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N-1130 - Rpt #2 (Progress)
Contract Nr. DA19-129-qm-1307
Vanderbilt University

Protective Effects of Certain Natural
Foods Against Whole-Body Irradiation

Periods: 15 January 1959 - 14 April 1959

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QUARTERMASTER FOOD AND CONTAINER INSTITUTE FOR THE ARMED FORCES
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 Quartermaster Corps, U.S. Army
 Chicago, Illinois

CONTRACT RESEARCH PROJECT REPORT

QUARTERMASTER FOOD AND CONTAINER INSTITUTE FOR THE ARMED FORCES, CHICAGO,
QM Research and Engineering Command, U. S. Army, QM Research and Engineering
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Vanderbilt University
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Dr. William T. Darby

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Dr. John G. Coniglio
Mr. Carl E. Miller
Mr. James Farrar

Project Nr.: 7-84-13-002A

Contract: DA19-129-qm-1307

File Nr.: N-1130

Report Nr.: 2 (Progress)

Period: 15 January 1958 -

14 April 1959

Initiation Date: 14 Oct 1958

Title of Contract: Protective Effects of Certain Natural
Foods Against Whole-Body Irradiation

PROGRESS REPORT NO. 2

Protective Effects of Certain Foods
Against Total Body Irradiation

By

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Project No.: 7-94-13-002A

Contract No.: DA-19-129-QM-1307

Period: 15 January 1959 to 14 April 1959

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ABSTRACT

Seventy-five male rats, divided into three groups according to diet, were irradiated with 800r total body irradiation. All control animals were dead by the 13th day after irradiation; those receiving broccoli were dead by the 19th day and those on mustard greens by the 27th day.

Experimental

Eighty male Sprague Dawley Rats were received on 17 February 1959. During the pre-experimental period, they were maintained on basal diet. After two weeks, they were divided into three groups of 25 each; group one as controls with no vegetables, group 2 received 50 gms. broccoli starting two weeks prior to irradiation and continuing until death, and group three 50 gms. of mustard greens starting two weeks prior to irradiation and continuing until death. On day zero, the animals were exposed to 800r of total body X-radiation from a Keleket X-ray therapy machine. The radiation factors used were: 200KV, 20 ma, 1/2 mm. copper and 1 mm. aluminum filters, approximately 1hr per min., 55 cr. target distance. There was no mortality until the 4th day after irradiation (Figure 1), and those animals receiving a vegetable in addition to basal diet had a somewhat longer post irradiation survival time. Two rats on the mustard greens survived the 21 day observation period, one of which died on the 25th day after irradiation, the other on the 27th day.

Incorporation of broccoli or mustard greens in the diet of the rats resulted in an improved growth curve and a slight recovery of weight after irradiation not evidenced in the control group (Figure 2). The diet consumption dropped to near zero in 3 days after irradiation, made a partial recovery and decreased again in the terminal phase (Figure 3).

Blood studies revealed a slight amount of hemoconcentration by the 2nd day after irradiation (Figures 4, 5). The packed cell volume and hemoglobin dropped rapidly thereafter. Those rats receiving broccoli or mustard greens showed a slower decrease than the control rats.

White blood cell counts dropped uniformly for all groups, and began a slow recovery just before death (Figure 6). The control rats did not survive to show this recovery.

An acute, and apparently nationwide shortage of guinea pigs prevented us from getting more than 59 of our 75 guinea pigs ordered. Those available for experimental use were further reduced due to rectal prolapse, respiratory infection and pediculosis. The surviving animals are now on experiment.

Sixteen 4-6 lb. rhesus monkeys have been received. They are being held for a 30-day conditioning and quarantine period before beginning actual experimental procedures.

1. Estimate of percentage of work completed to date -- 10%.
2. Estimate of the percentage of the estimated cost incurred to date -- 1.9%.
3. The funds remaining unexpended appear to be sufficient to complete the work outlined in the contract.

Figure 2.
MALE RATS GROWTH CURVES
February - April 1959

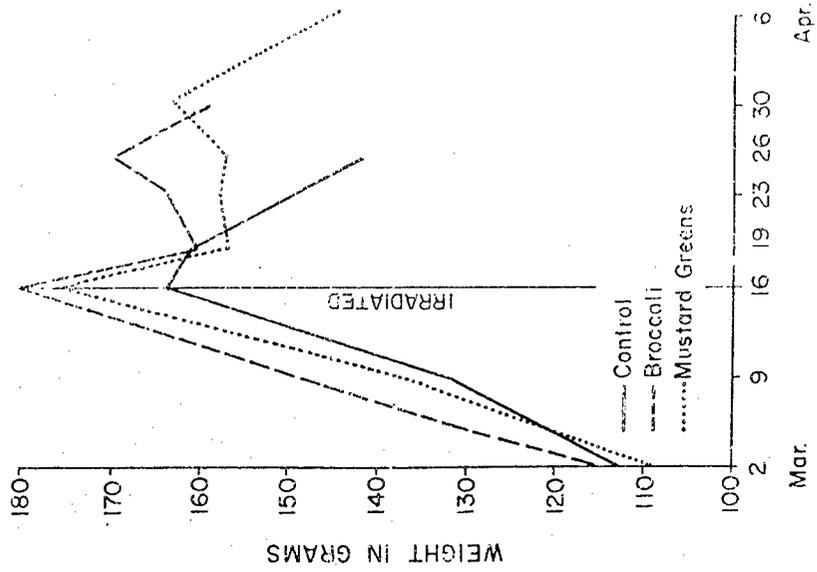


Figure 1.
SURVIVAL RATE MALE SPRAGUE-DAWLEY
RATS (February-April 1959)

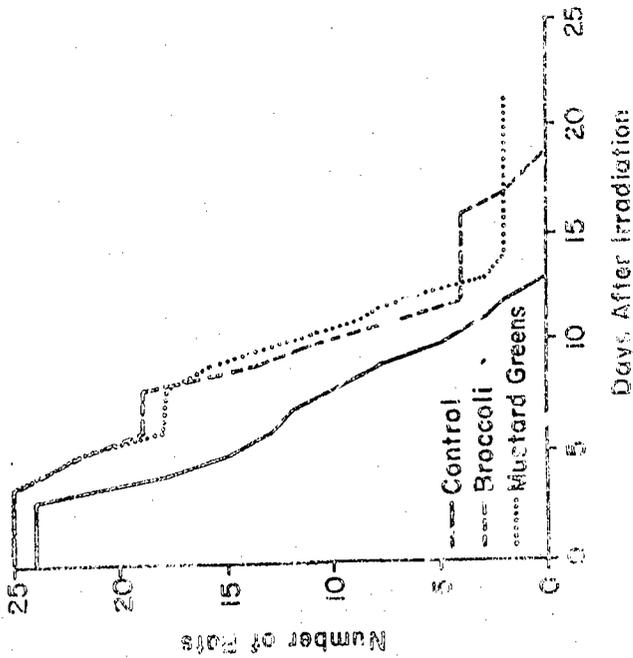


Figure 4.
HEMOGLOBIN IN GRAMS MALE RATS
February - April 1959

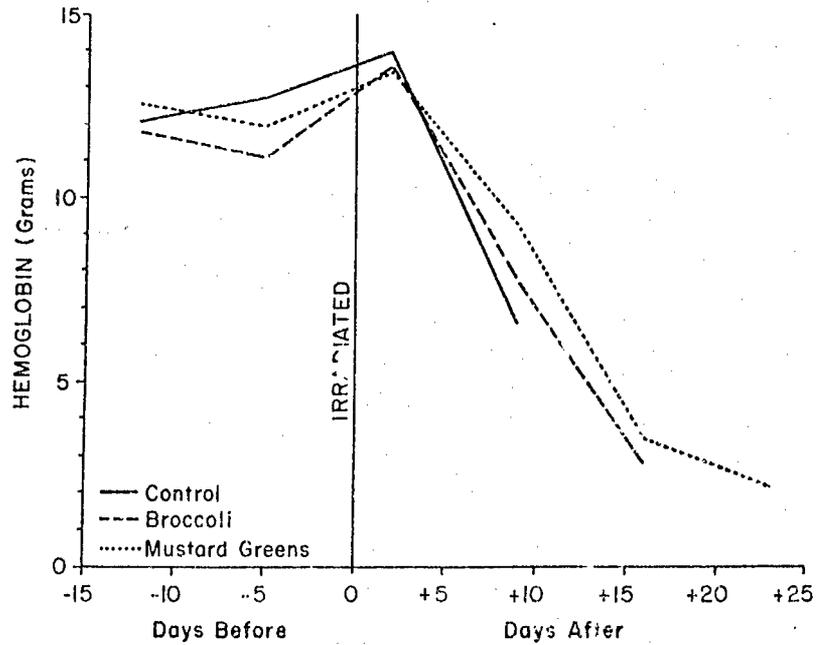


Figure 3.
BASAL DIET CONSUMPTION MALE SPRAGUE-DAWLEY RATS
February - April 1959

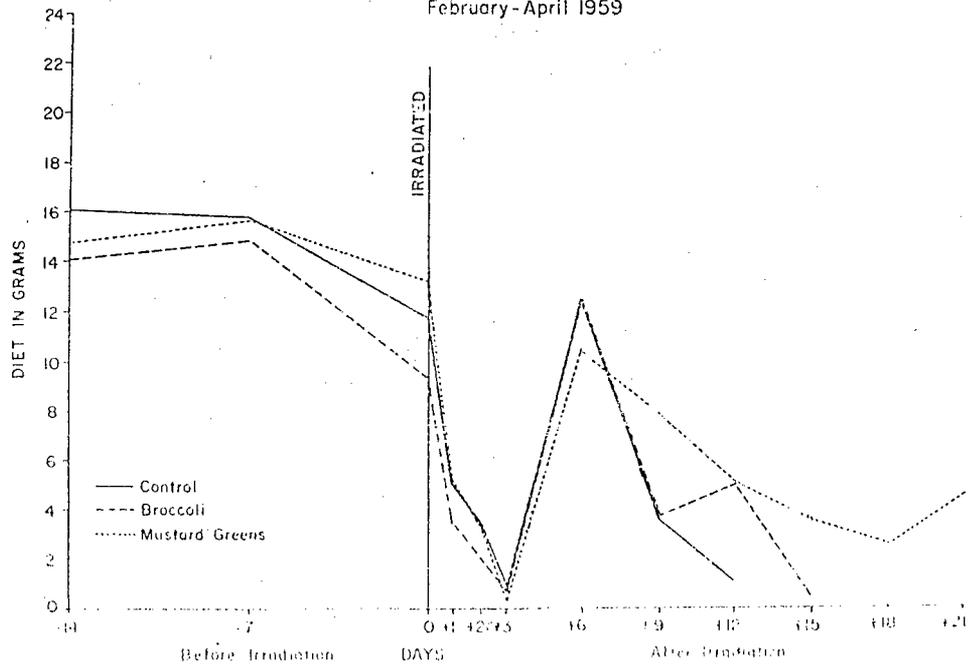


Figure 6.
 WHITE BLOOD CELL COUNTS MALE RATS
 February-April 1959

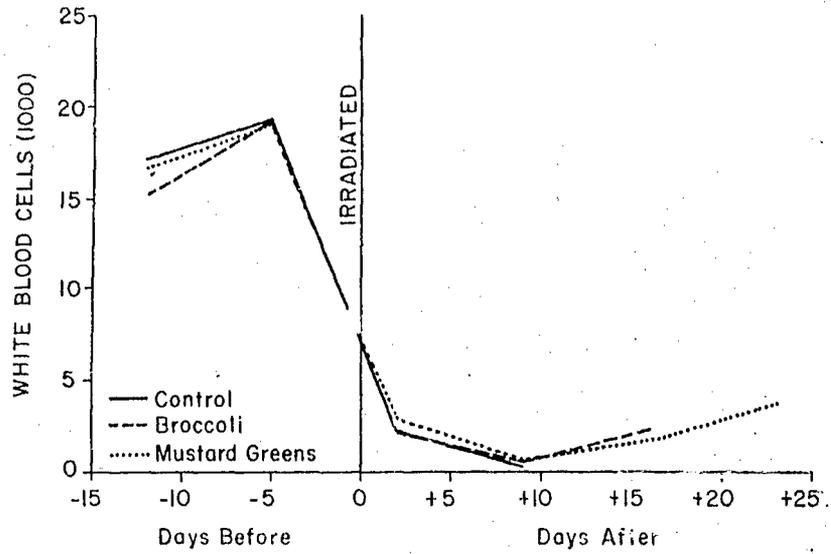


Figure 5.
 PACKED CELL VOLUME MALE RATS
 February-April 1959

