University

Renal Blood Flow
Dartmouth Medical School
Georgetown University

Renal Tissue Homogenate Preparations
Dartmouth Medical School

Secretive Tests
Dartmouth Medical School
Department of Health and Welfare, Vancouver, Canada
Georgetown University
Stanford University

Urinary Concentrating and Diluting Ability
Dartmouth Medical School
Georgetown University
Harvard Medical School

Urinary Enzyme Activity
Georgetown University

HAMSTERS

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Dartmouth Medical School
Mount Desert Island Biological Laboratories
University of Arkansas
University of North Carolina

Drug Metabolic Studies
Baylor College of Medicine
Dartmouth Medical School

Glomerular Dysfunction
University of Arkansas
HAMSTERS (concluded)

**Glomerular Filtration Rate**
Dartmouth Medical School

**Morphology, Histopathology**
Baylor College of Medicine
Dartmouth Medical School
Mount Desert Island Biological Laboratories
University of Arkansas
University of North Carolina

**Renal Blood Flow**
Baylor College of Medicine
Dartmouth Medical School

**Renal Tissue Homogenate Preparations**
Baylor College of Medicine
Dartmouth Medical School

**Secretive Tests**
Baylor College of Medicine
Dartmouth Medical School
University of Arkansas

**Urinary Concentrating and Diluting Ability**
Dartmouth Medical School

**Urinary Enzyme Activity**
Baylor College of Medicine
University of Arkansas
HUMANS

Duke University Medical Center
Georgetown University

Glomerular Dysfunction
Duke University Medical Center
Georgetown University

Glomerular Filtration Rate
Duke University Medical Center
Georgetown University

Morphology, Histology
Georgetown University

Plasma Renin Measurement
Duke University Medical Center

Renal Blood Flow
Georgetown University

Secretive Tests
Duke University Medical Center
Georgetown University

Urinary Concentrating and Diluting Ability
Duke University Medical Center
Georgetown University

Urinary Enzyme Activity
Georgetown University

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Michigan State University
National Institute of Environmental Health Sciences
Stanford University
University of Arkansas
University of Mississippi Medical Center
University of Montreal
University of Pennsylvania
University of Rochester
University of Tennessee Center for the Health Sciences
University of Western Ontario

76
MICE (continued)

Biochemical Damage Indicators
ICI Americas, Inc.
National Institute of Environmental Health Sciences
Stanford University
University of Rochester

Drug Metabolic Studies
Baylor College of Medicine
Dartmouth Medical School

Glomerular Dysfunction
Georgetown University
Michigan State University
National Institute of Environmental Health Sciences
Stanford University
University of Arkansas
University of Mississippi Medical Center
University of Montreal
University of Rochester
University of Tennessee Center for the Health Sciences

Glomerular Filtration Rate
Dartmouth Medical School
Georgetown University
ICI Americas, Inc.
Michigan State University
National Institute of Environmental Health Sciences
Stanford University
University of Pennsylvania
University of Tennessee Center for the Health Sciences
University of Western Ontario

Morphology, Histology
Baylor College of Medicine
Georgetown University
National Institute of Environmental Health Sciences
Stanford University
University of Arkansas
University of Mississippi Medical Center
University of Montreal
University of Rochester
University of Tennessee Center for the Health Sciences
University of Western Ontario

Reabsorptive Tests
University of Mississippi Medical Center
University of Montreal
University of Pennsylvania
University of Rochester
MICE (concluded)

Renal Blood Flow
Baylor College of Medicine
Dartmouth Medical School
Georgetown University
ICI Americas, Inc.
University of Pennsylvania
University of Western Ontario

Renal Tissue Homogenate Preparations
Baylor College of Medicine
Dartmouth Medical School
University of Rochester
University of Western Ontario

Secretive Tests
Baylor College of Medicine
Dartmouth Medical School
Georgetown University
ICI Americas, Inc.
Michigan State University
National Institute of Environmental Health Sciences
Stanford University
University of Arkansas
University of Mississippi Medical Center
University of Montreal
University of Pennsylvania
University of Rochester

Urinary Concentrating and Diluting Ability
Dartmouth Medical School
Georgetown University
ICI Americas, Inc.
Michigan State University
National Institute of Environmental Health Sciences
Stanford University
University of Mississippi Medical Center
University of Tennessee Center for the Health Sciences

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Baylor College of Medicine
Georgetown University
National Institute of Environmental Health Sciences
University of Arkansas
MONKEYS

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Harvard Medical School
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The Squibb Institute for Medical Research

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Georgetown University
Harvard Medical School
The Squibb Institute for Medical Research

Glomerular Filtration Rate
Georgetown University
Harvard Medical School
Smith, Kline and French Laboratories
The Squibb Institute for Medical Research

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Georgetown University
Harvard Medical School
Smith, Kline and French Laboratories
The Squibb Institute for Medical Research

Renal Blood Flow
Georgetown University
Smith, Kline and French Laboratories
The Squibb Institute for Medical Research

Secretive Tests
Georgetown University
Smith, Kline and French Laboratories
The Squibb Institute for Medical Research

Urinary Concentrating and Diluting Ability
Georgetown University
Harvard Medical School

Urinary Enzyme Activity
Georgetown University
The Squibb Institute for Medical Research
RABBITS

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National Institute of Environmental Health Sciences
Stanford University
University of Iowa
University of Mississippi Medical Center
University of Montreal
University of Pennsylvania
University of Rochester
University of Tennessee Center for the Health Sciences
University of Western Ontario

Biochemical Damage Indicators
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National Institutes of Health
Stanford University
University of Rochester

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Duke University Medical Center
Harvard Medical School
National Institutes of Environmental Health Sciences
University of Iowa
University of Mississippi Medical Center
University of Montreal
University of Tennessee Center for the Health Sciences

Glomerular Filtration Rate
Department of Health and Welfare, Vancouver, Canada
Duke University Medical Center
Harvard Medical School
ICI Americas, Inc.
National Institutes of Health
National Institute of Environmental Health Sciences
University of Iowa
University of Pennsylvania
University of Tennessee Center for the Health Sciences
University of Western Ontario

Morphology, Histology
Harvard Medical School
National Institute of Environmental Health Sciences
Stanford University
University of Montreal
University of Tennessee Center for Health Sciences
University of Western Ontario
RABBITS (concluded)

Plasma Renin Measurement
Duke University Medical Center

Reabsorptive Tests
University of Mississippi Medical Center
University of Montreal
University of Pennsylvania

Renal Blood Flow
ICI Americas, Inc.
University of Iowa
University of Pennsylvania
University of Western Ontario

Secretive Tests
Department of Health and Welfare, Vancouver, Canada
Duke University Medical Center
ICI Americas, Inc.
National Institutes of Health
Stanford University
University of Iowa
University of Mississippi Medical Center
University of Montreal
University of Pennsylvania

Urinary Concentrating and Diluting Ability
Duke University Medical Center
Harvard Medical School
ICI Americas, Inc.
University of Iowa
University of Mississippi Medical Center
University of Tennessee Center for the Health Sciences

Urinary Enzyme Activity
National Institutes of Health
National Institute of Environmental Health Sciences
RATS

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Dartmouth Medical School  
Duke University Medical Center  
Environmental Protection Agency  
Food and Drug Research Laboratories  
Georgetown University  
Harvard Medical School  
Department of Health and Welfare, Ottawa, Canada  
Department of Health and Welfare, Vancouver, Canada  
ICI Americas, Inc.  
Indiana University  
Medical College of Virginia  
Michigan State University  
Mount Desert Island Biological Laboratories  
National Institute of Environmental Health Sciences  
North Carolina Central University  
Schering-Plough Corporation  
Smith Kline and French Laboratories  
Southern California Edison Power Company  
The Squibb Institute for Medical Research  
Stanford University  
State University of New York, Stony Brook  
University of Arkansas  
University of Cincinnati Medical Center  
University of Iowa  
University of Mississippi  
University of Montreal  
University of North Carolina  
University of Ottawa  
University of Pennsylvania  
University of Rochester  
University of Tennessee Center for the Health Sciences  
University of Washington  
University of Western Ontario  
Vanderbilt University
RATS (continued)

Biochemical Damage Indicators
Environmental Protection Agency
Food and Drug Research Laboratories
ICI Americas, Inc.
National Institute of Environmental Health Sciences
North Carolina Central University
Southern California Edison Power Company
Stanford University
State University of New York, Stony Brook
University of Ottawa
University of Rochester
University of Washington

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Dartmouth Medical School

General Tubular Damage
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Glomerular Dysfunction
Dartmouth Medical School
Department of Health and Welfare, Vancouver, Canada
Duke University Medical Center
Georgetown University
Harvard Medical School
Indiana University
Medical College of Virginia
Michigan State University
National Institute of Environmental Health Sciences
Schering-Plough Corporation
Southern California Edison Power Company
The Squibb Institute for Medical Research
Stanford University
State University of New York, Stony Brook
University of Arkansas
University of Iowa
University of Mississippi Medical Center
University of Montreal
University of Ottawa
University of Rochester
University of Tennessee Center for the Health Sciences
RATS (continued)

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Dartmouth Medical School
Department of Health and Welfare, Vancouver, Canada
Duke University Medical Center
Georgetown University
Harvard Medical School
ICI Americas, Inc.
Indiana University
Medical College of Virginia
Michigan State University
National Institute of Environmental Health Sciences
North Carolina Central University
Smith Kline and French Laboratories
The Squibb Institute for Medical Research
Stanford University
State University of New York, Stony Brook
University of Cincinnati Medical Center
University of Iowa
University of North Carolina
University of Ottawa
University of Pennsylvania
University of Tennessee Center for the Health Sciences
University of Western Ontario
Vanderbilt University

**Morphology, Histology**
Baylor College of Medicine
Dartmouth Medical School
Department of Health and Welfare, Ottawa, Canada
Environmental Protection Agency
Georgetown University
Harvard Medical School
Indiana University
Medical College of Virginia
Mount Desert Island Biological Laboratories
National Institute of Environmental Health Sciences
Schering-Plough Corporation
Smith Kline and French Laboratories
Southern California Edison Power Company
The Squibb Institute for Medical Research
Stanford University
State University of New York, Stony Brook
University of Cincinnati Medical Center
University of Houston
University of Montreal
University of North Carolina
University of Rochester
University of Tennessee Center for the Health Sciences
University of Washington
University of Western Ontario

84
RATS (continued)

Plasma Renin Measurement
Duke University Medical Center
Vanderbilt University

Reabsorptive Tests
University of Mississippi Medical Center
University of Montreal
University of Pennsylvania
University of Rochester

Renal Blood Flow
Baylor College of Medicine
Dartmouth Medical School
Food and Drug Research Laboratories
Georgetown University
ICI Americas, Inc.
Smith Kline and French Laboratories
The Squibb Institute for Medical Research
University of Cincinnati Medical Center
University of Iowa
University of North Carolina
University of Pennsylvania
University of Western Ontario
Vanderbilt University

Renal Tissue Homogenate Preparations
Baylor College of Medicine
Dartmouth Medical School
University of Western Ontario

Secretive Tests
Baylor College of Medicine
Dartmouth Medical School
Department of Health and Welfare, Ottawa, Canada
Department of Health and Welfare, Vancouver, Canada
Duke University Medical Center
Food and Drug Research Laboratories
Georgetown University
ICI Americas, Inc.
Medical College of Virginia
Michigan State University
National Institute of Environmental Health Sciences
Smith Kline and French Laboratories
The Squibb Institute for Medical Research
Stanford University
State University of New York, Stony Brook
University of Arkansas
University of Cincinnati Medical Center
University of Houston
RATS (concluded)

Secretive Tests - (Continued)

University of Iowa
University of Mississippi Medical Center
University of Montreal
University of North Carolina
University of Pennsylvania
University of Rochester
Vanderbilt University

Urinary Concentrating and Diluting Ability
Dartmouth Medical School
Duke University Medical Center
Food and Drug Research Laboratories
Georgetown University
Harvard Medical School
ICI Americas, Inc.
Indiana University
Michigan State University
National Institute of Environmental Health Sciences
Schering-Plough Corporation
Stanford University
State University of New York, Stony Brook
University of Iowa
University of Mississippi Medical Center
University of North Carolina
University of Tennessee Center for the Health Sciences
University of Washington

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Baylor College of Medicine
Environmental Protection Agency
Food and Drug Research Laboratories
Georgetown University
Indiana University
Medical College of Virginia
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APPENDIX C

INDEX OF INDIVIDUALS IN THE DIRECTORY
<table>
<thead>
<tr>
<th>NAME</th>
<th>ORGANIZATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agus, Z.S.</td>
<td>University of Pennsylvania</td>
</tr>
<tr>
<td>Argy, W.P., Jr.</td>
<td>Georgetown University</td>
</tr>
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<td>Schering-Plough Corporation</td>
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</tr>
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<td>University of Iowa</td>
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<td>NAME</td>
<td>ORGANIZATION</td>
</tr>
<tr>
<td>----------------------</td>
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</tr>
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<tr>
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</tr>
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<td>Hatch, F.E.</td>
<td>University of Tennessee Center for the Health Sciences</td>
</tr>
<tr>
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</tr>
<tr>
<td>Hook, J.B.</td>
<td>Michigan State University</td>
</tr>
<tr>
<td>Jandhyala, B.S.</td>
<td>University of Houston</td>
</tr>
<tr>
<td>Johnson, D.R.</td>
<td>University of Cincinnati Medical Center</td>
</tr>
<tr>
<td>Kaloyanides, G.J.</td>
<td>State University of New York, Stony Brook</td>
</tr>
<tr>
<td>NAME</td>
<td>ORGANIZATION</td>
</tr>
<tr>
<td>------------------</td>
<td>------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Kau, S.T.</td>
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<td>King, L.C.</td>
<td>U.S. Environmental Protection Agency, Research Triangle Park</td>
</tr>
<tr>
<td>Kleiman, L.I.</td>
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</tr>
<tr>
<td>Kleit, S.A.</td>
<td>Indiana University</td>
</tr>
<tr>
<td>Kluwe, W.M.</td>
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</tr>
<tr>
<td>Koschier, F.J.</td>
<td>Food and Drug Research Laboratories</td>
</tr>
<tr>
<td>Kosek, J.C.</td>
<td>Stanford University</td>
</tr>
<tr>
<td>Lage, A.L.</td>
<td>Harvard Medical School</td>
</tr>
<tr>
<td>Lassiter, W.E.</td>
<td>University of North Carolina</td>
</tr>
<tr>
<td>Layton, W.M., Jr.</td>
<td>Dartmouth Medical School</td>
</tr>
<tr>
<td>Loomis, T.A.</td>
<td>University of Washington</td>
</tr>
<tr>
<td>Luft, F.C.</td>
<td>Indiana University</td>
</tr>
<tr>
<td>Mazze, R.I.</td>
<td>Stanford University</td>
</tr>
<tr>
<td>McCormack, K.M.</td>
<td>Michigan State University</td>
</tr>
<tr>
<td>McGuire, P.F.</td>
<td>Department of Health and Welfare, Ottawa, Ontario, Canada</td>
</tr>
<tr>
<td>Mitchell, J.R.</td>
<td>Baylor College of Medicine</td>
</tr>
<tr>
<td>Mudge, G.H.</td>
<td>Dartmouth Medical School</td>
</tr>
<tr>
<td>Munro, I.C.</td>
<td>Department of Health and Welfare, Ottawa, Ontario, Canada</td>
</tr>
<tr>
<td>NAME</td>
<td>ORGANIZATION</td>
</tr>
<tr>
<td>-----------------</td>
<td>---------------------------------------------------</td>
</tr>
<tr>
<td>Oken, D.E.</td>
<td>Medical College of Virginia</td>
</tr>
<tr>
<td>Patel, V.</td>
<td>Indiana University</td>
</tr>
<tr>
<td>Plaa, G.L.</td>
<td>University of Montreal</td>
</tr>
<tr>
<td>Poutsiaka, J.W.</td>
<td>The Squibb Institute for Medical Research</td>
</tr>
<tr>
<td>Powers, J.D.</td>
<td>Ohio State University</td>
</tr>
<tr>
<td>Powers, T.E.</td>
<td>Ohio State University</td>
</tr>
<tr>
<td>Preuss, H.</td>
<td>Georgetown University</td>
</tr>
<tr>
<td>Rickert, D.E.</td>
<td>Michigan State University</td>
</tr>
<tr>
<td>Robinson, R.R.</td>
<td>Duke University Medical Center</td>
</tr>
<tr>
<td>Sanger, V.L.</td>
<td>Michigan State University</td>
</tr>
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<td>Sastry, B.V. Rama</td>
<td>Vanderbilt University</td>
</tr>
<tr>
<td>Schmidt-Nielsen, B.</td>
<td>Mount Desert Island Biological Laboratories</td>
</tr>
<tr>
<td>NAME</td>
<td>ORGANIZATION</td>
</tr>
<tr>
<td>--------------</td>
<td>---------------------------------------------------</td>
</tr>
<tr>
<td>Winchester, J.</td>
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</tr>
<tr>
<td>Woods, J.S.</td>
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95