

1319

K+M file

Form OR-569 (2/53) REQUEST FOR CONTRACT ACTION (submit in duplicate)

1. TO: **J. R. Moore** Chairman Contract Board. ORIGINAL SIGNED BY **HERMAN M. ROTH** From: **Res. & Med. Division**

It is requested that the Contract Board take the necessary action to process the following described contract action in accordance with the provisions of Bulletin OR-O&M-19: 718394

2. Nature of Action Requested

Selection of New Contractor and Negotiation of Contract. Modification of Contract No. **AT-(40-1)-284** Contractor: **William M. Rice Institute Houston, Texas**

Review and approval of Contract, Sub-contract or Purchase Order. Other (Explain) _____

Number: _____ Name: _____

3. Nature of Services to be Covered by Contract

Construction Architect-Engineer Other (Explain)

4. Funding Amount to be Obligated by this Contract Action : **12,500.00**

Source of Funds

Approved ORO Financial Plan, _____ Quarter, Fiscal Year 19____

Project No. _____ or, Activity No. _____

Funds to be Obligated: Allotment No. _____ (F.Y. 19____ Funds)

Procurement Directive No. **BM-54-242** Dated **4-26-54**

Issuing Office **Division of Biology and Medicine, Washington**

Concurrence in Funding Statement: (signed) _____ Chief, Budget Branch

5. Project or Activity to be Covered by Contract Action:

Location of Work: _____ Construction Directive No. _____

Estimated Cost of Work to be Covered by this Contract Action \$: _____

Schedule: Date Work to Start _____ Estimated Completion Date _____

Description of Project or Activity: _____

(If more space is required use separate sheets and attach hereto:)

Bulletin OR-O&M-19

Exhibit I

W-1563 ✓
OR
Reumilb
-19-54

OR
Copley
5/20/54

CRB
C. Simpson
5/20/54

OR
Roth
5/21/54

REPOSITORY Oak Ridge Operations
 Records & Billing area
 COLLECTION Doc. 1944-94 Bldg. 2714-H
 BOX No. A-41-4 26 of 79 Univ.
 Rice Univ Contract AT-(40-1)-284
 FOLDER 1949-1959 - Talman

1121200

<p>6. Contract Board Docket No. _____ (To be assigned by Board Secretary)</p>	<p>7. Request Submitted By: (signed) _____ Date: <u>5/21/54</u> Title: _____</p>
<p>8. <u>Complete Description of Services to be Furnished by Contractor:</u> Washington designated research contract. Title: "Endocrine and Metabolic Studies Utilizing Radioisotopes and Labelled Hormones" (If more space is required use separate sheets and attach hereto:)</p>	
<p>9. <u>Description of other changes to be covered by Modification:</u> Renew contract for a period of one year beginning July 1, 1954, with new funds in the amount of \$12,500. (If more space is required use separate sheets and attach hereto:)</p>	
<p>10. <u>Negotiated Contracts.</u> (Show why it appears desirable to negotiate new contract or to negotiate modification to existing contract) Memo - W. R. Boss to K. Kasschau, dated April 26, 1954 (If more space is required use separate sheets and attach hereto:)</p>	
<p>11. <u>Contracts, Subcontracts, or Purchase Orders Submitted for Review and Approval:</u> (Furnish brief description of action in this space and attach pertinent documents) None</p>	
<p>12. <u>Disputes:</u> Attach a statement summarizing the dispute together with pertinent documents and Background Material. None</p>	

Budget for Contract No. AT-(40-1)-284

For Period 7-1-54 - 6-30-55

Salaries & Wages		\$12,000.00
Dr. R. V. Talmage (Part time)	\$3,000.00	
Research Assistants, Technical Assistance	8,250.00	
Secretarial & Clerical Aid	750.00	
Animals, animal supplies and care:		2,000.00
Supplies and materials:		3,000.00
Isotopes:		800.00
Equipment and maintenance:		1,350.00
Travel:		500.00
Indirect Costs and Overhead:		<u>1,600.00</u>
		<u>\$21,250.00</u>

The Commission's contribution to the above budget is \$12,500.

Resume

The work performed under this contract falls under three headings:

1. The control of calcium and phosphate metabolism by the parathyroid gland. Work will be continued on the delineation of the sites of action of parathyroid hormone in rats and dogs. Experiments will be based on the use of radiocalcium and radiophosphorus accompanied by analyses of either or both the stable forms of these elements. Emphasis will be placed on bone physiology to determine whether radiophosphorus removal from the bone by parathyroid extract indicates active and increased exchange of phosphate ions, or major removal of this ion from bone. Additional work will be done on kidney function in relation to hormonal aid in the regulation of serum levels of calcium and phosphorus.
2. The action of dihydrotachysterol. This compound is used in human therapy as a substitute for parathyroid hormone. Because of its importance clinically it is important to learn its mode of action. Studies similar to those described in (1) above will be performed substituting this compound for parathyroid extract.
3. The chemistry of parathyroid extract. Exploratory studies will be made by electrophoretic and chromatographic methods to learn more of the nature of the parathyroid extract so that future progress can be made in its purification.

UNITED STATES ATOMIC ENERGY COMMISSION
DIVISION OF BIOLOGY AND MEDICINE
WASHINGTON, D. C.

DATE: 100

TO : r. Kenneth Kasschan, Director, Office of
Research and Medicine, Oak Ridge Operations Office
FROM : w. P. Boss, Physiologist, Biology Branch
Division of Biology and Medicine
SUBJECT: TRANSMITTAL OF RESEARCH PROPOSAL FOR CONTRACT NEGOTIATION
SYMBOL : EMB;WRB

This letter with enclosures, in triplicate, is sent in accordance with the procedure described in a letter from the General Manager to all Managers of Operations dated January 27, 1949.

1. Institution: The Rice Institute
2. Investigator (s): Dr. Roy V. Talmage
Endocrine and Metabolic Studies Utilizing Radioisotopes
3. Title: and Labelled Hormones.
4. () New Contract or () Renewal of Contract No. AT(40-1)284
5. Duration - From: July 1, 1954 to June 30, 1955
6. AEC Technical Supervision: Biology Branch
7. Recommended Support: \$12,500.00
Authorized by Procurement Directive No. B-54-242
Issued 12,500.00
Activity No. 6400
8. Other Comments:

Title to equipment to be vested in the Institute.

8. Comments (Continued)

9. Security Requirements:

In accordance with the provisions of GM-93 (Revised March, 1950), and the requirements of the Declassification Guide, the Division of Biology and Medicine has determined that the following security precautions should be taken in connection with the proposed research contract.

Since there is essentially zero chance that restricted data may be required or developed, no personnel security requirements should be imposed.

10. Reports: () Reports are to be required as provided for by Memorandum Instruction of November 9, 1949, on subject "Direct Research Contract Reports".

() Special Reports Instructions are as follows:

Enclosures: () "A" - Proposal, dated Rec'd from Oak Ridge
 () "B" - Notification letter, dated _____
() "C" - Other correspondence, _____ letters
 () "D" - Procurement Directive BY 54-242

Distribution:

Addressee: Original (w encl.) Division File: Yellow Copy (w encl.)
 1st Copy (" ") Pink Copy (w/o encl.)
 2nd Copy (" ") Green Copy (" ")
Program Analysis Branch File: White Copy (w " ")
Branch: White Copy (w/o encl.)

cc: Mr. Stanwood

BMB:VRB

400

Dr. Roy V. Talmage
Department of Biology
The Rice Institute
Houston, Texas

Dear Dr. Talmage:

I am glad to inform you that your renewal request for your project entitled "Endocrine and Metabolic Studies Utilizing Radioisotopes and Labelled Hormones" has been reviewed by our Research Committee, and has been approved for another year.

We are pleased with the progress you have made during the past year and hope that you may be able to continue successfully during the forthcoming year. It would be appreciated if you would send us copies of your reprints.

You may expect to hear from the Oak Ridge Operations Office within the near future regarding negotiation of the renewal contract.

Sincerely yours,

W. R. Boss
Physiologist, Biology Branch
Division of Biology and Medicine

cc: William V. Houston, President

1127206

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HMB:WRS

Dr. Roy V. Talmage
Department of Biology
The Rice Institute
Houston, Texas

Dear Dr. Talmage:

I am glad to inform you that your renewal request for your project entitled "Endocrine and Metabolic Studies Utilizing Radioisotopes and Labelled Hormones" has been reviewed by our Research Committee, and has been approved for another year.

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You may expect to hear from the Oak Ridge Operations Office within the near future regarding negotiation of the renewal contract.

Sincerely yours,

W. R. Boss
Physiologist, Biology Branch
Division of Biology and Medicine

cc: William V. Houston, President

*yellow***Office Memorandum • UNITED STATES GOVERNMENT**

TO : John C. Bugher, Director
Division of Biology and Medicine, Washington

DATE: March 16, 1954

FROM : Kenneth Kasschau, Director
Research and Medicine Division

SUBJECT: RENEWAL OF CONTRACT NO. AT-(10-1)-284 - THE RICE INSTITUTE

SYMBOL: OR:JER

We are submitting for your review and appropriate action the following information concerning the contract which will expire on June 30, 1954.

1. Renewal Proposal (4)
2. Progress Report (4)
3. Financial Statement (1)

Estimated balance at
expiration of current
contract period

None

We shall appreciate your advising us of your decision so we may proceed with the necessary contract action at the earliest possible date.

Kenneth Kasschau

Enclosure:
As Listed Above

Bounseville:mah

bc: C. S. Sheep

W-814

*Rothman
3/16*

THE RICE INSTITUTE

HOUSTON, TEXAS

12 March 1954

DEPARTMENT OF BIOLOGY

Dr. C.S. Shoup
Biology Brancy
Research and Medicine Division
U.S. Atomic Energy Commission
Oak Ridge, Tennessee

Dear Sam,

According to the revised instructions received from Dr. Kasschau as of March 1 of this year, I am sending directly to you six copies of our annual report of research performed under Contract AT-(40-1)-284 and six copies of our request for renewal of said contract.

In the past I have submitted three copies of each directly to the Washington Office but I believe I am conforming with the revised Guide by submitting all copies to you and none directly to the Washington Office. May I ask that you correct me if this is not right.

It was my impression from conversations with you last summer in Oak Ridge, that you had hoped to visit us some time during the year. We hope that the failure of this visit to materialize does not mean that you have forgotten us.

Relative to our report and application, we hope that it is in proper order and will be glad to answer any question concerning either one.

Sincerely,



Roy V. Talmage

cc: Dr. Paul B. Pearson
Division of Biology and Medicine
A.E.C., Washington, D.C.

enclosures:

Annual Report of Contract AT-(40-1)-284 - 6 copies
Request for Renewal of Said Contract - 6 copies
Statement of Expenditures (Current) - 2 copies

MAR 1954
D-1290

1127249

Original

APPLICATION FOR RENEWAL OF
CONTRACT AT-(40-1)-284

To the Division of Biology and Medicine
of The Atomic Energy Commission

Submitted for
The Department of Biology of The Rice Institute

by
Roy V. Talmage
Associate Professor of Biology

To make possible the continuation of its research program utilizing radio-isotopes in the field of physiology and endocrinology, the Department of Biology of The Rice Institute hereby makes the following request for the renewal of Contract AT-(40-1)-284 for the year beginning July 1, 1954:

A grant for \$12,500 to aid in carrying out the research program described in the following pages. This grant to be utilized as follows:

1. Wages and Salaries-----	\$7500.00
2. Expendable Materials -----	2000.00
3. Animals and Animal Supplies -----	1100.00
4. Radioactive Isotopes -----	800.00
5. Small Equipment Fund -----	600.00
6. Travel -----	500.00

The research carried out under the Title Project "Endocrine and Metabolic Studies Utilizing Radioisotopes and Labelled Hormones" is divided into the following three sub-projects:

1. The Control of Calcium and Phosphate Metabolism by the Parathyroid Glands. A continuation of our present study to determine the pathways through which the parathyroids effect the physiology of bone and influence calcium and phosphate levels in the serum and their excretion by the kidney.
2. The Action of Dihydrotachysterol: A continuation of the mechanism of action of this important drug which is already used extensively in human therapy.
3. The Chemistry of Parathyroid Extract: A preliminary endeavor concerning the purification and structure of the parathyroid hormone. At the present time this extract cannot be used extensively in human therapy as the human body soon becomes refractory to its administration.

- General Information -

The physical plant of the Radio-isotope Laboratories consists of approximately half of the basement of the Physics Building and contains the appropriate "hot" laboratories, chemistry labs, counting room, animal rooms, chromatographic laboratories, constant temperature cold room, and general laboratory needed for physiological experimentation utilizing isotopes.

Our counting room includes the following equipment: A Texas Company Gamma Counter, a Tracerlab Automatic Sample Changer, a cup-type scintillation counter, a Tracerlab flow counter and several standard scalers including one 1000 scaler. With this equipment we are able to minimize technical assistance in the counting room and thereby save considerable time and expense.

Our chromatographic laboratory and constant temperature cold room make it possible to carry on protein and amino acid chemistry in connection with our research. Our paper electrophoresis apparatus has made possible the study of proteins and has aided in our past work on the separation and purification of proteins.

Our general laboratories are well equipped, including most standard laboratory equipment and apparatus for making standard chemical determinations and for preparation of tissues for radio-active determinations. Much of our equipment is home-made as we are fortunate enough to have the facilities and personnel connected with the Institute for doing this work. Most of our laboratories are air-conditioned permitting maximum efficiency during the long humid summer months found in this part of the country.

Though The Rice Institute is not in session during the summer months, our laboratories are in operation the year round, and due to the absence of academic duties pick up additional activity and personnel during the summer months. The past summer, the project director visited Oak Ridge and was able to carry out problems connected with this program at the U.T.-A.E.C. Laboratories which were not possible here. This summer his plans are to remain here, devoting almost full time to the research programs. The Rice Institute maintains our laboratories, the original remodelling of which was made possible in part by the Atomic Energy Commission, for the primary use of research. They are open as far as possible for the use of research being done by other members of the Department as well as other departments. They are also used to some extent in the instructional program of the school.

The Institute furnishes all of the care of the animals, the facilities of the various shops, the time of the various staff members directly or indirectly connected with this project. In addition, all indirect costs are supplied by the Institute including the clerical and secretarial aid necessary for the performance of this project. Also, the standard equipment and facilities and some financial support of the Biology Department are at our disposal for use in our research.

- Staff -

ROY V. TALMAGE - Project Director, Associate Professor of Biology.

In past years a short biography of the project director has been supplied with each renewal application. Examination of these will show that no complete bibliography was ever given in connection with an application or re-application. For this reason, such a bibliography is appended to this request in place of the usual biographical sketch. As a matter of interest to the Commission, all published work which has resulted from present and past work under this contract is starred.

FRANCES W. KRAINTZ (Mrs.) - Research Assistant (full time).

Special commendation is in order to Mrs. Kraintz who has been with us in our work for four years, and who, through her technical skills and scientific interests has made a most important contribution to the work accomplished under this contract. This has been especially appreciated for she has remained with us despite the fact that her skills and training have brought her many opportunities for other positions carrying higher remunerations. Her husband receives his Ph.D. from Rice this spring, but is expecting to remain in Houston at one of our neighboring institutions and as a result it is very possible that we will have Mrs. Kraintz's services for at least one more year.

GEORGE DALE BUCHANAN - Graduate Student in the Department of Biology and a Graduate Assistant on the departmental teaching staff. Buchanan has served part time and full time during the summer for three different years, divided by a tour with the U.S. Marine Corps.

BERNARD F. DODDS - Graduate Student in the Department of Biology, and a Graduate Assistant on the departmental teaching staff. Dodds is completing his first year with us and will probably be added to the full time summer staff. During the current year and probably during the next academic year he will receive no remuneration from the grant but is engaged in research covered under this project.

OTHERS - Each year we engage part time, usually on an hourly basis, advanced undergraduates in biology who furnish some of our technical help. This past year, Miss Hazel L. Owen has been with us both full time during the summer and part time during the year. We expect that she will be with us again during the period covered by this renewal request.

Roy V. Talmage
The Rice Institute
Bibliography - in chronological order.

PAPERS

1. Abramowitz, A.A., W.L. Money, M.X. Zarrow, R.V. Talmage, L.H. Kleinholz and F.L. Hisaw: Preparation, Biological Assay and Properties of Relaxin. *Endocrinology* 34:103-114 (1944)
2. Hisaw, F.L., M.X. Zarrow, W.L. Money, R.V. Talmage, and A.A. Abramowitz. Importance of the Female Reproductive Tract in the Formation of Relaxin. *Endocrinology* 34:122-134 (1944)
3. Talmage, R.V. A Histological Study of the Effects of Relaxin on the Symphysis Pubis of the Guinea Pig. *J. Exp. Zool.* 106:281-298. (1947)
4. Talmage, R.V. Changes Produced in the Symphysis Pubis of the Guinea Pig by Sex Steroids and Relaxin. *Anat. Rec.* 99:91-106 (1947).
5. Talmage, R.V. Influence of Estradiol on Alkaline Phosphatase Activity in the Genital Tract of the Rat. *Proc. Soc. Exp. Biol. & Med.* 70:719-721 (1949)
6. Talmage, R.V. and W.R. Hurst. Variability in the Response of the Symphysis Pubis of the Guinea Pig to Relaxin. *J. Endocrinology* 7:24-60 (1950)
7. Talmage, R.V. The Role of Estrogen in the Estrogen-Relaxin Relationship in Symphyseal Relaxation. *Endocrinology* 47:75-82. (1950)
- * 8. Talmage, R.V. and Fern A. Garrett. Effects of Repeated Injections of the Steroids and Relaxin on the Symphysis Pubis of the Guinea Pig as Studied by X-Ray. *Endocrinology* 48:162-168. (1951)
- * 9. Frost, R.C., and Roy V. Talmage. Fluid and Electrolyte Shifts in the Hydrated Adrenalectomized Rat. *Endocrinology* 49:606-612. (1951)
- * 10. Frost, R.C. and Roy V. Talmage. Fluid and Electrolyte Shifts in the Hydrated Adrenalectomized Rat after Nephrectomy. *Proc. Soc. Exp. Biol. & Med.* 80:171. (1952)
- * 11. Garrett, F.A. and Roy V. Talmage. Influence of Relaxin on the Development of Mammary Glands of Guinea Pigs and Rabbits. *J. Endocrinology*
- * 12. Talmage, Roy V., F.W. Krintz, and L. Krintz. The Effect of the Parathyroids on Radio-Calcium Uptake and Exchange in Rat Tissues. *Proc. Soc. Exp. Biol. & Med.* 80:553-557. (1952)

- * 13. Kraintz, Leon, and Roy V. Talmage. Distribution of Radioactivity Following Intravenous Administration of Trivalent Chromium 51 in the Rat and Rabbit. Proc. Soc. Exp. Biol. & Med. 81:490-492. (1952)
- * 14. Talmage, Roy V., F.W. Kraintz, R.C. Frost, and L. Kraintz. Evidence for a Dual Action of the Parathyroid Hormone in Maintaining Serum Calcium and Phosphate Levels. Endocrinology 52:318-323. (1953)
- * 15. Talmage, Roy V., H. Nachimson, L. Kraintz, and J.A. Green. The Effect of Phenothiazine N.F. (Green) on the Uptake of I-131 by the Rat Thyroid. Science 118:191-192 (1953)
- 16. Talmage, Roy V., B.F. Trum, R.A. Monroe, and J.H. Rust. The Effect of Phenothiazine N.F. (Green) and Phenothiazine N.F. Purified on the Uptake of I-131 by the Thyroid of the Burro. J. Am. Vet. Med. Assn. 123:328-329. (1953).
- 17. Talmage, Roy V., W.E. Lotz, and C.L. Comar. Action of Parathyroid Extract on Bone Phosphorus and Calcium in the Rat. Proc. Soc. Exp. Biol. & Med. 84:578-582. (1953).

Following Papers in Press:

- * 1. Talmage, Roy V., G.D. Buchanan, F.W. Kraintz, E.A. Lazo-Wasem, and M.X. Zarrow. The Presence of a Functional Corpus Luteum During Delayed Implantation in the Armadillo. J. Endocrinology: In Press (1954)
- 2. Talmage, Roy V., and G.D. Buchanan. The Armadillo: A Study of its Ecology, Natural History, Anatomy, and Reproductive Physiology. The Rice Institute Pamphlet Vol. IV:#2. (1954).

Following Papers Submitted for Publication:

- 1. Lotz, W.E., Roy V. Talmage, and C.L. Comar. Effect of Parathyroid Extract Administration in Sheep.
- * 2. Talmage, Roy V. and F.W. Kraintz. Immediate Changes in Phosphate Excretion following Parathyroidectomy by the Rat.
- 3. Talmage, Roy V., R.A. Monroe, and C.L. Comar. A Survey of the Effect of Phenothiazine on Uptake of Radioiodine by the Thyroids of Farm Animals.
- 4. Buchanan, G.D. and Roy V. Talmage. The Geographic Distribution of the Armadillo in the United States.

Roy V. Talmage
The Rice Institute
Bibliography, cont'd.

ABSTRACTS

1. Abramowitz, A.A., F.L. Hisaw, L.H. Kleinholz, W.L. Money, R.V. Talmage and M.X. Zarrow. The Preparation and Biological Assay of Relaxin. Anat. Rec. 84:456. (1942)
2. Hisaw, F.L., M.X. Zarrow, R.V. Talmage, W.L. Money, and A.A. Abramowitz. Relation of Progesterone to the Formation of Relaxin. Anat. Rec. 84:457 (1942).
3. Talmage, R.V. Histological Effects of Estradiol, Progesterone, and Relaxin on the Symphysis Pubis of the Guinea Pig. Anat. Rec. 96:528 (1946)
4. Talmage, R.V. The Role of Estrogen in the Estrogen-Relaxin Relationship in Relaxation of the Symphysis Pubis of the Guinea Pig. Anat. Rec. 99:15. (1947).
- * 5. Talmage, R.V., R.C. Frost, R.J. Shalek, J.H. Burr, and F.A. Garrett. Extracellular Fluid Volume of the Rat. Anat. Rec. 105:486. (1949)
- * 6. Talmage, R.V., J.W. Beck, and E.T. Adams. Serum Uptake of Radio-Calcium in Guinea Pigs. Anat. Rec. 105:604. (1949)
- * 7. Garrett, F.A. and R.V. Talmage. Influence of Relaxin on Mammary Development. Anat. Rec. 108:35. (1950)
- * 8. Talmage, R.V., F.W. Krintz, L.K. Wang, and L. Krintz. Comparative Uptake of Carrier and Carrier-Free Ca-45 in Rats. Federation Proc. 2:159. (1952)
- * 9. Krintz, L. and Roy V. Talmage. Studies with I-131 Relaxin. Anat. Rec. 113:89. (1952).
- * 10. Talmage, R.V., G.D. Buchanan, and F.W. Krintz. Parathyroid Function as Studied with Radio-Calcium and Radio-Phosphorus. International Physiological Congress 19:820 (1953).
- * 11. Krintz, Leon and Roy V. Talmage. In Vitro Incorporation of Radioactive S-35 Methionine by Beef Pituitary Slices. Anat. Rec. 117:537. (1953).
- * 12. Buchanan, G.D. and Roy V. Talmage. Effect of Parathyroid Extract on P-32 Excretion in Thyroparathyroidectomized Dogs. Anat. Rec. 117:622 (1953)
- * 13. Talmage, Roy V. Influence of the Parathyroids on Renal Excretion of Calcium. Federation Proceedings: In Press.

- Research Program -

The annual report of Contract AT-(40-1)-284 for the year ending March 15, 1954 is being submitted concurrently with this application for renewal of said contract. The background for the research problems and program given below can be found in this report. For this reason, these proposed investigations are given in as brief a form as possible.

1. The Control of Calcium and Phosphate Metabolism by the Parathyroid Glands.

This is a continuation of our present program in which we are attempting to delineate within as narrow limits as possible the sites of action of the parathyroid hormone. Our work will be carried on primarily with rats and dogs. The use of at least two different mammalian species is important in showing that results are not specific to one group of mammals but probably include the entire class including man.

Our work will revolve around the use of radiocalcium and radiophosphorus accompanied by quantitative analyses of either or both of the stable forms of these elements. Emphasis will be placed on bone physiology to determine whether radiophosphorus removal from the bone by parathyroid extract indicates active and increased exchange of phosphate ions, or major removal of this ion from bone. If the former is true, an excellent lead as to the action of the hormone of bone will be given us implying that this hormone places calcium and phosphate in a state where it is readily exchangeable. If the latter is true, present concepts of bone physiology will have to be revised to explain the mechanism by which large amounts of one ion can be removed from the bone with little if any effect on the other. At the moment we lean toward the former of these two concepts. Additional emphasis will also be placed on kidney function, to confirm the evidence we now have that the hormone aids in the regulation of serum levels for these two ions by regulating the kidney threshold for their excretion.

2. The Action of Dihydratichysterol.

Dihydratichysterol is now used in human therapy as a substitute for parathyroid hormone. It reportedly acts by increasing the phosphate excretion by the kidney and thereby producing step by step the changes proposed by the Albright and Reifenstein theory of parathyroid function. In the light of our new knowledge of the mechanism of action of the parathyroids, it is very important to study further the action of a drug so prevalently used in human therapy. Our experimental procedures will be to repeat in so far as possible many of our experimental procedures with parathyroid extract, substituting for the extract this drug. Particular emphasis will be placed on serum levels for the two ions, and the removal of phosphate (P-32) from the long bones of the rat.

3. The Chemistry of Parathyroid Extract.

The studies in this regard during the coming year will be of an exploratory nature. This will be made possible by electrophoretic apparatus, our chromatographic laboratories, and advances in protein study and separation. All we hope to be able to accomplish this year is to learn more of the nature of the extract, so that future progress can be made in its purification. The eventual aim would be the hope that an extract could be produced that would not be refractory in human therapy.

- Financial Assistance from Sources Other Than Institutional

This contract is at the present time the only source, other than institutional, from which financial aid for the research endeavors carried out by the Project Director is received. However, the project director, currently has submitted an application for a grant to the National Science Foundation to aid in carrying out research on the problem of hormonal control of implantation using the armadillo as the test animal. The initial work under this project was supported by this A.E.C. Contract. The program was dropped for lack of funds as of June 30, 1953. Aid from the National Science Foundation, approximating \$8000.00 annually is being sought to enable the renewal of that work.

There will be some overlapping of the physical facilities of the Biology Department under these two grants if awarded. The only overlapping of personnel will be in the person of the Project Director, who will serve in this capacity for both grants. The research performed and the personnel actively supported by the two grants will be completely separate.

- Total Cost of Project Including Institutional Support -

The total cost of this project annually has been calculated to be approximately \$21,000.00. Of this amount request is made to the A.E.C. for a grant of \$12,500.00 which is an amount slightly less than 60% of the estimated cost. While it is practically impossible to calculate with any degree of accuracy the part in which the Institution enters in the support of the proposed research, the following items include the primary sources of its support. A general discussion of this is considered under the section entitled "General Information".

1. The time of the Project Director: Including the full time research activities of the project director during vacation periods and summer months, it is estimated that during a calendar year he spends approximately three-quarters of his time on research endeavors. Of this, 50% or more has been and will be spent on the problems included in this contract. (Approximately \$3000.00)*
2. The Rice Institute has as yet not charged any indirect costs of carrying out this work to this contract. This is one of the few such contracts in force and is therefore a major contribution to the cost of the work. Based on a figure of 8% of the total cost this is approximately \$1600.00*
3. All secretarial and clerical aid is furnished by the Dept. of Biology. This is a considerable sum when the work involved in annual reports, applications for renewals, and the preparation of manuscripts for publication is considered. (Estimated: \$750.00)*
4. Care of the animals has in the past been supplied entirely by the Department of Biology as well as a major part of the cost of food for these animals. (Estimated \$900.00)*
5. Special maintenance and construction problems, particularly in regard to the maintenance of air-conditioning and cold room equipment. (est. \$750)*
6. Considerable amount of technical assistance in the form of work by graduate students supported by the Department of Biology is used in the performance of this work. (Approximately \$750.00)*
7. When available, actual cash sums for the purchase of expendable materials, and some major pieces of equipment have been provided by the Biology Department. This averages approximately \$1000.00 annually. *

- Itemized Budget of Funds Requested -

Salaries and Wages

Full time research assistant -----	\$4000.00	
Graduate Assistant - Part time during		
school, full time in summer -----	2200.00	
Part time and additional summer help -----	1300.00	

		\$ 7500.00

Expenses

Glassware, chemicals, G.M. Tubes, syringes, hormones, etc.-- 2000.00 X

Animals and Animal Supplies

Rats - cost approximately \$1.50 each -----	\$1000.00	
Dogs - present cost \$1.00 each -----	100.00	

		1100.00

Radio-active Isotopes

The primary isotopes used are P³² and Ca⁴⁵.
 However, high specific activity material of
 the latter costs \$45.00/mc ----- 800.00

Small Equipment Fund

No major equipment item is expected to be needed.
 However, minor pieces of equipment costing usually
 less than \$75.00 frequently are needed to be added
 or replaced ----- 600.00

Travel

To make it possible for the project director and/or
 advanced graduate students connected with the project
 to attend scientific meetings for discussion and
 presentation of the work resulting from this contract.----- 500.00

TOTAL: \$ 12,500.00

-Endorsements -

Contract Renewal Application to the Division of Biology and Medicine of the
 Atomic Energy Commission -- Dated March 15, 1954

For the Department of Biology

For The Rice Institute

Roy V. Talmage
 Roy V. Talmage
 Project Director
 Associate Professor of Biology

W. V. Houston
 William V. Houston
 President