

UNIVERSITY OF FLORIDA  
GAINESVILLE

714368

HEALTH CENTER  
COLLEGE OF MEDICINE  
Office of the Dean

January 15, 1954

Atomic Energy Commission  
Office of Research and Medicine  
P. O. Box E  
Oak Ridge, Tennessee

REPOSITORY Oak Ridge Operations Office  
COLLECTION Contract Files  
# AT-(40-1)-288  
BOX No. Drawer H-578-2  
FOLDER Bowman Gray 288, Harrell  
1951-53

Gentlemen:

You will find enclosed the final report on Title I, of the Contract No. AT-(40-1)-288, made at the Bowman Gray School of Medicine at Wake Forest College.

We have already forwarded to you summaries of the exhibits and black and white photographs of them. Reprints of some of the papers have not been received and will be forwarded to you as soon as they are available. Color photographs of the exhibit are being prepared to be sent to you when they are completed. We regret very much that more work was not accomplished in the few months between the last progress report and the termination of the grant. It was impossible to keep the laboratory in full operation without the co-investigator of the past year and our trained technician. We are pleased with the recognition of our work by other medical schools and by medical associations. Please let me express to you again on behalf of all the people who have worked with the project our deepest appreciation for your help. Without your support it would have been impossible to have allowed Dr. Aikawa to continue so actively in research. We feel we have made a definite contribution to existing knowledge.

We sincerely hope that when the new University of Florida College of Medicine has been constructed that it will be possible for us to pick up this research again.

Respectfully,

*George T. Harrell*

George T. Harrell, M.D.

GTH:mt

Enclosure

Note: Reprints are going forward directly from Winston-Salem, N. C.

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CONTRACTS  
- Bowman Gray 288  
P-1-1954

## FINAL REPORT

Contract No. AT-(40-1)-288 - Title I  
The Bowman Gray School of Medicine of  
Wake Forest College, Winston-Salem, N.C.

### DISTRIBUTION AND TURNOVER OF SODIUM AND POTASSIUM IN ACUTE INFECTIONS

Dr. George T. Harrell, Jr., Project Leader                      March 15 to December 31, 1953

Facilities: No Changes have been made in the laboratory.

Personnel: Dr. Jerry K. Aikawa resigned to be available for military duty, when called. He has accepted an appointment at the University of Colorado, effective July 1, 1953.

Miss Eloise Rhoades terminated her employment July 1, 1953. She is now working in Wilmington, Delaware in a hospital isotope laboratory. It was impossible to obtain a replacement.

William Brooks continued with the project until Fall. When it became apparent that the laboratory could not remain in full operation, he was gradually shifted to another research project in the school which assumed his salary.

A graduate student candidate for the Master's Degree was to have begun her research project on this problem, September 1, 1953. The beginning date of her research was gradually pushed back so that she still had not begun her research at the time of the termination of the project.

The Project Leader resigned from the Bowman Gray School of Medicine to become Dean of the new University of Florida College of Medicine in Gainesville, effective January 1, 1954.

Isotopes: Shipments continued to arrive as needed this year.

Animals: The number of animals used was drastically reduced because of the curtailment in personnel.

### Scope and Plan of Approach

#### Concept of Membrane Permeability Defect

Experiments since the Progress Report of March 15, 1953 were directed primarily toward alterations in distribution of sodium and potassium within cells. The alteration in membrane permeability induced by infection and by a decrease in production of thyroid hormone - myxedema - were studied. The studies on deficiency in thyroid hormone were performed to contrast with the effect of an increase in metabolic rate induced in the course of infection.

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Results of Experiments1. Standardization of Methods

No new methods were developed or standardized.

2. Intracellular Infections

Experiments with Rickettsial Spotted Fever in rabbits and guinea pigs were completed. The data have been analyzed, written up, and accepted for publication by the Journal of Infectious Disease as shown in the bibliography.

3. Extracellular Infections

No extracellular infections were studied.

4. Immune Reactions without Infection

No further experiments of this type were attempted.

5. Hormone Influences

Myxedema was produced in a group of rabbits and the serial changes in distribution of fluid spaces and ion content were followed. We are in some doubt that the dose of  $I_{131}$  administered was sufficient to produce complete myxedema. The data are somewhat variable and not entirely conclusive, so that it has been decided not to publish the results of the experiments on this group of animals. In general, in the animals in which changes occurred, the trend was in the direction observed in human patients with myxedema; the blood volume was reduced and the extravascular fluid space increased. The change was greater in the  $Na_{24}$  space than in the exchangeable  $K_{42}$  space.

Clinical Studies

Additional data were collected on a limited number of patients with myxedema. No suitable cases of other diseases were available for study.

6. Exhibits

The exhibit, "Clinical Application of Studies with Radiosodium and Potassium," prepared in conjunction with Dr. Jerry K. Aikawa, was presented at the New York session of the American Medical Association, June 1-5, 1953, in the section on Experimental Medicine. A copy of the summary distributed and photograph of the exhibit have already gone forward to you.

The exhibit was reworked, with the emphasis and several panels changed. The revised exhibit, "Cellular Changes of Sodium and Potassium in Man", was presented at the 47th annual meeting of the Southern Medical Association, in Atlanta, Georgia, October 26-29, 1953 in the section on Medicine. The exhibit received the First

Scientific Award at this showing. A copy of the summary distributed and a photograph of the exhibit have already gone forward to you.

On the basis of the showing at the American Medical Association, the American Academy of General Practice has requested that the exhibit be presented at its Annual Assembly in Cleveland, Ohio, March 22-25, 1954. We have agreed to send the exhibit as revised for the Southern Medical Association.

#### Lectures

The George Washington University School of Medicine invited the principal investigator to give the Kellogg Lecture in Washington, March 23, 1953. The results of the past several years' experiments were summarized in a formal presentation, "Electrolyte Disturbances in Clinical Practice."

Two short lectures were given at the International Physiologic Congress in Montreal, August, 1953. They were entitled, "Physiologic Studies on Exchangeable Potassium," and "Permeability Defect in Edema."

In conjunction with the exhibit presented at the Southern Medical Association, the Chairman's Address in the section on Medicine was given on the subject, "Alterations of Sodium and Potassium Within Cells."

## Bibliography

Final Report

Contract No. AT-(40-1)-288  
Title I  
December 31, 1953

Articles and abstracts published during the period March 16, 1953 to December 31, 1953, and based on work conducted under the contract with the Atomic Energy Commission:

Aikawa, J. K., Felts, John H., Jr., and Harrell, G. T.: Alterations in the Body Potassium Content in Cirrhosis of the Liver. *Gastroenterology* 24:437-443 (July) 1953.

Aikawa, J. K., and Harrell, G. T.: Effect of Cortisone Acetate on Experimental Rocky Mountain Spotted Fever in the Guinea Pig. *Proc. Soc. Exper. Biol. and Med.* 82:698-701, 1953.

Aikawa, J. K., and Harrell, G. T.: Isotopic Studies of Fluid and Electrolyte Changes in Domestic Rabbits with Rocky Mountain Spotted Fever. *Jour. Infec. Dis.* 93:222-225 (November-December) 1953.

Aikawa, J. K., and Harrell, G. T.: Changes in the Tissue Radiosodium Space Associated with Experimental Rocky Mountain Spotted Fever in Guinea Pigs. *Jour. Infec. Dis.* 93:263-265 (November-December) 1953.

Harrell, G. T.: Permeability Defect in Myxedema. (Abstract) XIX International Congress of Physiology, 1953.

Harrell, G. T.: Physiologic Studies on Exchangeable Potassium. (Abstract) XIX International Congress of Physiology, 1953.