

1134 R

717193

DATE: Nov. 30, 1960

TO : Addressees Listed Below

FROM : R. C. Humphries, Director, Contract Division

SUBJECT: CONTRACTUAL DOCUMENTS FOR REVIEW, COMMENTS AND INITIALING

The document(s) listed below (is) (are) forwarded for your review, comments and initials. Upon completion of your review, please attach your comments, if any, and forward to next in turn. Expeditious handling of this matter will be appreciated.

Modification 12 to Contract AT-(40-1)-253 with the University of Virginia

| Addressee                    | Division            | Init.         | Date               | Remarks             |
|------------------------------|---------------------|---------------|--------------------|---------------------|
| 1. <del>A. E. Johnston</del> | <del>Contract</del> | <del>WJ</del> | 11/30/60           |                     |
| 2. <del>A. E. Miller</del>   | Budget              | afm           | 12/1               | No additional funds |
| 3. C. S. Shoup               | Res. & Dev.         | grr<br>CS     | 12/2/60<br>12/5/60 |                     |
| 4. <del>A. E. Miller</del>   | Finance             | WJ            | 12/6/60            |                     |
| 5.                           |                     |               |                    |                     |
| 6.                           |                     |               |                    |                     |

RETURN TO:

Alice Brown

Contract Division

Tel.: 1719

REPOSITORY Oak Ridge Operations  
Records Holding area  
COLLECTION Documents 4944-94  
Contracts AT-(40-1)-Gen 253-  
BOX No. 1 of 2 Bldg. 2714-H 265  
FOLDER Backup Papers + record of  
Negotiations + award

1110981

1. TO: \_\_\_\_\_ Chairman Contract Board. From: \_\_\_\_\_

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:

2. Nature of Action Requested

Selection of New Contractor and Negotiation of Contract.

Modification of Contract No. AT-(40-1)-263

Contractor: University of Virginia  
Charlottesville, Virginia

Review and approval of Contract, Sub-contract or Purchase Order.  
Number: \_\_\_\_\_  
Name: \_\_\_\_\_

Other (Explain) \_\_\_\_\_

3. Nature of Services to be Covered by Contract

Construction  Architect-Engineer  Other  (Explain) Research

4. Funding

Amount to be Obligated by this Contract Action \$ None

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. \_\_\_\_\_ Dated \_\_\_\_\_  
Issuing Office \_\_\_\_\_

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:)

|   |  |
|---|--|
| <p>6. <b>Contract Board Docket</b><br/>         No. _____<br/>         (To be assigned by<br/>         Board Secretary)</p>   | <p>7. <b>Request Submitted By: (signed)</b> <u>C. S. Shultz</u><br/>         Date: <u>NOV 25 1960</u><br/>         Title: _____<br/>         C. S. SHULTZ<br/>         ASSISTANT SECRETARY</p> |
| <p>8. <b>Complete Description of Services to be Furnished by Contractor:</b><br/>         Headquarters designated research contract</p> <p><b>TITLE:</b> "The Metabolic Exchange of Radioactive Isotopes in Isolated Cell Systems"</p> <p>(If more space is required use separate sheets and attach hereto:)</p>  |  |
| <p>9. <b>Description of other changes to be covered by Modification:</b></p> <p>Modify contract to provide for the performance of additional research to be completed not later than June 30, 1961, without additional funds. There will be no significant change in the scope of the work.</p> <p>(If more space is required use separate sheets and attach hereto:)</p> |  |
| <p>10. <b>Negotiated Contracts.</b> (Show why it appears desirable to negotiate new contract or to negotiate modification to existing contract)</p> <p>Memorandum from James L. Liverman to Norman H. Roth dated November 18, 1960</p> <p>(If more space is required use separate sheets and attach hereto:)</p>  |  |
| <p>11. <b>Contracts, Subcontracts, or Purchase Orders Submitted for Review and Approval:</b> (Furnish brief description of action in this space and attach pertinent documents)</p> <p>None</p>   |  |
| <p>12. <b>Disputes:</b><br/>         Attach a statement summarizing the dispute together with pertinent documents and Background Material.</p> <p>None</p>  |  |

UNITED STATES GOVERNMENT

# Memorandum

Herman M. Roth, Director  
Research and Development Division  
Oak Ridge Operations Office

DATE: November 16, 1960

FROM : *J. L. Diverman*  
James L. Diverman, Chief, Biology Branch  
Division of Biology and Medicine

SUBJECT: RESEARCH CONTRACT NO. AT(40-1)263--UNIVERSITY OF VIRGINIA--  
CHALMERS L. GEMMILL

SYMBOLS: BMB:JLL

Reference is made to your memorandum dated October 25, 1960, with attached copies of letter dated October 19 from Dr. Gemmill requesting that the period under subject contract be extended to July 1, 1961, without additional funds.

Approval is granted for the requested extension.

NOV 19 1960

OAK RIDGE OPERATIONS  
E. C.

AIRTEL

NOV 21 1960

1110984

DEPARTMENT OF PHARMACOLOGY

CHARLOTTESVILLE, VIRGINIA

October 19, 1960

Dr. C. S. Shoup  
Chief, Biology Branch  
Research and Development Division  
U. S. Atomic Energy Commission  
Oak Ridge, Tennessee

Dear Dr. Shoup:

According to our letter of August 19, 1960, we decided not to apply for a renewal of our Contract No. AT-(40-1)-263 which expires November 30, 1960. At the present time, we have about \$4000.00 unexpended. The reason for this surplus is due to our inability to locate an adequate technician for this work since last January. However, we do have a good technician at the present time.

Would there be any possibility of extending the expiration date until July 1, 1961 in order that we may use this money on our contract?

Thanking you for your aid in the past, I am

Sincerely yours,

*Chalmers L. Gemmill*  
Chalmers L. Gemmill, M.D.  
Professor of Pharmacology

cms:CLG

1110985

Addressees Listed Below

DATE: Dec. 18, 1959

W. L. Humphries, Director, Contract Division

CONTRACTUAL DOCUMENTS FOR REVIEW, COMMENTS AND INITIALING

The document(s) listed below (is) (are) forwarded for your review, comments and initials. Upon completion of your review, please attach your comments, if any, and forward to next in turn. Expeditious handling of this matter will be appreciated.

Modification 11 to Contract AT-(40-1)-263 with the University of Virginia

| Addressee               | Division                   | Init          | Date                | Remarks      |
|-------------------------|----------------------------|---------------|---------------------|--------------|
| A. E. Miller            | Budget                     | WLM           | 12/18/59            | 06-01-91(24) |
| <del>C. S. Snow</del>   | <del>Res. &amp; Dev.</del> | <del>CS</del> | <del>12/24/59</del> |              |
| <del>L. B. Mackay</del> | <del>Finance</del>         | <del>LB</del> | <del>12/24/59</del> |              |
| A. E. Johnston          | Contract                   | AEJ           |                     |              |
|                         |                            |               |                     |              |
|                         |                            |               |                     |              |
|                         |                            |               |                     |              |
|                         |                            |               |                     |              |
| Alice Brown             | Contract Division          |               |                     | Tel.: 4719   |

To Cont. 12/23/59

1. TO: Dr. J. S. Bridges Chairman Contract Board. From: Res. & Dev. Div.

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:

2. Nature of Action Requested

Selection of New Contractor and Negotiation of Contract.

Modification of Contract  
No. AT-(10-1)-263

Contractor: University of Virginia  
Charlottesville, Virginia

Review and approval of Contract, Sub-contract or Purchase Order.  
Number: \_\_\_\_\_  
Name: \_\_\_\_\_

Other (Explain) \_\_\_\_\_

3. Nature of Services to be Covered by Contract

Construction  Architect-Engineer  Other  (Explain) Research

4. Funding

Amount to be Obligated by this Contract Action : 8,089.00

Source of Funds

Approved ORO Financial Plan, \_\_\_\_\_ Quarter, Fiscal Year 19\_\_

Project No. \_\_\_\_\_ or, Activity No. 6330

Funds to be Obligated: Allotment No. 06-01-9-04 (F.Y. 1960 Funds)

Procurement Directive No. K.M. 60-243 Dated 12-1-59

Issuing Office Paul J. Brockman

Concurrence in Funding Statement: (signed) \_\_\_\_\_

*Sheldon B. ...*  
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:)

|  |   |
|--|---|
| <p><b>6. Contract Board Docket</b><br/>         No. _____<br/>         (To be assigned by<br/>         Board Secretary)</p>  | <p><b>7. Request Submitted By: (signed)</b> _____<br/>         Date: <u>DEC 8</u> 1958: <u>C. S. Shoup</u><br/>         C. S. SHOUP<br/>         CHIEF, BIOLOGY BRANCH<br/>         RESEARCH AND DEVELOPMENT DIVISION</p> |
| <p><b>8. Complete Description of Services to be Furnished by Contractor:</b><br/>         Headquarters designated research contract<br/>         TITLE: "The Metabolic Exchange of Radioactive Isotopes in Isolated<br/>         Cell Systems"<br/> <br/>         (If more space is required use separate sheets and attach hereto:)</p>                                   |   |
| <p><b>9. Description of other changes to be covered by Modification:</b><br/>         Modify contract to provide for the performance of additional research<br/>         to be completed not later than November 30, 1960, with new funds in<br/>         the amount of \$8,089.<br/> <br/>         (If more space is required use separate sheets and attach hereto:)</p> |   |
| <p><b>10. Negotiated Contracts.</b> (Show why it appears desirable to negotiate new contract or to negotiate<br/>         modification to existing contract)<br/> <br/>         Form AEO-181 (Contract Authorization) from C. W. Shilling dated<br/>         December 1, 1959.<br/> <br/>         (If more space is required use separate sheets and attach hereto:)</p>   |   |
| <p><b>11. Contracts, Subcontracts, or Purchase Orders Submitted for Review and Approval:</b> (Furnish brief descrip-<br/>         tion of action in this space and attach pertinent documents)<br/> <br/>         None</p>   |   |
| <p><b>12. Disputes:</b><br/>         Attach a statement summarizing the dispute together with pertinent documents and Background<br/>         Material.<br/> <br/>         None</p>  |   |

1110988

APPENDIX "A"

SUPPLEMENT NO. 11

This SUPPLEMENT NO. 11 describes the research program and cost estimates agreed upon between the Commission and the Contractor.

1. PROGRAM

a. Scope and Plan of Approach:

The Contractor will continue studies of the metabolic exchange in isolated cell systems of radioisotopes to include work on inorganic phosphate transfer into erythrocytes, using radioactive phosphorus, to follow the lead that arsenate is a competitive inhibitor carried by the same means of transport as phosphate, new studies of erythrocyte ghost preparation, site of action of insulin and the cardiac glycosides, using I-131 and C-14 labeling, effects of insulin on the glucose oxidation in mammalian erythrocytes, and related experiments. Effects of insulin on potassium transfer in muscle will be studied with respect to ion transfer and using K-42, particularly to lead to a better understanding of the action of digoxin, deslanoside and ouabain, etc. In some of this work autoradiographic methods will be used.

2. BUDGET

a. Outline of Cost Estimates:

|   |            |                   |
|---|------------|-------------------|
| (1) <u>Salaries and Wages:</u>                      |            | \$10,900.00       |
| Dr. C. L. Gemmill (1/10 of time)                    | \$1,500.00 |                   |
| Dr. D.R.H. Courley (1/2 of time)                    | 4,800.00   |                   |
| Research Technician                                 | 3,600.00   |                   |
| Secretarial and Janitorial Aid                      | 1,000.00   |                   |
| (2) <u>Equipment:</u>                               |            | 3,300.00          |
| (3) <u>Travel:</u>                                  |            | 400.00            |
| (4) <u>Overhead</u> (38.34% of Salaries and Wages): |            | <u>4,179.00</u>   |
|   |            | Total \$18,779.00 |

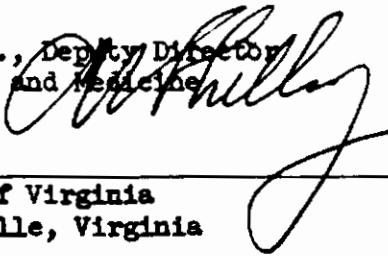
b. Items of property to be procured or manufactured by the Contractor, or to be furnished by the Government, title to which will vest or remain in the Government (see Article V): None

UNITED STATES ATOMIC ENERGY COMMISSION  
**CONTRACT AUTHORIZATION**

2. DATE **DEC 1 1959**

1 TO **S. R. Sapirie, Manager**  
**Oak Ridge Operations Office**

FROM **C. W. Shilling, M.D., Deputy Director**  
**Division of Biology and Medicine**



3. NUMBER  
**BM-60-243**

4.  NEW CONTRACT  
 RENEWAL OF  
  
CONTRACT NO **AT(40-1)263**

5. RESPONSIBLE TECHNICAL REVIEWER  
**John D. Spikes JDS**

6 CONTRACTOR **University of Virginia**  
**Charlottesville, Virginia**

7. PRINCIPAL INVESTIGATOR  
**Chalmers L. Gemmill**

8. DEPARTMENT **Department of Pharmacology**  
**School of Medicine**

9. PROJECT TITLE **"The Metabolic Exchange of Radioactive Isotopes in Isolated Cell Systems"**

10. RECOMMENDED TYPE  
 FIXED PRICE  
 COST REIMBURSEMENT

11. TERM  
**12-1-59 thru 11-30-60**

12. FINANCING  
NEW AEC FUNDS, NOT TO EXCEED . . . \$ **8,089**  
BALANCE FROM PRIOR TERM . . . . . \$  
  
ESTIMATED VOLUNTARY CONTRACTOR CONTRIBUTION . . . . . \$  
  
TOTAL PROJECT . . . . . \$

13. PROPERTY  
TITLE TO VEST IN  AEC  
 CONTRACTOR

14. ALLOTMENT TRANSFER CHARGEABLE

15. BUDGET AND REPORTING CLASSIFICATION  
OPERATING COSTS . . . . . **6330**  
EQUIPMENT COSTS (IF APPLICABLE) . . . . .

16. SECURITY  
WORK TO BE PERFORMED IS UNDER CATEGORY **I**  
AS DEFINED IN AEC MANUAL SECTION 3403. "Q" CLEARANCE IS REQUESTED FOR

17. REMARKS:  
THE TECHNICAL ASPECTS OF THE PROPOSED RESEARCH HAVE BEEN REVIEWED AND ARE APPROVED. A NEED CURRENTLY EXISTS FOR THE RESULTS OF THE RESEARCH THAT IS TO BE UNDERTAKEN. THE BUDGET INCORPORATED IN THE PROPOSAL HAS BEEN REVIEWED AND IS APPROVED EXCEPT AS INDICATED BELOW. NONE OF THE AEC FUNDS SHALL BE USED FOR CONFERRING A FELLOWSHIP. IF RADIOISOTOPES ARE TO BE USED UNDER THE PROVISIONS OF AEC MANUAL 7510, THE SAVINGS SHOULD BE CONSIDERED IN THE NEGOTIATIONS.

**This is the terminal year for this project.**

19. ENCLOSURES

- PROPOSAL DATED **OROO has copies**
- NOTIFICATION LETTER DATED \_\_\_\_\_
- FORM TO BE RETURNED

112205

DEC 3 - 1959

DEPARTMENT OF PHARMACOLOGY  
UNIVERSITY OF VIRGINIA SCHOOL OF MEDICINE  
CHARLOTTESVILLE, VIRGINIA

August 24, 1959

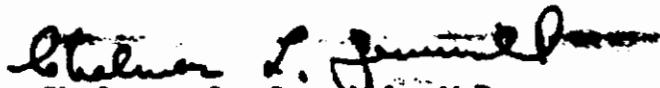
Dr. C. S. Shoup  
Chief, Biology Branch  
Research and Development Division  
Atomic Energy Commission  
Oak Ridge, Tennessee

Dear Dr. Shoup:

On my return from the Physiological Congress in Buenos Aires I found your letter concerning our budget. The difference between the \$18,457.34 and the \$17,731.50 will be accounted for by overhead expenditure during the period July 31, 1959 and November 30, 1959. Would it be possible for you to add under 2B, overhead \$725.84, for this period?

Thanking you for your aid in this matter, I am

Sincerely yours,



Chalmers L. Gemmill, M.D.

Professor of Pharmacology

cms:CLG

Subject: CONTRACT NO. AT-(40-I)-263

CONTRACT-263(49)

1110991

*Renewal Proposal*  
~~Progress Report and Renewal Proposal~~

Contract No. AT-(40-1)-263

Atomic Energy Commission

The Metabolic Exchange of Radioactive Isotopes  
in Isolated Cell Systems

Chalmers L. Gemmill, M.D.

Professor of Pharmacology

Desmond R. H. Gourley, Ph.D.

Associate Professor of Pharmacology

Department of Pharmacology

School of Medicine

University of Virginia

Charlottesville, Virginia

August 1, 1959

1110992

J 7991

## RENEWAL PROPOSAL

It is proposed that the work described in the Progress Report be continued. The total budget for this work is estimated to be \$18,779.00. The contribution to this budget requested from the Atomic Energy Commission is \$8089.00.

Not all of the lines of investigation proposed last year were explored since adequate technical assistance could not be found. A technician, Mr. Lewis Sutor, was obtained during the year and has been training in this laboratory for several months. There is reasonable assurance that Mr. Sutor will be available for this project during the coming year if financial support is granted. In addition a medical student, Mr. C. N. Schubert, has been assigned to this laboratory under a special training program in this Medical School which will permit him to participate in the research program for approximately five months of the coming year. No financial support is being sought for Mr. Schubert from the Atomic Energy Commission.

It is anticipated that the work on inorganic phosphate transfer into erythrocytes proposed last year will be continued. The experiments will be designed to follow the lead that arsenate is a competitive inhibitor and is transported by the same carrier as phosphate. P32 will be used to trace the movement of inorganic phosphate under these conditions. New methods of preparing ghosts of erythrocytes which will actively take up potassium ions have been developed by Hoffman (personal communication). These ghosts are completely free of hemoglobin and presumably contain no cytoplasm so that analysis of phosphate ion uptake in this preparation would provide additional useful information about the reactions occurring at the cell membrane.

The site of action of insulin and the cardiac glycosides in skeletal muscle has still not been conclusively demonstrated. An effort will be made to obtain I<sup>131</sup>-labeled insulin and a C<sup>14</sup>-labelled glycoside in the hope of preparing radioautographs of sections of frog muscle which would show whether these drugs are penetrating the tissue or exerting their effects at the fiber surface. We have previously made radioautographs of P<sup>32</sup>-labeled erythrocytes so that the facilities for such a study are available.

The results of the insulin stimulation of the oxygen consumption of frog muscles in the presence of glucose might be explainable in terms of an effect on the glucose oxidative pathway of metabolism. Recently it has been shown that the oxygen consumption of mammalian erythrocytes in the presence of methylene blue is due to glucose oxidation via this pathway. It is proposed to determine the effect of

insulin on this system to test this hypothesis although to date insulin has not been found to alter any aspect of erythrocyte metabolism.

The results recently obtained with digoxin, deslanoside and ouabain, as well as some earlier observations on the effect of insulin on potassium transfer in muscle, clearly indicate the desirability of obtaining rates of influx and efflux of this ion. This can only be done with  $K^{42}$  and the facilities for such studies are already available. It is hoped that a major portion of the time available can be devoted to this study and that it will lead to a better understanding of the locus of action of these drugs.

## 2. Expenditure Statement:

|  |         |                |
|--|---------|----------------|
| Contribution of AEC  |         | 4705.67        |
| Contribution of University of Va.                              |         |                |
| Salary of Dr. C. L. Gemmill for 8 months<br>(1/10 of salary)   | 1000.00 |                |
| Salary of Dr. D. R. H. Gourley for<br>8 months (1/2 of salary) | 3200.00 |                |
| Salary of Mr. Sutor  | 2328.00 |                |
| Secretarial and Janitorial Aid                                 | 656.00  | <u>7184.00</u> |
| Total expenditure to July 31, 1959                             |         | 11889.67       |

## 2B. Estimate of Costs for Remainder of Contract Period

|   |         |                |
|---|---------|----------------|
| Salaries                                | 3300.00 |                |
| Equipment                               | 2097.83 |                |
| Secretarial and Janitorial Aid          | 444.00  | <u>5841.83</u> |
| Total expenditures by November 30, 1959 |         | 17731.50       |

3. The funds available for the proposed period (Dec. 1, 1959 to Nov. 30, 1960) will be the contribution of the University of Virginia for this period, \$10,690.00.

4. Ten-Percent Voucher: To be prepared by office of comptroller.

5. Incident Report: No incidents have occurred as listed in Attachment "A".

6. No isotopes were purchased during this period of the contract on the AEC Discount Plan.

## 3. Budget for period Dec. , 1959 to Nov. 30, 1960

## A. Outline of Cost Estimates:

## 1. Salaries and Wages

|                                  |            |
|----------------------------------|------------|
| Dr. C. L. Gemmill (1/10 of time) | \$ 1500.00 |
|----------------------------------|------------|

|                                    |         |
|------------------------------------|---------|
| Dr. D. R. H. Gourley (1/2 of time) | 4800.00 |
|------------------------------------|---------|

|                     |         |
|---------------------|---------|
| Research Technician | 3600.00 |
|---------------------|---------|

|                                |         |
|--------------------------------|---------|
| Secretarial and Janitorial Aid | 1000.00 |
|--------------------------------|---------|

|              |         |
|--------------|---------|
| 2. Equipment | 3300.00 |
|--------------|---------|

|           |        |
|-----------|--------|
| 3. Travel | 400.00 |
|-----------|--------|

|                                  |                |
|----------------------------------|----------------|
| 4. Overhead (38.34% of Salaries) | <u>4179.00</u> |
|----------------------------------|----------------|

|       |            |
|-------|------------|
| TOTAL | \$18779.00 |
|-------|------------|

-----

|   |            |
|---|------------|
| The requested AEC contribution to the above budget is | \$ 8089.00 |
|---|------------|

|  |                   |
|--|-------------------|
| Contribution of University of Virginia | <u>\$10690.00</u> |
|--|-------------------|

|       |            |
|-------|------------|
| TOTAL | \$18779.00 |
|-------|------------|

## EXPENDITURES

from Dec. 31, 1958 to July 31, 1959

on Contract No. AT-(40-1)-263

from Contribution of AEC

|  |                     |               |
|--|---------------------|---------------|
| Dec. 31, 1958  | Personnel           | 276.00        |
|  | Will Corp.          | 60.64         |
|  | Union Carbide       | 27.00         |
|  | Sargent & Co.       | 8.10          |
|  | Will Corp.          | 20.20         |
|  | Beckman             | 99.80         |
| Jan. 31, 1959  | Personnel           | 276.00        |
|  | Univ. of Va.        | 1055.00       |
|  | Va. Radio Supply    | 7.32          |
|  | Will Corp.          | 71.25         |
|  | Fisher              | 3.43          |
|  | Greiner             | 397.50        |
|  | Will Corp.          | 3.63          |
|  | Sears               | 13.95         |
|  | Soc. for Exp. Biol. | 33.85         |
|  | Treas. of Va.       | 14.93         |
| Feb. 28, 1959  | Personnel           | 276.00        |
|  | Steinhilber         | 4.75          |
|  | Sargent             | 5.70          |
|  | Fisher              | 10.30         |
|  | Steinhilber         | 4.75          |
|  | Thomas              | 15.82         |
| Mar. 30, 1959  | Will Corp.          | 9.25          |
| Apr. 30, 1959  | Personnel           | 300.00        |
|  | Personnel           | 300.00        |
|  | D.R.H. Gourley      | 109.42        |
|  | Beckman             | 152.40        |
|  | Will Corp.          | 44.00         |
|  | Will Corp.          | 19.50         |
|  | Will Corp.          | 9.00          |
|  | Will Corp.          | 40.00         |
|  | Will Corp.          | 40.00         |
|  | Treas. of Va.       | 21.30         |
| May 30, 1959   | Personnel           | 300.00        |
|  | Sou. Oxygen         | 13.55         |
| June 30, 1959  | Personnel           | 300.00        |
|  | Will Corp.          | 28.34         |
|  | Will Corp.          | 5.36          |
|  | Greiner             | 17.55         |
| July 31, 1959  | Personnel           | <u>300.00</u> |
| Contribution of AEC of Expenditures to July 31, 1959 |                     | 4705.67       |

1110997

TO : Addressees Listed Below

DATE: December 11, 1958

FROM : John R. Moore, Director, Contract Division

SUBJECT: CONTRACTUAL DOCUMENTS FOR REVIEW, COMMENTS AND INITIALING

The document(s) listed below are forwarded for your review, comments and initials. Upon completion of your review, please attach your comments, if any, and forward to next in turn. Expeditious handling of this matter will be appreciated.

Modification 10 to Contract AT-(10-1)-263 with the University of Virginia

| Addressees:                   | Division:                  | Initialed         | Date:               | Remarks:  |
|-------------------------------|----------------------------|-------------------|---------------------|---|
| 1. <del>B. C. Humphreys</del> | <del>Contract</del>        | <del>CSA</del>    | <del>12/11/58</del> |   |
| 2. A. E. Miller               | Budget                     | R.L.M.            | 12/11/58            | 06-91-91(24)1   |
| 3. <del>J.O.S. Shoua</del>    | <del>Res. &amp; Dev.</del> | <del>CSB</del>    | <del>12-11-58</del> |   |
| 4. <del>L. D. Mackay</del>    | <del>Finance</del>         | Sh                | 12/9/58             | Alice - Change to<br>refer to subsection<br>11. However the sub-<br>section is listed as<br>b.<br>I suppose this was<br>typed before I sent<br>you the General<br>No machine certified<br>Tel: 1179 |
| 5.                            |                            |                   |                     |   |
| 6.                            |                            |                   |                     |   |
| RETURN TO:<br>Alice Brown     |                            | Contract Division |                     |   |

Revised - 12/22/58  
AKB

To Contractor  
12-22-58

1110998

1. TO: J. R. Moore Chairman  
Contract Board. From: Res. & Dev. Div.

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:

2. Nature of Action Requested

- Selection of New Contractor and Negotiation of Contract.
- Modification of Contract  
No. AT-(10-1)-263  
Contractor: University of Virginia  
Charlottesville, Virginia
- Review and approval of Contract, Sub-contract or Purchase Order.  
Number: \_\_\_\_\_  
Name: \_\_\_\_\_
- Other (Explain) \_\_\_\_\_

3. Nature of Services to be Covered by Contract

Construction  Architect-Engineer  Other  (Explain) Research

4. Funding

Amount to be Obligated by this Contract Action \$8,089.00

Source of Funds

Approved ORO Financial Plan, \_\_\_\_\_ Quarter, Fiscal Year 19\_\_

Project No. \_\_\_\_\_ or, Activity No. 6330

Funds to be Obligated: Allotment No. 26-91-91(29) F.Y. 1959 Funds)

Procurement Directive No. BM-59-222 Dated 11-21-58

Issuing Office Dir. of Biology & Medicine

Concurrence in Funding Statement: (signed) \_\_\_\_\_

*A. Miller*

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)

UNIVERSITY OF VIRGINIA  
SCHOOL OF MEDICINE  
DEPARTMENT OF PHARMACOLOGY  
CHARLOTTESVILLE, VIRGINIA.

Contract no. AT-(40-1)-263

Chalmers L. Gessell, M.D.  
Professor of Pharmacology,  
Project Leader.

THE METABOLIC EXCHANGE OF RADIOACTIVE ISOTOPES  
IN ISOLATED CELL SYSTEMS

Resume'

The Contractor will continue studies of metabolic exchange in isolated cell systems to include completion of earlier experiments in this area of study, particularly metabolic interchanges at cell membranes, transport of arsenate and Phosphorus-32 labeled phosphates, concentration effects, the phosphorus carrier, effects of pH, role of APT, presence of APT in ghosts of erythrocytes, role and movement of potassium, utilizing Potassium-42 if possible, gain and loss of muscle potassium, effects of ouabain to separate effects of insulin on lactate oxidation and potassium uptake, and possibly the potassium turnover rates in muscle.

C. S. Shoup

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Budget for Contract No. AT-(40-1)-263

12-1-58 - 11-30-59

|   |            |                 |
|---|------------|-----------------|
| (1) <u>Salaries and Wages:</u>                        |            | \$10,550.00     |
| Dr. C. L. Gemmill (1/10 of time)                      | \$1,500.00 |                 |
| Dr. D. R. H. Gourley (1/2 of time)                    | 4,750.00   |                 |
| Research Technician                                   | 3,300.00   |                 |
| Secretarial and Janitorial Aid                        | 1,000.00   |                 |
| (2) <u>Equipment:</u>                                 |            | 3,300.00        |
| (3) <u>Travel:</u>                                    |            | 400.00          |
| (4) <u>Overhead (39.88% of Salaries &amp; Wages):</u> |            | <u>4,207.34</u> |
|   | TOTAL      | \$18,457.34     |

The AEC's contribution to the above budget will be

<sup>18 457 34</sup>  
\$8,089.

1. 368 34

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UNITED STATES ATOMIC ENERGY COMMISSION  
WASHINGTON, D. C.

Contract Authorization No. BV-59-222

TO : S. R. Espirle, Manager  
Oak Ridge Operations Office

NOV 21 1958

FROM : C. W. Shilling, M.D., Deputy Director  
Division of Biology and Medicine

SUBJECT : FUND AUTHORIZATION AND TRANSMITTAL OF RESEARCH PROPOSAL FOR  
CONTRACT NEGOTIATION

REFERENCE : AEC 102/16 APPROVED OCTOBER 7, 1953, AS IMPLEMENTED BY MEMORANDUM  
TO MANAGERS, OPERATIONS OFFICES, DATED OCTOBER 23, 1953, JOINTLY  
SIGNED BY THE DIRECTORS OF THE DIVISIONS OF RESEARCH AND BIOLOGY  
AND MEDICINE.

SYMBOL : BMB:JLL

The research proposal described below has been approved by the  
Division of Biology and Medicine, funds are available, and you  
are authorized and requested to negotiate a contract in  
accordance with the following terms and conditions:

1. Institution: University of Virginia--School of Medicine
2. Investigator (s): Dr. C. L. Gemmill
3. Title: "The Metabolic Exchange of Radioactive Isotopes  
in Isolated Cell Systems"
4. ( ) New Contract, (x) Renewal of Contract No. AI(40-1)263
5. Duration: 12-1-58 thru 11-30-59
6. AEC Technical Representative: Dr. James E. Liverman
7. Funds are authorized for the obligation of this contract  
as follows:

| <u>Allotment No.</u> | <u>Budget</u>     |                   | <u>Amount</u>      |                   |
|----------------------|-------------------|-------------------|--------------------|-------------------|
|                      | <u>Category</u>   | <u>Previous</u>   | <u>This Action</u> | <u>Total</u>      |
| <u>06-91-91(24)</u>  | <u>6330</u>       | <u>          </u> | <u>\$8,089</u>     | <u>\$8,089</u>    |
| <u>          </u>    | <u>          </u> | <u>          </u> | <u>          </u>  | <u>          </u> |
| <u>          </u>    | <u>          </u> | <u>          </u> | <u>          </u>  | <u>          </u> |

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8. It is suggested that in the best interests of the government the following type contract be negotiated: Lump sum
9. It is requested that the title to any capital equipment procured under this contract shall be vested with:  

the contractor;       the government.
10. If radioisotopes are to be used in this research, it is requested that the savings available to the contractor under the Radioisotope Research Support Program (Ref. AEC Manual Chapter 7510) be considered in the negotiation of the amount to be funded under this contract.
11. Other comments: Request has been made for reprints of publications which have been made possible by this contract, and at the time of submission of next year's renewal proposal it is requested that investigator give a brief summation of the work accomplished during the past five years including list of publications, number of graduate students trained and the talks at scientific meetings.
12. Security Requirements:

In accordance with the provisions of Chapter 3403 of the AEC Manual and the requirements of the Declassification Guide, it has been determined that the following security precautions should be taken in connection with the proposed research contract:

Since there is essentially no chance for the development of restricted data, this project has been placed in Category I as defined in Chapter 3403 of the AEC Manual.

13. Reports:  Reports are to be required as provided for by "Revised Guide for the Submission of Research Proposals" dated February 8, 1954.  

Special reports instructions are as follows:

Enclosures:       "A" - Proposal, dated Received from OROC  
                   "B" - Notification letter, dated NOV 21 1958  
                   "C" - Other correspondence, \_\_\_\_\_ letters

Distribution:

|                               |                                      |
|-------------------------------|--------------------------------------|
| Addressee: Original (w encl.) | Division File: Yellow copy (w encl.) |
| 1st copy (w encl.)            | Pink copy (w/o encl.)                |
| 2nd copy (w encl.)            | Branch File: White copy (w encl.)    |

Program Analysis Branch:  
                  White copy (w/o encl.)

Renewal Proposal and Progress Report

Contract No. AT-(40-1)-263

Atomic Energy Commission

The Metabolic Exchange of Radioactive Isotopes  
in Isolated Cell Systems

Chalmers L. Gemmill, M.D.

Professor of Pharmacology

Desmond R. H. Gourley, Ph.D.

Associate Professor of Pharmacology

Department of Pharmacology

School of Medicine

University of Virginia

Charlottesville, Virginia

August 19, 1958

UNIVERSITY OF VIRGINIA

*David B. Bursar*

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1958 AUG 25 1058

A. Expenditures  
 from Dec. 31, 1957 to July 31, 1958  
 on Contract No. AT-(40-1)-263  
 from Contribution of AEC

|               |   |                        |
|---------------|---|------------------------|
| Dec. 31, 1957 | Personnel   | \$ 250.00              |
|               | Will Corp.  | 5.00                   |
|               | Sigma Chem. Co.   | 1.16                   |
|               | Ch <sup>1</sup> ville Lumber                                | 22.00                  |
|               | Am. Phys. Soc.  | 74.00                  |
| Jan. 31, 1958 | Personnel   | 250.00                 |
|               | Royal McBee Corp.   | 25.72                  |
|               | Va. Carolina Laun.  | 11.69                  |
|               | Tracerlab, Inc.   | 23.40                  |
|               | Sigma Chem. Co.   | 10.44                  |
|               | Atomic Energy News  | 18.00                  |
|               | Will Corp.  | 300.00                 |
|               | Treas. of Va.   | 5.63                   |
| Feb. 28, 1958 | Personnel   | 250.00                 |
|               | Will Corp.  | 31.80                  |
|               | Schaar & Co.  | 58.62                  |
|               | Distillation Pro.   | 10.64                  |
| Mar. 31, 1958 | Personnel   | 250.00                 |
|               | D.R.H. Gourley, travel                                      | 70.89                  |
|               | Union Carbide   | 21.00                  |
|               | Bodine Elec. Co.  | 26.78                  |
|               | Will Corp.  | 4.13                   |
|               | Beckman   | 62.19                  |
|               | Delmar Scien.   | 490.25                 |
|               | Murphy Ins. & Trav.   | 1.86                   |
| Apr. 30, 1958 | Personnel   | 250.00                 |
|               | D.R.H. Gourley, travel                                      | 81.08                  |
|               | Tracerlab, Inc.   | 13.92                  |
|               | Tracerlab, Inc.   | 23.40                  |
|               | Steinhilber   | 4.75                   |
|               | Union Carbide   | 21.00                  |
|               | Treas. of Va.   | 16.88                  |
| May 31, 1958  | Am. Phys. Soc.  | 69.50                  |
|               | D.R.H. Gourley, travel                                      | 20.41                  |
|               | Personnel   | 250.00                 |
| June 30, 1958 | Personnel   | 114.95                 |
|               | D.R.H. Gourley, travel                                      | 21.50                  |
|               | D.R.H. Gourley, travel                                      | 134.30                 |
|               | Univ. of Va.  | 1047.00                |
| July 31, 1958 | Union Carbide   | 21.00                  |
|               | Treas. of Va.   | 13.84                  |
|               | <b>Contribution of AEC of Expenditures to July 31, 1958</b> | <b><u>64278.73</u></b> |

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2. Expenditure Statement:

|   |         |                |
|---|---------|----------------|
| Contribution of AEC   |         | 4378.73        |
| Contribution of University of Va.                             |         |                |
| Salary of Dr. C. L. Gemmill for 8 months<br>(1/10 of total)   | 800.00  |                |
| Salary of Dr. D. R. H. Gourley for 8 months<br>(1/2 of total) | 3200.00 |                |
| Secretarial and Janitorial Aid                                | 656.00  | <u>4656.00</u> |
| Total expenditure to July 31, 1958                            |         | 9034.73        |

B. Estimate of Costs for Remainder of Contract Period

(Aug. 1, 1958 to Nov. 30, 1958) from AEC contribution

|                                    |         |         |
|------------------------------------|---------|---------|
| Salary of technician               | 1200.00 |         |
| Equipment                          | 2114.27 |         |
| Overhead on Salaries (33 per cent) | 396.00  | 3710.27 |

From University of Virginia contribution

|                             |         |                |
|-----------------------------|---------|----------------|
| Salaries                    | 3000.00 |                |
| Equipment                   | 943.15  |                |
| Overhead on Salaries        | 900.00  | <u>4843.15</u> |
| Total possible expenditures |         | 17588.15       |

C. These funds are available for financing the project during the period of performance terminating November 30, 1958.

3. Renewal Proposal for period December 1, 1958 to November 30, 1959

Outline of Cost Estimates

|  |              |             |
|--|--------------|-------------|
| 1. Salaries and wages  |              |             |
| Dr. C. L. Gemmill (1/10 of time)                             | 1500.00      |             |
| Dr. D. R. H. Gourley (1/2 of time)                           | 4750.00      |             |
| Technician   | 3300.00(AEC) |             |
| Secretarial and Janitorial Aid                               | 1000.00      |             |
| Total for Salaries   |              | 10550.00    |
| 2. Equipment   |              | 3300.00 AEC |
| 3. Travel  |              | 400.00 AEC  |
| 4. Overhead and Indirect Costs                               |              | 3481.50     |
| (33% of salaries and wages)                                  |              |             |
| (1089.00 AEC)  |              |             |
|  | Total Cost   | 17731.50    |
| The requested AEC contribution to the above budget will be - |              | 8089.00     |

4. Ten-per cent Voucher: To be prepared by Office of Comptroller and ~~enclosed~~ *follow*.
5. Incident Report: No incidents have occurred as listed in Attachment "A".
6. No subsidy discount was used this year in the purchase of isotopes. The total cost of isotopes purchased or ordered during the period of this contract will be \$66.00.

## RENEWAL PROPOSAL

It is proposed that the work described in the Progress Report be continued. The total budget for this work is estimated to be \$17588.15. The contribution to this budget requested from the Atomic Energy Commission is \$8089.00.

Several of the lines of investigation described in the Progress Report are as yet incomplete but appear to be worth following further. It is proposed to continue the work along the same lines in an effort to gain more information about metabolic interchanges at cell membranes and the effects of drugs on such reactions. For example, now that it is known that arsenate is transported into the erythrocyte by the same process as phosphate, it is proposed that a study of the  $P^{32}$  uptake rate be made in various concentrations of arsenate and thus obtain a competition reciprocal curve. If this is different from what would be expected if ion passage occurred by diffusion only, it will strengthen our working hypothesis that P transfer into erythrocytes is an active process. It will also be of interest to test many other anions in the system already established to determine the specificity of the P carrier.

Efforts to rigidly control the pH of the medium during incubation will be continued. With the imidazole buffer now in use it may be possible to measure the actual number of P ions transferred per molecule of glucose utilized.

The hypothesis that ATP is the carrier for P through the erythrocyte membrane needs further confirmation. In the proposed experiments with arsenate above it might be profitable to look for the formation of adenosine triarsenate by means of paper chromatography. In a preliminary experiment in this laboratory some years ago erythrocyte ghosts were prepared which appeared to lack the ability of intact erythrocytes to control the influx of P. If this can be repeated it would be interesting to know whether these ghosts contain ATP. It is hoped that the experiments described in the Progress Report in which the apyrase activity was modified with molybdate or magnesium can be extended to determine whether there is a relationship between apyrase activity and P transfer.

At the present time our work on the potassium movement from muscles is based upon measurements of K in the medium surrounding the muscles. Comparisons of such data from different experiments are limited because the precise relative gain or loss of the Muscle K is not known. Before any further work is attempted in this area efforts will be made to develop

a method whereby the initial muscle K can be determined. It may be that there is another muscle in the frog leg which has the same K content as the muscles now being used and, if such a muscle can be found, it can be used to determine the initial K content.

It is anticipated that the use of ouabain to separate the effects of insulin on lactate oxidation and K uptake at the surface of frog muscles will be extended. Efforts will also be directed to determining why the net loss of muscle K is greater in the presence of both ouabain and insulin than in the presence of ouabain alone.

As in the past year these proposals require the use of radioactive isotopes, particularly  $P^{32}$ .  $K^{42}$  may also be used to determine potassium turnover rates if the work on muscle progresses satisfactorily.

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TO : Addressees Listed Below

DATE: December 13, 1957

FROM : John R. Moore, Director, Contract Division

SUBJECT: CONTRACTUAL DOCUMENTS FOR REVIEW, COMMENTS AND INITIALING

The document(s) listed below are forwarded for your review, comments and initials. Upon completion of your review, please attach your comments, if any, and forward to next in turn. Expeditious handling of this matter will be appreciated.

Modification 9 to Contract AT-(40-1)-263 with the University of Virginia

| <u>Addressees:</u>   | <u>Division:</u>           | <u>Init:</u>   | <u>Date:</u>        | <u>Remarks:</u> |
|--|----------------------------|----------------|---------------------|-----------------|
| 1. R. G. Humphries   | Contract                   | <i>RBH</i>     | 12/13/57            |                 |
| 2. <del>A. E. Miller</del>                                 | <del>Budget</del>          | <del>APC</del> | <del>12/13/57</del> |                 |
| 3. <del>C. G. Shoup</del>                                  | <del>Rec. &amp; Dev.</del> | <del>SR</del>  | <del>12-17-57</del> |                 |
| 4. L. D. MacKay  | Finance                    | <i>BH</i>      |                     |                 |
| 5.   |                            |                |                     |                 |
| 6.   |                            |                |                     |                 |
| RETURN TO: <input checked="" type="checkbox"/> Alice Brown |                            |                |                     |                 |
| Contract Division  |                            |                | Tel.: 4719          |                 |

*Handwritten notes:*  
10  
12-20-57

*Office Memorandum* • UNITED STATES GOVERNMENT

TO : J. W. Ould, Jr., Assistant General Counsel      DATE: December 5, 1957

FROM : John R. Moore, Director, Contract Division, Col. Ridge Operations

SUBJECT: REQUEST FOR PREPARATION OF MODIFICATION TO CONTRACT AT-(40-1)-263  
WITH UNIVERSITY OF VIRGINIA

SYMBOL: ACD:LM

Please prepare an appropriate modification to the subject contract to provide additional research, completion of which will not be later than November 30, 1958, with an increase in funds in the amount of \$8,028.

Request for Contract Action, which includes the budget breakdown and renewal proposal, is enclosed for your use.

  
John R. Moore

Enclosure:  
Rqst for Cont Action

CC: C. S. Shoup  
L. D. MacKay  
A. Brown

1. TO: J. R. Moore Chairman Contract Board From: Res. Dev. Div.

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:

2. Nature of Action Requested

- Selection of New Contractor and Negotiation of Contract. Modification of Contract No. AT-(40-1)-263 Contractor: University of Virginia Charlottesville, Virginia. Review and approval of Contract, Sub-contract or Purchase Order. Other (Explain)

3. Nature of Services to be Covered by Contract

Construction Architect-Engineer Other (Explain) Research

4. Funding Amount to be Obligated by this Contract Action \$ 5,025.00

Source of Funds

Approved ORO Financial Plan, Quarter, Fiscal Year 19 Project No. or, Activity No. Funds to be Obligated: Allotment No. Procurement Directive No. Issuing Office

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:)

|   |  |
|---|--|
| <p>6. <b>Contract Board Docket</b><br/>         No. _____<br/>         (To be assigned by<br/>         Board Secretary)</p>   | <p>7. <b>Request Submitted By: (signed)</b><br/>         Date: <u>Nov 4</u> 195<u>8</u> Title: <u>C. S. Shoup</u><br/>         C. S. SHOUP<br/>         CHIEF, BIOLOGY BRANCH<br/>         RESEARCH AND DEVELOPMENT DIVISION</p> |
| <p>8. <b>Complete Description of Services to be Furnished by Contractor:</b><br/>         Headquarters designated research contract<br/>         TITLE: "The Metabolic Exchange of Radioactive Isotopes in Isolated<br/>         Cell Systems"<br/>         (If more space is required use separate sheets and attach hereto:)</p>                        |  |
| <p>9. <b>Description of other changes to be covered by Modification:</b><br/>         Modify contract to provide additional research completion of which<br/>         will not be later than November 30, 1958, with new funds in the<br/>         amount of \$8,028.<br/>         (If more space is required use separate sheets and attach hereto:)</p> |  |
| <p>10. <b>Negotiated Contracts.</b> (Show why it appears desirable to negotiate new contract or to negotiate<br/>         modification to existing contract)<br/>         Memorandum from C. W. Shilling to S. R. Sapirie dated November 22, 1957.<br/>         (If more space is required use separate sheets and attach hereto:)</p>                    |  |
| <p>11. <b>Contracts, Subcontracts, or Purchase Orders Submitted for Review and Approval:</b> (Furnish brief descrip-<br/>         tion of action in this space and attach pertinent documents)<br/>         None</p>  |  |
| <p>12. <b>Disputes:</b><br/>         Attach a statement summarizing the dispute together with pertinent documents and Background<br/>         Material.<br/>         None</p>   |  |

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BUDGET FOR CONTRACT NO. AT-(40-1)-263  
 FOR PERIOD 12-1-57 - 11-30-58

|  |                        |             |
|--|------------------------|-------------|
| (1) <u>Salaries and Wages:</u>         |                        | \$10,325.00 |
| Dr. C. L. Gemmill (1/10 of time)       | \$1,275. <sup>00</sup> |             |
| Dr. D. R. H. Gourley (1/2 time)        | 4,750. <sup>00</sup>   |             |
| Research Technician                    | 3,300. <sup>00</sup>   |             |
| Secretary & Janitorial Aid             | 1,000. <sup>00</sup>   |             |
| <br>                                   |                        |             |
| (2) <u>Equipment:</u>                  |                        | 3,300.00    |
| <br>                                   |                        |             |
| (3) <u>Travel:</u>                     |                        | 400.00      |
| <br>                                   |                        |             |
| (4) <u>Overhead (33% of Salaries):</u> |                        | 3,407.25    |
|  |                        | <hr/>       |
|  | TOTAL                  | \$17,432.25 |

The AEC's contribution to the above budget will be \$8,028; the Contractor's contribution will be \$9,343.25; and the unexpended balance is \$61.

8028  
 61  
 8089

9343.25  
 21  
 9000.22

8028  
 61  
 8089  
 9343.25  
 17432.25

UNIVERSITY OF MISSISSIPPI  
DEPARTMENT OF PHYSIOLOGY  
SCHOOL OF MEDICINE  
COLUMBUS, MISSISSIPPI.

CONTRACT NO. AT\*(40-1)-263

Chalmers L. Gemmill, M.D., and  
D.H.R. Gourley, Ph.D.  
Project Leaders.

THE METABOLIC EXCHANGE OF RADIOACTIVE ISOTOPES IN  
ISOLATED CELL SYSTEMS.

Resume'

The Contractor will continue studies involving radioactive isotopes in isolated cell systems, with emphasis on (1) the effect of various ions, pH-control, etc. including ATP and ATPase in causing effects or controlling the phosphate transfer into erythrocytes, and (2) a study of the action of drugs on ion transport into the erythrocyte cell system and across the cell membrane. In this work the radioisotopes Phosphorus-32 and Potassium-42 will be utilized. Attention will be paid to the effect of cardiac glycosides on potassium uptake and transfer in skeletal muscle, in addition to the red cell studies. Action of a proprietary other materials, such as insulin, will be included.

U. S. Star

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UNITED STATES ATOMIC ENERGY COMMISSION  
WASHINGTON, D. C.

Contract Authorization No. BM-58-242

TO : S. R. Sapirie, Manager  
Oak Ridge Operations Office

FROM : C. W. Shilling, M. D., Deputy Director  
Division of Biology and Medicine, Washington

SUBJECT : FUND AUTHORIZATION AND TRANSMITTAL OF RESEARCH PROPOSAL FOR  
CONTRACT NEGOTIATION

REFERENCE : AEC 102/16 APPROVED OCTOBER 7, 1953, AS IMPLEMENTED BY MEMORANDUM  
TO MANAGERS, OPERATIONS OFFICES, DATED OCTOBER 23, 1953, JOINTLY  
SIGNED BY THE DIRECTORS OF THE DIVISIONS OF RESEARCH AND BIOLOGY  
AND MEDICINE.

SYMBOL : BMB:JRT

The research proposal described below has been approved by the  
Division of Biology and Medicine, funds are available, and you  
are authorized and requested to negotiate a contract in  
accordance with the following terms and conditions:

1. Institution: University of Virginia
2. Investigator (s): Dr. Chalmers L. Gemmill
3. Title: The Metabolic Exchange of Radioactive Isotopes in  
Isolated Cell Systems.
4. ( ) New Contract, (x) Renewal of Contract No. AT(40-1)-263
5. Duration: December 1, 1957 thru November 30, 1958
6. AEC Technical Representative: Dr. John R. Totter *JRT*
7. Funds are authorized for the obligation of this contract  
as follows:

| <u>Allotment No.</u> | <u>Budget<br/>Category</u> | <u>Previous</u> | <u>Amount<br/>This Action</u> | <u>Total</u> |
|----------------------|----------------------------|-----------------|-------------------------------|--------------|
| 06-81-91(24)         | 6330                       |                 | \$8,089                       | \$8,089      |
|                      |                            |                 |                               |              |
|                      |                            |                 |                               |              |

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## RENEWAL PROPOSAL

It is proposed that this work be continued with a total budget of \$17,432.25. The requested contribution to this budget from the Atomic Energy Commission is \$8089.00.

Experimental Design: In this laboratory the primary interests are in metabolic interchanges at cell membranes and the effects of drugs on such reactions. It is proposed that the studies under this contract will follow this general line of investigation. The tissues used most frequently for these studies in this laboratory in recent years are red blood cells and isolated intact skeletal muscles. It is expected that during the next year these same tissues will again be used since a considerable background of knowledge about them has accumulated here.

The Effect of Various Ions on Phosphate Transfer into Erythrocytes. This study was initiated during the present contract year and will be continued during the coming year. A number of problems have been met in connection with the studies on the effect of phosphate concentration particularly with reference to pH control and calcium ion concentration. These have been largely resolved but it seems desirable now to study the effect of varying concentrations of calcium ions. It has been noted in previous reports that magnesium and adenosine triphosphate (ATP) may combine with inorganic phosphate to form a complex which penetrates the erythrocyte membrane. An attempt will be made to determine the optimal ratio of magnesium, inorganic phosphate and ATP for maximal phosphate transfer. In order to do this it may be necessary to inhibit the ATPase which is active at the external surface of erythrocytes. It is expected that this may be possible with molybdate or tungstate.

In a previous study of phosphate transfer in chicken erythrocytes (now in press in the American Journal of Physiology) interesting results were obtained with arsenate. Arsenate increased the requirement of the cells for glucose presumably because the supply of energy from oxidative sources was inhibited and decreased phosphate transfer. Arsenate may compete with phosphate ions for the sites of transfer in the cell membrane and, if so, a study of the effects of arsenate may lead to more information about these sites.

The Effect of Drugs on Ion Transport. Recently it has been found that the cardiac glycoside compounds inhibit active transport of potassium ions into erythrocytes by competition with potassium for the sites of transport. The cardiac glycosides thus emerge as the only substances, apart from the metallic cations, which act on the carrier system. There have been numerous suggestions in the literature that the uptake of potassium ions by cells is linked to the uptake of phosphate ions. It is hoped that the use of the cardiac glycosides in a study of phosphate transfer will show whether or not the same carrier system is involved in transferring the two different ions in erythrocytes.

It has been shown previously in this laboratory that the sites for potassium transfer in intact frog muscle can be rapidly saturated with insulin in vitro (now in press in the American Journal of Physiology). In this tissue the effect of insulin on the potassium transfer sites is to

increase the turnover of potassium at the site. Experiments are planned to test the effects of the cardiac glycosides on potassium uptake in frog muscle since it is not known with certainty whether the cation transport mechanism in red cells is similar in detail to that in skeletal muscle. If the cardiac glycosides do compete for the sites of potassium transport in frog muscle this study will be extended to determine whether previous binding of insulin to these sites prevents the action of the glycosides.

Conversely, it would be of great interest to determine whether insulin influences potassium transport in red blood cells. If the carrier mechanism for potassium is similar in the two tissues the insulin effect should be observed in red cells also. Such a finding would strengthen our present belief that the effect of insulin on lactate oxidation is independent of the effect on potassium transport in frog muscle since human erythrocytes can not oxidise lactate but obtain all of their energy from anaerobic glycolysis of glucose.

The studies outlined in this proposal will utilise radioactive isotopes when it is advantageous.  $P^{32}$  is already in use in the phosphate transfer studies and  $K^{42}$  will be used to determine potassium turnover rates if the cardiac glycoside and insulin proposals prove sufficiently interesting to warrant further study.

Approved

D. McIntosh

Comptroller

2. EXPENDITURES FOR THE PERIOD

DECEMBER 1, 1956 - JULY 31, 1957.

FROM CONTRIBUTION OF AEC

|                               |                         |         |
|-------------------------------|-------------------------|---------|
| Dec. 31, 1956                 | Personnel               | 225.00  |
|                               | Will Corp.              | 32.43   |
|                               | Steinhilber & Co.       | 5.37    |
|                               | Amer. Instn. Co.        | 21.92   |
|                               | Div. of Med. Illns.     | 24.00   |
| Jan. 31, 1957                 | Personnel               | 225.00  |
|                               | Fisher Scien. Co.       | 105.00  |
|                               | Union Carbide           | 12.20   |
|                               | Will Corp.              | 12.00   |
|                               | Treas. of Va.           | 13.50   |
| Feb. 28, 1957                 | Personnel               | 250.00  |
|                               | Univ. of Va.            | 2.19    |
|                               | Univ. of Va.            | .50     |
|                               | Univ. of Va.            | 6.24    |
|                               | Univ. of Va.            | 6.59    |
|                               | Arthur Thomas Co.       | 467.50  |
|                               | Synthetical Lab.        | 181.22  |
|                               | Scien. Pro. Div.        | 340.00  |
| Kinsman Optical Co.           | 650.00                  |         |
| Mar. 31, 1957                 | Personnel               | 250.00  |
|                               | Univ. of Va.            | .65     |
|                               | Univ. of Va. (overhead) | 802.75* |
|                               | Univ. of Va.            | .35     |
|                               | Arthur Thomas Co.       | 13.50   |
|                               | Arthur Thomas Co.       | 32.30   |
|                               | Steinhilber & Co.       | 5.99    |
|                               | Arthur Thomas Co.       | 34.88   |
|                               | Univ. of Va.            | 1.88    |
|                               | Univ. of Va.            | 1.15    |
| Murphy Ins. & Trav.           | 6.80                    |         |
| Apr. 30, 1957                 | Personnel               | 250.00  |
|                               | D.R.H. Gourley, travel  | 154.39  |
|                               | Sears Roebuck & Co.     | 19.90   |
|                               | Arthur Thomas Co.       | 69.92   |
|                               | Ch'ville Coop.          | 22.66   |
|                               | Arthur Thomas Co.       | 146.80  |
|                               | Treas. of Va.           | 16.31   |
| Credit - Murphy Travel & Ins. | - 3.29                  |         |
| May 31, 1957                  | Personnel               | 250.00  |
|                               | D.R.H. Gourley, travel  | 15.70   |

\* Based on 15% of total expenditures for the period Dec. 1, 1956 - July 31, 1957.

|  |                     |              |
|--|---------------------|--------------|
| June 30, 1957  | Personnel           | 125.00       |
|  | Patent Lab. Div.    | 18.00        |
| July 31, 1957  | Worthington Etc.    | 20.00        |
|  | Distillation Pro.   | 3.38         |
|  | Sigma Chemical Co.  | 5.50         |
|  | G.R. Morris         | 1200.00      |
|  | Lexington Fund Inc. | 23.40        |
|  | Lexington Fund Inc. | 58.50        |
|  | Va. Radio Supply    | 7.21         |
|  | Va. Radio Supply    | 6.04         |
|  | Treas. of Va.       | <u>14.06</u> |
| Contribution of AEC of Expenditures to July 31, 1957 |                     | \$6154.39    |

2. Expenditure Statement:

|  |                |
|--|----------------|
| Contribution of AEC  | \$6154.39      |
| Contribution of University of Virginia                         |                |
| Salary C. L. Gemmill for 8 months (1/10 of total)              | 800.00         |
| Salary of Dr. D. R. H. Gourley for 8 months,<br>(1/2 of total) | 2528.00        |
| Secretarial and Janitorial Aid                                 | <u>66.00</u>   |
| Total for salaries -   | <u>3984.00</u> |
| Total expenditure to July 31, 1957 -                           | \$10138.39     |

B. 1. Cost of Project to Date \$10138.39

2. Estimate of costs for the remainder of contract period.

|                                    |                |
|------------------------------------|----------------|
| Salaries                           | 3572.00        |
| Equipment                          | 2700.00        |
| Overhead on salaries (33 per cent) | 1178.76        |
|                                    | <u>7450.76</u> |

Total expenditures by November 30, 1957 \$17589.15

C. These funds are available for financing the project during the period of performance.

3. Renewal Proposal for period December 1, 1957 to November 30, 1958.

Outline of Cost Estimates.

1. Salaries and wages

|                                    |               |
|------------------------------------|---------------|
| Dr. C. L. Gemmill (1/10 of time)   | \$1275.00     |
| Dr. D. R. H. Gourley (1/2 of time) | 4750.00       |
| Technician                         | 3300.00 (AEC) |
| Secretarial and Janitorial Aid     | 1000.00       |

|                    |                                |            |
|--------------------|--------------------------------|------------|
| Total for salaries | <i>Buckman Regulator #1000</i> | \$10325.00 |
|--------------------|--------------------------------|------------|

|               |  |               |
|---------------|--|---------------|
| 2. Equipment: |  | 3300.00 (AEC) |
|---------------|--|---------------|

|           |  |              |
|-----------|--|--------------|
| 3. Travel |  | 400.00 (AEC) |
|-----------|--|--------------|

|   |  |                |
|---|--|----------------|
| 4. Overhead and Indirect Costs (33% of salaries and wages)<br>( \$1089.00 (AEC) ) |  | <u>3607.25</u> |
|---|--|----------------|

Total Cost \$17432.25

The requested AEC contribution to the above budget will be - \$8089.00

4. Ten-Per cent Voucher: To be prepared by office of Comptroller.
5. Incident Report: No incidents have occurred as listed in Attachment "A".
6. 50 millicuries of P-32-P1 were obtained during the current year.  
This amount of radioisotopes were shipped in five shipments.

|  |             |
|--|-------------|
| The cost of 10 millicuries of Radioactive P32 P1 | \$11.00     |
| Less subsidy                                     | <u>8.80</u> |
| Actual Cost per 10 millicuries                   | \$ 2.20     |

Two more shipments will arrive during the period of the contract making seven in all.

|  |              |
|--|--------------|
| Total contract cost established by AEC for 70 mc P32 | \$77.00      |
| Actual Cost using discount                           | <u>15.40</u> |
| Saving realized                                      | \$61.60      |

TO : Addressees Listed Below

DATE: June 13, 1957

FROM : John R. Moore, Director, Contract Division

SUBJECT: CONTRACTUAL DOCUMENTS FOR REVIEW, COMMENTS AND INITIALING

The document(s) listed below are forwarded for your review, comments and initials. Upon completion of your review, please attach your comments, if any, and forward to next in turn. Expeditious handling of this matter will be appreciated.

Modification 2 to Contract AF-(LC-1)-263 with the University of Virginia

| Addressees:                 | Division:           | Initia        | Date:   | Remarks:           |
|-----------------------------|---------------------|---------------|---------|--------------------|
| 1. <del>A. C. Hammett</del> | <del>Contract</del> | <del>AM</del> | 6/13/57 |                    |
| 2. <del>A. E. Miller</del>  | Budget              | AM            | 6-13-57 | 06-71-91(24) Funds |
| 3. C. S. Shoup              | Res. & Dev.         | SR            | 6-13    |                    |
| 4. L. P. MacKay             | Finance             | AM            |         |                    |
| 5.                          |                     |               |         |                    |
| 6.                          |                     |               |         |                    |

RETURN TO: Alice Brown Contract Division Tel.: 1-770

## Office Memorandum • UNITED STATES GOVERNMENT

TO : J. W. Cuid, Jr., Assistant General Counsel

DATE: June 7, 1957

FROM : John R. Moore, Director, Contract Division

SUBJECT: REQUEST FOR MODIFICATION TO CONTRACT NO. AT-(40-1)-263 WITH  
UNIVERSITY OF VIRGINIA, CHARLOTTESVILLE, VIRGINIA

SYMBOL: ACD:DS

Please prepare an appropriate modification to the subject contract to provide for an additional contribution by the Commission in the amount of \$1,800, and an additional contribution by the Contractor amounting to \$594.00. The budget for the current period should be revised to include the additional contributions. There will not be any significant changes in the scope of the work. This contract action is covered by Contract Authorization No. EM-57-57A.

Request for contract action from the Research and Development Division is enclosed for your use.

  
John R. Moore

## Enclosures:

1. Report for Cont. action
2. Budget breakdown
3. Memo fr. wash. 5/9/57 fm Div. of Biology & Medicine
4. Cy of ltr dtd 4/25/57 to JFBonner fr CLGemmill
5. Cy of ltr fr CLGemmill to CSSHoup dtd 5/22/57

CC: C. S. Shoup  
L. D. MacKay  
Alice Brown, w/cy encis 1, 2 & 3

1. TO: J. H. Moore Chairman Contract Board. From: Rec. & Inv. Div.

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-OR-M-19:

2. Nature of Action Requested

[ ] Selection of New Contractor and Negotiation of Contract.

[X] Modification of Contract No. AT-(40-1)-263

Contractor: University of Virginia Charlottesville, Virginia

[ ] 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 [X] (Explain) Research

4. Funding Amount to be Obligated by this Contract Action \$1,800.00

Source of Funds

Approved ORO Financial Plan, Quarter, Fiscal Year 19

Project No. or, Activity No. 6320

Funds to be Obligated: Allotment No. 067491(24) F.Y. 1957 Funds

Procurement Directive No. BM-57-57-2 Dated 5-9-57

Issuing Office: Div. of Biology & Medicine

Concurrence in Funding Statement: (signed)

A. E. Miller

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:)

6. Contract Board Docket  
No. \_\_\_\_\_  
(To be assigned by  
Board Secretary)

7. Request Submitted By: (signed) C. S. Shoup  
Date MAY 31 1957 Title: \_\_\_\_\_

C. S. SHOUP  
CELL BIOLOGY BRANCH  
RESEARCH AND DEVELOPMENT DIVISION

8. Complete Description of Services to be Furnished by Contractor:

Headquarters designated research contract

TITLE: "The Metabolic Exchange of Radioactive Isotopes in Isolated  
Cell Systems"

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

9. Description of other changes to be covered by Modification:

Modify contract to provide for an additional contribution by the AEC in the amount of \$1,800 and an additional contribution by the Contractor amounting to \$594. The budget for the current period should be revised to include the additional contributions. There will not be any significant changes in the scope of the work.

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

10. Negotiated Contracts. (Show why it appears desirable to negotiate new contract or to negotiate modification to existing contract)

Memorandum from Charles W. Shilling to S. R. Sapirie, dated May 9, 1957.

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

11. Contracts, Subcontracts, or Purchase Orders Submitted for Review and Approval: (Furnish brief description of action in this space and attach pertinent documents)

None

12. Disputes:

Attach a statement summarizing the dispute together with pertinent documents and Background Material.

None

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The budget should be revised to read as follows:

BUDGET FOR CONTRACT NO. AT-(40-1)-263  
FOR PERIOD 12-1-56 - 11-30-57

|   |            |                      |
|---|------------|----------------------|
| (1) <u>Salaries and Wages:</u>                                      |            | \$10,600.00          |
| Dr. C. L. Gemmill (1/10 of time)                                    | \$1,200.00 |                      |
| Research Associates   | 5,400.00   |                      |
| Technician  | 3,000.00   |                      |
| Secretarial and Janitorial Aid                                      | 1,000.00   |                      |
| (2) <u>Equipment:</u>   |            | 3,100.00             |
| (3) <u>Travel:</u>  |            | 400.00               |
| (4) <u>Overhead and Indirect Costs (33% of Salaries and Wages):</u> |            | 3,498.00             |
|   | TOTAL      | <u>\$17,598.00</u> " |

The AEC's contribution to the above budget will be \$8,820.

UNITED STATES ATOMIC ENERGY COMMISSION  
WASHINGTON, D. C.

Contract Authorization No. EM-57-57A

MAY 9 1957

TO : S. R. Sapirie, Manager  
Oak Ridge Operations Office

FROM : Charles W. Shilling, M. D., Deputy Director  
Division of Biology and Medicine, Washington

SUBJECT : FUND AUTHORIZATION AND TRANSMITTAL OF RESEARCH PROPOSAL FOR  
CONTRACT NEGOTIATION

REFERENCE : AEC 102/16 APPROVED OCTOBER 7, 1953, AS IMPLEMENTED BY MEMORANDUM  
TO MANAGERS, OPERATIONS OFFICES, DATED OCTOBER 23, 1953, JOINTLY  
SIGNED BY THE DIRECTORS OF THE DIVISIONS OF RESEARCH AND BIOLOGY  
AND MEDICINE.

SYMBOL : **EM:JFB**

The research proposal described below has been approved by the  
Division of Biology and Medicine, funds are available, and you  
are authorized and requested to negotiate a contract in  
accordance with the following terms and conditions:

1. Institution: University of Virginia Medical School
2. Investigator (s): Chalmers L. Gemmill, M. D.
3. Title: "The Metabolic Exchange of Radioactive Isotopes  
in Isolated Cell Systems"

4. ( ) New Contract, (x) Supplement to  
Renewal of Contract No. AT(40-1)263

5. Duration: 12/1/56 through 11/30/57

6. AEC Technical Representative: John F. Bonner *JFB*

7. Funds are authorized for the obligation of this contract  
as follows:

| <u>Allotment No.</u> | <u>Budget<br/>Category</u> | <u>Previous</u> | <u>Amount<br/>This Action</u> | <u>Total</u>    |
|----------------------|----------------------------|-----------------|-------------------------------|-----------------|
| <u>06-71-91 (24)</u> | <u>6320</u>                | <u>\$ 7,020</u> | <u>\$ 1,800</u>               | <u>\$ 8,820</u> |
| _____                | _____                      | _____           | _____                         | _____           |
| _____                | _____                      | _____           | _____                         | _____           |

*2-3*  
MAY 13 1957

1111031

8. It is suggested that in the best interests of the government the following type contract be negotiated: **Lump-sum**
9. It is requested that the title to any capital equipment procured under this contract shall be vested with:
- ✓             the contractor;    ( ) the government.
10. If radioisotopes are to be used in this research, it is requested that the savings available to the contractor under the Radioisotope Research Support Program (Ref. AEC Manual Chapter 7510) be considered in the negotiation of the amount to be funded under this contract.
- ✓
11. Other comments:

12. Security Requirements:

In accordance with the provisions of Chapter 3403 of the AEC Manual and the requirements of the Declassification Guide, it has been determined that the following security precautions should be taken in connection with the proposed research contract:

✓            Since there is essentially no chance for the development of restricted data, this project has been placed in Category I as defined in Chapter 3403 of the AEC Manual.

13. Reports:     Reports are to be required as provided for by "Revised Guide for the Submission of Research Proposals" dated February 8, 1954.

( ) Special reports instructions are as follows:

Enclosures:    ( ) "A" - Proposal, dated \_\_\_\_\_  
                   "B" - Notification letter, dated                     
                   "C" - Other correspondence, one letters

*142 A-4 h/25/57*

April 25, 1957

Dr. John F. Bonner  
Assistant to Chief  
Medical Branch, Div. of Biol. and Med.  
U.S. Atomic Energy Comm.  
Washington 25, D.C.

Reference: BMM:JFB, letter April 18, 1957  
BMD:CWS, letter April 3, 1957

Dear Dr. Bonner:

I would like to ask for a supplement to our Atomic Energy Commission Contract AI(40-1)263 for the purpose of having Dr. G. R. Norris for the period June 5, 1957 until Sept. 5, 1957. He will receive \$1800.00 for this period. Dr. Norris was selected to work with us by the Education Committee of the American Physiological Society.

- (1) Therefore the stipend for Dr. Norris is \$1800.00 for the period June 5, 1957 until Sept. 5, 1957.
- (2) The reason for having Dr. Norris is to aid in the program of the Amer. Physiol. Soc. to give summer research experience to college teachers in physiology and biology.
- (3) Dr. Norris will be associated with Dr. Gourley in his study of (1) the effect of magnesium and other divalent cations on phosphate transfer in erythrocytes and (2) the effect of chlorpromazine and other drugs on phosphate transfer and metabolism of erythrocytes. This program is part of the general program to be carried out under the terms of the A.E.C. Contract with this department.

Thanking you for your help, I am

Sincerely yours,

Chalmers L. Gemmill, M. D.  
Professor of Pharmacology

1111033

DEPARTMENT OF PHARMACOLOGY  
UNIVERSITY OF VIRGINIA SCHOOL OF MEDICINE  
CHARLOTTESVILLE, VIRGINIA

May 22, 1957

Dr. G. S. Shoup  
Chief, Biology Branch  
Research and Development Division  
U. S. Atomic Energy Commission  
Oak Ridge, Tennessee

Ref: CRS: EMM.

Subject: Contract No. AT -(40-1)-263.

*T-3062  
MAY 24 1957*

Dear Dr. Shoup:

I would prefer not to have any overhead involved in the payment of the \$1800. This amount was given to us in order to have a college teacher for the summer, working in our department on the grant. It would be easier not to increase the overhead costs for this item.

Sincerely yours,

*Chalmers L. Gennill*  
Chalmers L. Gennill, M. D.  
Professor of Pharmacology

cmc:CLG.  
1st Endorsement.

1321 MAY 23 10: 44

The University is willing to contribute the \$630 of overhead on the above contract.

*Vincent Shea*  
Vincent Shea, Comptroller

G 4781

1111034

C O P Y

S. R. Sapirie, Manager  
Oak Ridge Operations Office

August 17, 1956

C. W. Shilling, M.D., Deputy Director  
Division of Biology and Medicine

FY 1957 FUND AUTHORIZATION FOR NEGOTIATION OF DBM OFF-SITE CONTRACTS  
FUNDED ON AN INTERIM BASIS DURING FY 1956

SYMBOL: BMP:NFS

For purpose of record this memorandum and the attachment hereto may be identified as contract authorization number EM-57-57.

Reference is made to my memorandum of July 18, 1956, subject as above. The attachment to this memorandum provides a detailed list of the remainder of such contracts funded on an interim basis. Funds for these contracts were included in Advice of Allotment Transferred, issued to your office under Allotment Symbol 06-71-91 (24) on August 10, 1956.

It is requested that your office take such action as may be necessary to extend and supplement each of these contracts for an additional contract period in the amount indicated in the attachment to this memorandum. The attachment includes the FY 1956 contract authorization number for each of these contracts; the Division's intent with respect to the contract period, level of support, and funding will be found in items 5 and 10 of each FY 1956 contract authorization.

There are attached 29 copies of form "Notification of Contract Negotiation" to cover the contracts included in this listing and 3 additional copies of the form for use in reporting negotiation of the contracts listed in the attachment to memorandum CA Number BM 57-17 dated July 18, 1956.

C O P Y

1111035

**FY 1957 FUND AUTHORIZATION FOR NEGOTIATION OF DEM OFF-SITE CONTRACTS FUNDED ON AN INTERIM BASIS DURING  
FY 1956 - A 1ST ALLOTMENT**

Contract Authorization No. EM-57-57

**OAK RIDGE OPERATIONS OFFICE**

| <u>FY 1956<br/>C/A No.</u> | <u>Contractor</u>              | <u>Contract<br/>Number</u> | <u>Effective Date<br/>of New 12<br/>Months Period</u> | <u>Budget<br/>Category</u> | <u>FY 1956<br/>Funds</u> |
|----------------------------|--------------------------------|----------------------------|---|----------------------------|--------------------------|
| 56-345                     | Texas, Univ. of                | 40-1-1323                  | 10/1/56 - 9/30/57                                     | 6130                       | \$ 24,840                |
| 56-348                     | Texas, Univ. of                | 40-1-1649                  | 10/1/56 - 9/30/57                                     | 6130                       | 4,410                    |
| 56-425                     | Texas, Univ. of                | 40-1-1750                  | 10/1/56 - 9/30/57                                     | 6130                       | 6,000                    |
| 56-333                     | Texas, Univ. of                | 40-1-1751                  | 10/1/56 - 9/30/57                                     | 6130                       | 9,000                    |
| 56-301                     | Virginia, Univ. of             | 40-1-2010                  | 10/1/56 - 9/30/57                                     | 6140                       | 6,300                    |
| 56-317                     | Duke University                | 40-1-289                   | 10/1/56 - 9/30/57                                     | 6320                       | 13,000                   |
| 56-299                     | Rice Institute                 | 40-1-284                   | 10/1/56 - 9/30/57                                     | 6330                       | 14,500                   |
| 56-396                     | Southern Res. Institute        | 40-1-1038                  | 10/1/56 - 9/30/57                                     | 6330                       | 10,851                   |
| 56-411                     | Texas, Univ. of                | 40-1-1040                  | 10/1/56 - 9/30/57                                     | 6330                       | 10,203                   |
| 56-385                     | Texas Agric. Exp. Station      | 40-1-1758                  | 10/1/56 - 9/30/57                                     | 6330                       | 8,700                    |
|                            |                                |                            |   | Sub-total                  | <u>\$107,804</u>         |
| 56-307                     | Vanderbilt University          | 40-1-1033                  | 11/1/56 - 10/31/57                                    | 6120                       | 23,000                   |
| 56-302                     | Wake Forest College            | 40-1-1638                  | 12/1/56 - 11/30/57                                    | 6120                       | 18,514                   |
| 56-304                     | Yerkes Laboratory              | 40-1-1553                  | 12/1/56 - 11/30/57                                    | 6120                       | 19,335                   |
| 56-117A                    | Tennessee, Univ. of            | 40-1-1999                  | 11/1/56 - 10/31/57                                    | 6120                       | 5,000                    |
| 56-409                     | Duke University                | 40-1-1647                  | 11/1/56 - 10/31/57                                    | 6130                       | 22,990                   |
| 56-323                     | Florida Univ. Agric. Exp. Sta. | 40-1-2004                  | 11/1/56 - 10/31/57                                    | 6130                       | 5,700                    |
| 56-349                     | North Carolina State College   | 40-1-1314                  | 11/1/56 - 10/31/57                                    | 6130                       | 6,400                    |
| 56-382                     | North Carolina State College   | 40-1-1747                  | 11/1/56 - 10/31/57                                    | 6130                       | 17,379                   |
| 56-369                     | Meharry Medical College        | 40-1-269                   | 11/1/56 - 10/31/57                                    | 6310                       | 40,000                   |
| 56-397                     | Oklahoma Medical Res. Found.   | 40-1-1433                  | 11/1/56 - 10/31/57                                    | 6320                       | 11,000                   |
| 56-320                     | Tennessee, Univ. of            | 40-1-1642                  | 11/1/56 - 10/31/57                                    | 6320                       | 13,000                   |
| 56-313                     | Tennessee, Univ. of            | 40-1-1643                  | 11/1/56 - 10/31/57                                    | 6320                       | 18,804                   |
| 56-357                     | Tennessee, Univ. of            | 40-1-2003                  | 11/1/56 - 10/31/57                                    | 6320                       | 6,000                    |
| 56-372                     | Virginia Univ. Sch. of Med.    | 40-1-263                   | 12/1/56 - 11/30/57                                    | 6320                       | 7,020                    |
| 56-426                     | Christian Brothers College     | 40-1-2005                  | 11/1/56 - 10/31/57                                    | 6330                       | 7,400                    |
| 56-423                     | Florida, Univ. of              | 40-1-1321                  | 11/1/56 - 10/31/57                                    | 6330                       | 16,740                   |
| 56-388                     | North Carolina State College   | 40-1-264                   | 11/1/56 - 10/31/57                                    | 6330                       | 7,800                    |
| 56-384                     | North Carolina State College   | 40-1-1324                  | 11/1/56 - 10/31/57                                    | 6330                       | 6,834                    |
| 56-351                     | Vanderbilt University          | 40-1-1322                  | 11/1/56 - 10/31/57                                    | 6560                       | 7,780                    |
|                            |                                |                            |   | Sub-total                  | <u>260,696</u>           |
|                            |                                |                            |   | Total                      | <u>\$368,500</u>         |

111103b

## Office Memorandum • UNITED STATES GOVERNMENT

TO : J. W. Culd, Jr., Assistant General Counsel

DATE: June 12, 1956

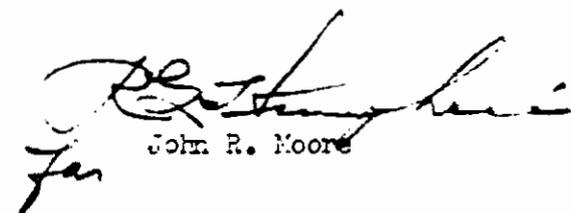
FROM : John R. Moore, Director, Contract Division

SUBJECT: RENEWAL OF CONTRACT NO. AT-(40-1)-263 - UNIVERSITY OF VIRGINIA

SYMBOL: ACD:ARB

Enclosed is an approved proposal for renewal of subject contract for the period July 1, 1956 through November 30, 1957. This action is covered by Contract Authorization No. BM-56-372, dated June 1, 1956, in the amount of \$2,925.00.

Please prepare an appropriate modification to extend the term of this contract to November 30, 1957, with new funds in the amount of \$2,925.00 to be paid on a lump-sum basis for the period July 1 through November 30, 1956, and with a provision for additional funds in the amount of \$7,020.00 to be paid after written notification from the contract administrator. Provision for compliance with AEC Manual Chapter 7510 should also be included in this modification.



John R. Moore

## Enclosures:

1. Request for Contract Action
2. Budget
3. Resume
4. Contract Authorization BM-56-372
5. Cy Ltr, Shoup to Gemmill, 6/8/56
6. Cy Budget for 7/1/56 - 11/30/56
7. Renewal Proposal

CC: C. S. Shoup  
L. D. Mackay  
J. Nicholson, w/cys Encls. 1 and 2

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1. Chairman  
TO: **J. R. Moore** Contract Board. From: **Research & Dev. 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:

2. Nature of Action Requested

Selection of New Contractor and Negotiation of Contract.

Modification of Contract  
No. **AT-(40-1)-263**

Contractor: **University of Virginia  
Charlottesville, Virginia**

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) **Research**

4. Funding

Amount to be Obligated by this Contract Action **\$2,925.**

Source of Funds

Approved ORO Financial Plan, \_\_\_\_\_ Quarter, Fiscal Year 19\_\_

Project No. \_\_\_\_\_ or, Activity No. **6320**

Funds to be Obligated: Allotment No. **066191** (est. Y. 19**56** Funds)

Procurement Directive No. **BM 56-372** Dated **6-1-56**

Issuing Office **Div. Biology & Medicine**

Concurrence in Funding Statement: (signed)

*Joseph L. Potter*  
Chief, Budget Branch 6/11/56

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: \_\_\_\_\_

270

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

|  |   |
|--|---|
| <p>6. Contract Board Docket No. _____<br/>(To be assigned by Board Secretary)</p>  | <p>7. Request Submitted By: (signed) _____<br/>Date: <u>JUN 8 - 1956</u> Title: _____<br/>C. S. SHoup<br/>BIOLOGY BRANCH<br/>GENERAL AND DEVELOPMENT DIVISION</p> |
| <p>8. Complete Description of Services to be Furnished by Contractor:<br/><b>Washington designated research Contract</b><br/><b>TITLE: "The Metabolic Exchange of Radioactive Isotopes in Isolated Cell Systems."</b></p> <p>(If more space is required use separate sheets and attach hereto:)</p>  |   |
| <p>9. Description of other changes to be covered by Modification:<br/><b>Modify Contract to provide for extension of period to November 30, 1956, with new funds in the amount of \$2,925. Include provisions for compliance with AEC Manual Chapter 7510. Also include provisions for extension of period to November 30, 1957, with additional funds in the amount of \$7,020, subject to further written notification from the contract administrator. Provide for lump-sum payment of funds for first period.</b><br/>(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)</p> <p><b>Memorandum from C. W. Shilling to S. R. Sapiris, dated June 1, 1956.</b></p> <p>(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)</p> <p><b>None</b></p>   |   |
| <p>12. <u>Disputes:</u><br/>Attach a statement summarizing the dispute together with pertinent documents and Background Material.</p> <p><b>None</b></p>   |   |

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Budget For Contract No. AT-(40-1)-263  
For Period 7-1-56 - 11-30-56

|   |           |             |
|---|-----------|-------------|
| (1) <u>Salaries and Wages:</u>                                      |           | \$ 3,668.00 |
| Dr. C. L. Gemmill (1/10 of time)                                    | \$ 500.00 |             |
| Research Associate  | 1,501.00  |             |
| Technician  | 1,250.00  |             |
| Secretarial and Janitorial Aid                                      | 417.00    |             |
| (2) <u>Equipment:</u>   |           | 1,290.00    |
| (3) <u>Travel:</u>  |           | 168.00      |
| (4) <u>Overhead and Indirect Costs (33% of Salaries and Wages):</u> |           | 1,210.44    |
|   | TOTAL     | \$ 6,336.44 |

The Commission's contribution to the above budget  
will be \$2,925.

634 1/10  
2925  
3611 00

Budget For Contract No. AT-(40-1)-263  
For Period 12-1-56 - 11-30-57

|   |            |                    |
|---|------------|--------------------|
| (1) <u>Salaries and Wages:</u>                                      |            | \$ 8,800.00        |
| Dr. C. L. Gemmill (1/10 of time)                                    | \$1,200.00 |                    |
| Research Associate  | 3,600.00   |                    |
| Technician  | 3,000.00   |                    |
| Secretarial and Janitorial Aid                                      | 1,000.00   |                    |
| (2) <u>Equipment:</u>   |            | 3,100.00           |
| (3) <u>Travel:</u>  |            | 400.00             |
| (+) <u>Overhead and Indirect Costs (33% of Salaries and Wages):</u> |            | 2,904.00           |
|   | TOTAL      | <u>\$15,204.00</u> |

The Commission's contribution to the above budget will be \$7,020.

*Handwritten:*  
2000  
7020  
18

University of Virginia  
Department of Pharmacology  
School of Medicine  
Charlottesville, Va.

Contract No. AT-(10-1)-263

Chalmers L. Gemmill, M.D.  
Project Leader.

THE METABOLIC EXCHANGE OF RADIOACTIVE ISOTOPES IN  
ISOLATED CELL SYSTEMS.

Resume'

The contractor ~~proposes~~ <sup>shall</sup> continue work using radioactive isotopes on cells; to (1) study the effect of concentration of phosphate, utilizing radioactive phosphorus-32, and concentration of magnesium on the phosphate transfer in red blood cells, (2) to study the mechanisms of adenosine and related compounds in red cells, utilizing chromatographic methods, and (3) to study the action of insulin on the uptake of various isotopes, particularly the insulin effect on potassium transfer.

C. S. Shoup

UNITED STATES ATOMIC ENERGY COMMISSION  
 WASHINGTON, D. C.

Contract Authorization No. EM-56-372

TO : S. R. Sapirie, Manager  
 Oak Ridge Operations Office

FROM : Charles W. Shilling, M. D., Deputy Director  
 Division of Biology and Medicine, Washington, D. C.

SUBJECT : FUND AUTHORIZATION AND TRANSMITTAL OF RESEARCH PROPOSAL FOR  
 CONTRACT NEGOTIATION

REFERENCE : AEC 102/16 APPROVED OCTOBER 7, 1953, AS IMPLEMENTED BY MEMORANDUM  
 TO MANAGERS, OPERATIONS OFFICES, DATED OCTOBER 23, 1953, JOINTLY  
 SIGNED BY THE DIRECTORS OF THE DIVISIONS OF RESEARCH AND  
 BIOLOGY AND MEDICINE.

SYMBOL : EMM:CVH

The research proposal described below has been approved by the  
 Division of Biology and Medicine, funds are available, and you  
 are authorized and requested to negotiate a contract in  
 accordance with the following terms and conditions:

1. Institution: University of Virginia
2. Investigator (s): Chalmers L. Gemmill, M. D.
3. Title: "The Metabolic Exchange of Radioactive Isotopes in  
 Isolated Cell Systems"

4. ( ) New Contract, (x) Renewal of Contract No. AT(40-1)263
5. Duration: 7/1/56 thru 11/30/57 \$9,945  
 7/1/56 thru 11/30/56 2,925  
 12/1/56 thru 11/30/57 7,020
6. AEC Technical Representative: Clifford V. Harding *CVH*
7. Funds are authorized for the obligation of this contract  
 as follows:

| <u>Allotment No.</u>       | <u>Budget Category</u> | <u>Previous</u>   | <u>Amount</u>      |                   |
|----------------------------|------------------------|-------------------|--------------------|-------------------|
|                            |                        |                   | <u>This Action</u> | <u>Total</u>      |
| <u>06-61-91 (24)</u>       | <u>6320</u>            | <u>          </u> | <u>\$ 2,925</u>    | <u>\$ 2,925</u>   |
| <u>Please see item #10</u> | <u>          </u>      | <u>          </u> | <u>          </u>  | <u>          </u> |
| <u>          </u>          | <u>          </u>      | <u>          </u> | <u>          </u>  | <u>          </u> |

7-4694  
 JUN 1956

8. It is suggested that in the best interests of the government the following type contract be negotiated: Lump-sum
9. It is requested that the title to any capital equipment procured under this contract shall be vested with:

(x) the contractor; ( ) the government.

10. Other comments: The balance of approved contract funds in the amount of \$7,020 for the contract period 12/1/56 through 11/31/57 will be allotted promptly upon receipt of FY 1957 appropriations. It is recommended that the contract extension be for the full period approved in item 5, with provision for funding as indicated above.

If radioisotopes are to be used in this research, it is requested that the savings available to the contractor under the Radioisotope Research Support Program (Ref. AEC Manual Chapter 7510) be considered in the negotiation of the amount to be funded under this contract.

11. Security Requirements:

In accordance with the provisions of Chapter 3403 of the AEC Manual and the requirements of the Declassification Guide, it has been determined that the following security precautions should be taken in connection with the proposed research contract:

Since there is essentially no chance for the development of restricted data, this project has been placed in Category I as defined in Chapter 3403 of the AEC Manual.

12. Reports: (x) Reports are to be required as provided for by "Revised Guide for the Submission of Research Proposals" dated February 8, 1954.

( ) Special reports instructions are as follows:

Enclosures: (x) "A" - Proposal, dated March 15, 1956  
(x) "B" - Notification letter, dated JUN 1, 1956  
( ) "C" - Other correspondence, none letters

Distribution:

Addressee: Original (w encl.)      Division File: Yellow copy (w encl.)  
1st copy (w encl.)                      Pink copy (w/o encl.)  
2nd copy (w encl.)                      Branch File: White copy (w encl.)

Program Analysis Branch:  
White copy (w/o encl.)

In Reply  
Refer to: AT-100

Oak Ridge, Tennessee  
June 8, 1956

Dr. C. L. Council  
Department of Pharmacology  
University of Virginia  
School of Medicine  
Charlottesville, Virginia

Subject: CONTRACT NO. AT-(10-1)-863

Dear Dr. Council:

This is to advise you that we have received notification from Washington to extend the period under Contract No. AT-(10-1)-863 to November 30, 1957. However, the notification only authorized the Commission's contribution for the period July 1, 1956, to November 30, 1956, in the amount of \$2,925. Therefore, we have initiated action for the preparation of a modification to extend the period to November 30, 1956, with the Commission contributing \$2,925 in new funds to the total cost of \$6,336.44.

The modification will also contain the necessary provisions to extend the period to November 30, 1957, and will include an outline of the total-cost budget for the period beginning December 1, 1956, with the Commission contributing \$7,000 to the total cost of \$15,204. However, an additional stipulation will be included to indicate that all provisions for the twelve-month period are subject to further written notification by the Commission. This notification will be forthcoming as soon as we receive an additional allocation of funds which should be shortly after July 1.

Copies of the budgets to be included in the modification are enclosed for your information. The modification will be forwarded to you for signature as soon as it is completed. You should sign it, obtain the signatures of the appropriate officials of the University, and return the signed copies as soon as possible.

In arriving at the budgets to be included in the modification, you will note that we have deleted the \$4,170 equipment item for the period July 1, 1956, to November 30, 1956, and the \$10,000 equipment item for the period December 1, 1956, to November 30, 1957, since you indicate that this equipment has already been purchased. We like to consider only those items of equipment which are purchased during the contract period; therefore, we have deleted these items from the budgets. You will also note that we

1111045

June 8, 1956

have used 33 percent of "Salaries and Wages" as the allowable "Overhead," since Mr. Vincent Shea has advised us that this is the established overhead rate for similar type contracts with the University. Inasmuch as the 33 percent rate has been established for the University, it would appear that this amount of indirect cost or overhead would be incurred whether or not we recognized it in the contract. Also, the Commission's policy on support of research is based on its making a contribution to the estimated total cost of the project. Therefore, we prefer to include the established rate, make our contribution to the total-cost budget as outlined in the contract, and let the University determine which funds are to be used for the items included in the budget. We make no attempt to designate our funds for any specific items of the budget. If this arrangement is not satisfactory, please advise us immediately.

Very truly yours,

G. S. Shep  
Chief, Biology Branch  
Research and Development Division

Enclosures:  
Budgets (2)

CC: Vincent Shea, University  
of Virginia, w/encls.  
G. L. Dunham, AEC, Washington  
J. R. Moore ✓

Res.Serv.Br.

Biology Br.

Mason:ny

1111046

Estimated Budget for Five Month Period  
July 1, 1925 to November 30, 1925

|   |        |                     |                  |
|---|--------|---------------------|------------------|
| <b>Salaries:</b>                              |        |                     |                  |
| Full Time Salary for Technician               |        | 1,250.00            |                  |
| <b>Permanent Equipment:</b>                   |        |                     |                  |
| To be purchased as needed                     |        | 540.00              |                  |
| <b>Disposable Equipment</b>                   |        |                     |                  |
| Glassware                                     | 250.00 |                     |                  |
| Chemicals and Reagents                        | 250.00 |                     |                  |
| Animals                                       | 250.00 | 750.00              |                  |
| <b>Travel</b>                                 |        | <del>100.00</del>   |                  |
|   |        | <del>1,150.00</del> |                  |
| <b>Overhead to University (2%)</b>            |        | <u>27.00</u>        |                  |
| <b>Total of Outcheck requested for A.R.C.</b> |        |                     | <u>22,925.00</u> |

Costs Contributed by the University

|   |                 |                  |
|---|-----------------|------------------|
| One-half of Dr. Gourlay's Salary  | 1,500.00        |                  |
| One-fourth of Dr. Gamill's Salary   | 900.00          |                  |
| Secretarial Aid   | 200.00          |                  |
| Juniorial Aid   | 200.00          |                  |
| <b>Estimated cost of Laboratory expenses,<br/>light, heat, electricity, water and<br/>shop facilities</b> | 412.00          |                  |
| <b>Estimated cost of equipment bought from<br/>these sources</b>  | <u>4,170.00</u> |                  |
|   |                 | <u>7,382.00</u>  |
| <b>Total Budget for Five Month Period</b>   |                 | <u>30,307.00</u> |

Renewal Proposal for  
Atomic Energy Commission Contract  
No. AT-(40-1)-263

THE METABOLIC EXCHANGE OF RADIOACTIVE ISOTOPES IN  
ISOLATED CELL SYSTEMS

Chalmers L. Gemmill, M.D.  
Professor of Pharmacology

Desmond R. H. Gourley, Ph.D.  
Associate Professor of Pharmacology

Approved:

  
Comptroller

Department of Pharmacology  
School of Medicine  
University of Virginia  
Charlottesville, Va.

March 15, 1956

1111048

F-2391

The following studies will be made under the renewal proposal.

1. The Effect of Concentration of Phosphate and Magnesium on Phosphate Transfer into Erythrocytes.

The use of  $P^{32}$ -labeled phosphate ions as an indicator of phosphate transfer in erythrocytes has been found very useful in this laboratory. It is proposed to further utilize this technique and the Tris-buffered medium which has been developed to study the effect of various ions on phosphate transfer. Particular attention will be directed to the effect of the concentration of the phosphate ion itself since the result of such a study will add further to the understanding of the nature of the phosphate transfer process. Some evidence also implicates the magnesium ion in phosphate transfer and it is now possible to control the magnesium concentration and determine its effect. These experiments were not attempted in other buffered solutions previously investigated because in some the rigid control of pH at 7.4 was difficult while in others the phosphate transfer was less than it was in plasma.

2. Metabolism of Adenosine and Related Compounds in Erythrocytes.

The technique of preparing human erythrocyte ghosts containing relatively high concentrations of substances to which the intact erythrocyte is impermeable appears to be useful in studying the metabolism of the erythrocyte. A further study of nucleoside metabolism in this preparation is planned to explore its general usefulness. The fate of adenosine added to erythrocytes, as in storage, is not known precisely and the investigation will be aimed at further elucidation of this pathway. For example, little is known about the presence in blood of the enzyme adenase, which catalyzes the reaction adenine to hypoxanthine in certain other tissues. Hypoxanthine accumulation has been noted in drawn blood and the presence of adenase would explain this accumulation. If it is found that nucleoside metabolism is related to phosphate ion transfer, as the present evidence indicates, it may be necessary to separate the various nucleoside breakdown products. The simplest method by which this can be accomplished seems to be chromatographic separation on paper. Apparatus for running separations on paper is already available in this Department.

3. The Effect of Insulin on Isolated Transfer Mechanisms.

Following the demonstration that insulin accelerates the uptake of potassium ions of intact skeletal muscle incubated in vitro, several experiments were performed in vitro in this laboratory with radioactive potassium to determine the turnover rate of this ion. In the initial series of experiments the extensor digitorum longus muscle of the rat was used and the techniques involved in the use of radioactive potassium refined. In order to avoid oxygen deficiency only small rat extensor muscles could be used and consequently the potassium uptake was small. The insulin effect on potassium uptake is greater in isolated frog muscle than it is in rat muscle. It is proposed to repeat these experiments in isolated frog muscle so that larger amounts of tissue can be used and the resultant potassium uptake will be greater. The effect of insulin on the rate at which potassium ions are replaced in the muscles will then be studied.

## Personnel

Dr. D. R. H. Gourley devoted fifty per cent of his time on a twelve month basis to this project. He will be available for a similar period of time during the coming year. Dr. C. L. Gemmill gave about ten per cent of his time to the project. Mrs. Nancy Lee, the technician, gave full time to the project. Mr. James Anderson, who prepared the iodinated and brominated compounds, gave full time to the project.

### Proposed Budget for new Fiscal Year Dec. 1, 1956 to November 30, 1957

|  |        |               |
|--|--------|---------------|
| <b>Salaries:</b>                       |        |               |
| Full Time Salary for Technician        |        | 3,000.00      |
| <b>Permanent Equipment:</b>            |        |               |
| To be purchased as needed              |        | 1,300.00      |
| <b>Expendable Equipment</b>            |        |               |
| Glassware                              | 600.00 |               |
| Chemicals and Isotopes                 | 600.00 |               |
| Animals                                | 600.00 | 1,800.00      |
| <b>Travel</b>                          |        | <u>400.00</u> |
|  |        | 6,500.00      |
| <b>Overhead to University (8%)</b>     |        | <u>520.00</u> |
| Total of Contract requested for A.E.C. |        | \$7,020.00    |

### Costs Contributed by the University

|   |           |                  |
|---|-----------|------------------|
| One-half of Dr. Gourley's Salary  | 3,600.00  |                  |
| One-tenth of Dr. Gemmill's Salary   | 1,200.00  |                  |
| Secretarial Aid   | 500.00    |                  |
| Janitorial Aid  | 500.00    |                  |
| Estimated cost of Laboratory expenses, light,<br>heat, electricity, water and shop facilities | 1,000.00  |                  |
| Estimated cost of equipment bought from other<br>sources                                      | 10,000.00 | <u>16,800.00</u> |
|   |           | 23,820.00        |

### Proposed Expenditure for Five Month Period July 1, 1956 to November 30, 1956

|                    | AEC             | CONTRACTOR       | TOTAL            |
|--------------------|-----------------|------------------|------------------|
| 7/1/56 to 11/30/56 | \$2,925.00      | \$7,000.00       | \$9,925.00       |
|                    | <u>7,020.00</u> | <u>16,800.00</u> | <u>23,820.00</u> |
|                    | \$9,945.00      | \$23,800.00      | \$33,745.00      |

Total of Contract requested for A.E.C. for 17 months      \$9,945.00

UNIVERSITY OF VIRGINIA, CHARLOTTESVILLE, VIRGINIA

Contract No. AF-(40-1)-263 - Statement of Expenditures - July 1, 1955 - March 15, 1956

A. Expenditures from A.E.O. Money

Salaries

|                                 |          |                    |
|---------------------------------|----------|--------------------|
| H. J. Lee, Technician           | 7 months | \$ 1,700.00        |
| Social Security Taxes           |          | 29.00              |
| <b>Total Salaries and Taxes</b> |          | <b>\$ 1,729.00</b> |

Equipment

|   |                    |
|---|--------------------|
| Model 2612 Count Rate Meter, Serial #138                                  | \$ 272.25          |
| 4311 D. C. Kaufman Source   | 495.00             |
| Portable Refrigerated Centrifuge, Model PB-2, head - 16 place combination | 2,061.00           |
| Ultra-violet transmission filters (2)                                     | 373.77             |
| <b>Total Equipment</b>  | <b>\$ 3,202.02</b> |

Supplies

|  |                    |
|--|--------------------|
| Radioactive Phosphorus   | \$ 57.60           |
| Petty Cash - Miscellaneous Laboratory supplies, blood donor  | 51.00              |
| Film Badge Service Weekly  | 70.20              |
| 2 doz. rubber bulbs, 2 doz. hematocrit tubes, 2 washing bottles, 2 ctns. pipettes, 10 pilot lamps, 25 lb. glass rods                                     | 139.37             |
| Time labels and hand dispensers  | 26.52              |
| 1000 Kaysort cards   | 35.67              |
| 8 batteries  | 44.43              |
| 2 punches  | 12.60              |
| 12 bags corks, 12 lb. rubber stoppers, 144 ft. rubber tubing, 4 cs. pyrex beakers, 4 cs. pipettes and flasks, 3 cs. glass rods, 3 cs. glass tubing, plug | 514.57             |
| 2 needle valves, 2 replacement lamps   | 5.10               |
| Flow regulator   | 12.00              |
| 1 year subscription to Atomic Energy Newsletter  | 18.00              |
| 8 metal shields  | 12.01              |
| Ice crusher  | 11.68              |
| 15 pipets, transfer, 1 doz pipet storage tubes   | 29.20              |
| 200 glass planchets  | 38.79              |
| Auto pipette and stand   | 25.75              |
| Chemicals  | 126.71             |
| Express charges  | 5.30               |
| 3 electrodes   | 29.02              |
| <b>Total Supplies</b>  | <b>\$ 1,299.52</b> |

Travel

|  |           |
|--|-----------|
| Dr. D. R. H. Gourley, Charlottesville, Va., to Iowa City, Iowa, and return by plane. To attend meeting of the American Society for Pharmacology and Experimental Therapeutics at the State University of Iowa. | \$ 153.10 |
|--|-----------|

111051

UNIVERSITY OF VIRGINIA, CHARLOTTESVILLE, VIRGINIA

Contract No. AT-(40-1)-263 - Statement of Expenditures - July 1, 1955 - March 15, 1956

Travel

Dr. D. R. H. Gourley, Charlottesville, Va., to Madison, Wis., and return by plane. To attend a "Symposium on the metabolic aspects of transport across cell membranes," at the University of Wisconsin.

\$ 127.55

Total Travel

\$ 280.65

Insurance

Workmen's Compensation and Public Liability Insurance

\$ 9.09

Overhead

\$ 520.00

Total Expenditures July 1, 1955 - March 15, 1956

\$ 7,000.28

Debit Balance brought forward July 1, 1955

16.53  
\$ 7,016.81

UNIVERSITY OF VIRGINIA, CHARLOTTESVILLE, VIRGINIA

Contract No. AT-(40-1)-263 - Statement of Expenditures - July 1, 1955 - March 15, 1956

B. Expenditures from Institutional Funds with proposed expenditures to June 30, 1956

Salaries

|  |                     |
|--|---------------------|
| Dr. D. R. H. Gourley   | \$ 3,600.00         |
| One-half of salary   |                     |
| Dr. C. L. Gemmill  | 1,200.00            |
| One-tenth of salary  |                     |
| Mrs. H. J. Lee, Technician   | 1,250.00            |
| 5 months salary  |                     |
| Secretarial Aid  | 500.00              |
| Janitorial Aid   | 500.00              |
| Estimated cost of Laboratory expenses, light, heat, electricity<br>and shop facilities | 1,000.00            |
| Estimated cost of equipment from other sources used in this<br>contract                | 10,000.00           |
| Contribution of University   | \$ 18,050.00        |
| Contribution of A.E.C. to date   | 7,016.81            |
| Total Expenditure  | <u>\$ 25,066.81</u> |

There are no funds remaining at the present time from the Atomic Energy Commission money. Therefore there will be no remainder of money at the end of the fiscal year.

The cost for the remainder of the contract period will be mainly the salary of Mrs. Lee and purchase of isotopes. These items will be covered by institutional funds.

Office Memorandum • UNITED STATES GOVERNMENT

TO : J. W. Ould, Jr., Assistant General Counsel

DATE: May 25, 1955

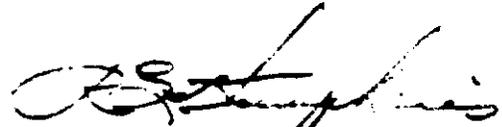
FROM : R. G. Humphries, Assistant Director, Contract Division

SUBJECT: RENEWAL OF CONTRACT NO. AT-(40-1)-263 - UNIVERSITY OF VIRGINIA

SYMBOL: ADA:ARB

Enclosed is an approved proposal for renewal of the subject contract for a period of one year beginning July 1, 1955. This action is covered by Contract Authorization No. EM-55-323, dated April 29, 1955, in the amount of \$7,020.00.

Please prepare an appropriate modification to renew this contract for a period of one year, beginning July 1, 1955, with additional funds in the amount of \$7,020.00.



R. G. Humphries

Enclosures:

1. Request for Contract Action
2. Budget for Contract AT-(40-1)-263
3. Contract Authorization EM-55-323
4. Renewal Proposal

CC: C. S. Shoup  
L. D. MacKay  
J. Nicholson, w/Encls. 1 and 2

Brown:arb

270  
1111054

UNIVERSITY OF VIRGINIA  
SCHOOL OF MEDICINE  
DEPARTMENT OF PHARMACOLOGY  
CHARLOTTESVILLE, VA.

Dr. Chalmers L. Gemmill  
Professor of Pharmacology,  
Project Leader.

THE METABOLIC EXCHANGE OF RADIOACTIVE ISOTOPES IN  
ISOLATED CELL SYSTEMS.

Resume'

*adenosine*

Work will continue by the Contractor on phosphate uptake by the chick nucleated erythrocytes, to include a study of the change of specific activity of labile phosphate groups of ATP (adenosine triphosphate) with time. The work has suggested that on the basis of preliminary experiments, these labile phosphate groups may be involved in active phosphate ion uptake by the human red cells. Work will also be carried out on the metabolism of glucose by chicken blood washed cells. In addition, the role of the red cell membrane will be further studied with respect to phosphate transport and cholinesterase activity, possibly using washed human cells. Iodination studies related to thyroxine mechanisms will continue.

C. S. Shoup.

1. Chairman  
 TO: C. B. Moore Contract Board. From: Research and Medicine Div.

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:

2. Nature of Action Requested

Selection of New Contractor and Negotiation of Contract.

Modification of Contract  
 No. AT-(40-1)-263

Contractor: University of Virginia  
Charlottesville, Virginia

Review and approval of Contract, Sub-contract or Purchase Order.  
 Number: \_\_\_\_\_  
 Name: \_\_\_\_\_

Other (Explain) \_\_\_\_\_

3. Nature of Services to be Covered by Contract

Construction  Architect-Engineer  Other  (Explain) Research

4. Funding Amount to be Obligated by this Contract Action \$ 7,020.

Source of Funds

Approved ORO Financial Plan, \_\_\_\_\_ Quarter, Fiscal Year 19\_\_

Project No. \_\_\_\_\_ or, Activity No. 6300

Funds to be Obligated: Allotment No. 6-51-91(24) F.Y. 1955 Funds)

Procurement Directive No. BM-55-323 Dated 4-29-55

Issuing Office Div. of Biology + Medicine

Concurrence in Funding Statement: (signed) \_\_\_\_\_

*Joseph A. Patten*  
 Chief, Budget Branch 5/24/55

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.)

|  |  |
|--|--|
| <p>6. <b>Contract Board Docket</b><br/>No. _____<br/>(To be assigned by<br/>Board Secretary)</p>   | <p>7. <b>Request Submitted By:</b> (signed) _____<br/>Date: <u>5-27-55</u> Title: <u>Herman M Roth</u></p>   |
| <p>8. <b>Complete Description of Services to be Furnished by Contractor:</b><br/><br/>Washington designated research contract.<br/>Title: "The Metabolic Exchange of Radioactive Isotopes in Isolated Cell Systems."<br/><br/>(If more space is required use separate sheets and attach hereto:)</p> |  |
| <p>816<br/>H<br/>5/25</p>  | <p>9. <b>Description of other changes to be covered by Modification:</b><br/><br/>Renew contract period for one year beginning July 1, 1955, with Commission funds in the amount of \$7,020.<br/><br/>(If more space is required use separate sheets and attach hereto:)</p> |
| <p>10. <b>Negotiated Contracts.</b> (Show why it appears desirable to negotiate new contract or to negotiate modification to existing contract)<br/><br/>Memo J. C. Bucher to S. A. Sapirle dated April 29, 1955.<br/><br/>(If more space is required use separate sheets and attach hereto:)</p>    |  |
| <p>11. <b>Contracts, Subcontracts, or Purchase Orders Submitted for Review and Approval:</b> (Furnish brief description of action in this space and attach pertinent documents)<br/><br/>None</p>  |  |
| <p>12. <b>Disputes:</b><br/>Attach a statement summarizing the dispute together with pertinent documents and Background Material.<br/><br/>None</p>  |  |

15230

1111057

Budget for Contract No. AT-(40-1)-263

For the Period 7-1-55 - 6-30-56

(1) Salaries and Wages: \$ 8,300.00

Dr. C. L. Gemmill (10% of time) \$1,200.00

Research Associate 3,600.00

Technician 3,000.00

Secretarial Assistance 500.00

(2) Equipment: 3,100.00

(3) Travel: 400.00

(4) Overhead and Indirect Costs: (33% of Salaries <sup>and</sup> & Wages); 2,739.00

TOTAL \$14,539.00

The Commission's contribution to the above budget will be \$7,020.00.

UNITED STATES ATOMIC ENERGY COMMISSION  
WASHINGTON, D. C.

Contract Authorization No. EM-55-323

APR 23 1955

TO : S. R. Sapirie, Manager  
Oak Ridge Operations Office

FROM : John C. Bugher, M. D., Director, Division  
of Biology and Medicine, Washington, D. C. *10 for J.C.B.*

SUBJECT : FUND AUTHORIZATION AND TRANSMITTAL OF RESEARCH PROPOSAL FOR  
CONTRACT NEGOTIATION

REFERENCE : AEC 102/16 APPROVED OCTOBER 7, 1953, AS IMPLEMENTED BY MEMORANDUM  
TO MANAGERS, OPERATIONS OFFICES, DATED OCTOBER 23, 1953, JOINTLY  
SIGNED BY THE DIRECTORS OF THE DIVISIONS OF RESEARCH AND  
BIOLOGY AND MEDICINE.

SYMBOL : **EM:REL**

The research proposal described below has been approved by the  
Division of Biology and Medicine, funds are available, and you  
are authorized and requested to negotiate a contract in  
accordance with the following terms and conditions:

1. Institution: University of Virginia
2. Investigator (s): Chalmers L. Gemmill, M. D.
3. Title: "The Metabolic Exchange of Radioactive Isotopes  
in Isolated Cell Systems"
4. ( ) New Contract, (x) Renewal of Contract No. AT(40-1)263
5. Duration: 7/1/55 through 6/30/56
6. AEC Technical Representative: Paul G. LeFevre *Les*
7. Funds are authorized for the obligation of this contract  
as follows:

| <u>Allotment No.</u> | <u>Budget Category</u> | <u>Amount</u>     |                    | <u>Total</u>      |
|----------------------|------------------------|-------------------|--------------------|-------------------|
|                      |                        | <u>Previous</u>   | <u>This Action</u> |                   |
| <u>06-51-91 (24)</u> | <u>6300</u>            | <u>          </u> | <u>\$7,020</u>     | <u>\$7,020</u>    |
| <u>          </u>    | <u>          </u>      | <u>          </u> | <u>          </u>  | <u>          </u> |
| <u>          </u>    | <u>          </u>      | <u>          </u> | <u>          </u>  | <u>          </u> |

*MAY 2 1955*  
*E-2624*

The study of phosphate uptake by the nucleated erythrocytes of the chicken described in the annual progress report will be continued to its logical conclusion. It is anticipated that this will include a study of the change in the specific activity of the labile phosphate groups of adenosine triphosphate (ATP) with time since earlier work in this laboratory suggested that these groups might be involved in the active uptake of phosphate ions by human erythrocytes. The method by which this study will be made has been indicated in the progress report and pilot experiments have been completed.

In the work on chicken blood to date, the utilization of glucose under varying conditions has been observed. Since this tissue consumes oxygen at a rate which is easily measurable, it seems desirable to study this phase of metabolism also and determine its relation, if any, to phosphate ion uptake. A few experiments of this type have been carried out but there are difficulties in measuring the oxygen consumption of whole blood. In the future work it is planned to use washed cells suspended in a suitable buffered Ringer's solution.

Preliminary observations have been made on the effect of magnesium ions and ATP on the phosphate ion uptake of rabbit erythrocytes (Jonas and Gourley, 1954). Again, in these experiments whole blood was used. The results suggest that the compound playing an active role in the transport of phosphate ions across the cell membrane is actually a complex of  $Mg^{++}$  and ATP. The preliminary work is sufficiently promising to warrant further investigation using washed cells suspended in a medium the ionic composition of which can be rigidly controlled. It is planned to carry out the extension of this work on human erythrocytes. Preliminary experiments also indicate that cholinesterase inhibitors may influence phosphate ion uptake. It is hoped to pursue this further using washed human cells.

The work of Dr. Gemmill on the use of radioactive iodine in iodination is part of a general study of thyroxine mechanisms. This work will be continued along with the general studies.

#### Personnel

Dr. D. R. H. Gourley devoted two months last summer to this project and approximately fifty per cent of his time during the winter. He will be available for two months this summer and approximately fifty per cent of this time during the remainder of the year. Dr. Gemmill gave about 10 per cent of his time to this project. Mrs. Nancy Lee, the technician was appointed Nov. 1, 1954 and will be available for full time on this program during 1955-56.

Since there has been a change in University policy whereby the staff is placed on a twelve month basis, there is no item for summer salaries requested in this contract as in previous years.

8. It is suggested that in the best interests of the government the following type contract be negotiated: **Lump-sum**

9. It is requested that the title to any capital equipment procured under this contract shall be vested with:

the contractor;       the government.

10. Other comments:

11. Security Requirements:

In accordance with the provisions of Chapter 3403 of the AEC Manual and the requirements of the Declassification Guide, it has been determined that the following security precautions should be taken in connection with the proposed research contract:

Since there is essentially no chance for the development of restricted data, this project has been placed in Category I as defined in Chapter 3403 of the AEC Manual.

12. Reports:  Reports are to be required as provided for by "Revised Guide for the Submission of Research Proposals" dated February 8, 1954.

Special reports instructions are as follows:

Enclosures:       "A" - Proposal, dated March 25, 1955 <sup>20</sup> 1955  
                   "B" - Notification letter, dated APR 20  
                   "C" - Other correspondence, none letters

Distribution:

Addressee:    Original (w encl.)      Division File: Yellow copy (w encl.)  
                  1st copy (w encl.)      Pink copy (w/o encl.)  
                  2nd copy (w encl.)

Branch File:    White copy (w encl.)

Program Analysis Branch:  
                  White copy (w/o encl.)

NATIONAL ATOMIC ENERGY COMMISSION  
ATOMIC ENERGY RESEARCH CONTRACT  
No. AT-(40-1)-263

THE METABOLIC EXCHANGE OF RADIOACTIVE ISOTOPES IN  
ISOLATED CELL SYSTEMS

Chalmers L. Cornill, M.D.  
Professor of Pharmacology

Desmond R. H. Gourley, Ph.D.  
Associate Professor of Pharmacology

Department of Pharmacology  
School of Medicine  
University of Virginia  
Charlottesville, Virginia

March 25, 1955

1111062

Proposed Budget for the Fiscal Year.

July 1, 1955 to June 30, 1956.

Salaries:

Full time salary for Technician 3,000.00

Permanent Equipment:

|   |               |          |
|---|---------------|----------|
| Tracerlab SC-42 Preset Timer for Autoscaler | 95.00         |          |
| Survey Meter                                | 300.00        |          |
| Other equipment as need arises              | <u>905.00</u> | 1,300.00 |

Expendable Equipment:

|                        |               |          |
|------------------------|---------------|----------|
| Glassware              | 600.00        |          |
| Chemicals and Isotopes | 600.00        |          |
| Animals                | <u>600.00</u> | 1,800.00 |

|        |               |               |
|--------|---------------|---------------|
| Travel | <u>400.00</u> | <u>400.00</u> |
|--------|---------------|---------------|

|  |  |               |
|--|--|---------------|
| Overhead to University (8%)            |  | 36,500.00     |
| Total of Contract requested for A.E.C. |  | <u>520.00</u> |
|  |  | 37,020.00     |

Costs contributed by the University

|  |                  |             |
|--|------------------|-------------|
| One half of Dr. Gorrley's Salary   | 33,600.00        |             |
| One tenth of Dr. Gennill's Salary  | 1,200.00         |             |
| Secretarial aid  | 500.00           |             |
| Janitorial aid   | 500.00           |             |
| Estimated cost of Laboratory expenses; light,<br>heat, electricity and shop facilities | 1,000.00         |             |
| Estimated cost of equipment bought from other<br>sources                               | <u>10,000.00</u> |             |
| Total costs contributed from University  |                  | \$16,800.00 |

Total expenditure:

|   |  |                  |
|---|--|------------------|
| A.E.C. contract and University contribution |  | <u>33,820.00</u> |
|---|--|------------------|

# Office Memorandum • UNITED STATES GOVERNMENT

TO : J. W. Cudd, Jr., Assistant General Counsel      DATE: May 5, 1954

FROM : R. G. Humphries, Assistant Director, Contract Division

SUBJECT: RENEWAL OF CONTRACT NO. AT-(40-1)-263 - UNIVERSITY OF VIRGINIA

SYMBOL: ADA:ARB

Enclosed is an approved proposal for renewal of subject contract for a period of one year beginning July 1, 1954. This approval action is covered by Procurement Directive No. BM-54-204, dated March 29, 1954, in the amount of \$8,966.00.

It is requested that you prepare an appropriate modification to renew this contract for a period of one year, beginning July 1, 1954, and provide for the payment of \$8,966.00.



R. G. Humphries

**Enclosures:**

1. Request for Contract Action
2. Budget
3. Resume
4. Memo fm LeFevre dtd 3/29/54
5. Ltr fm Bemill dtd 4/20/54
6. Cy Estimated Budget
7. Renewal Proposal

CC: C. S. Shoup  
L. D. MacKay  
Ed Ziegler, w/Encls. 1, 2, 3  
J. Nicholson

Brown:arb

1111064

J. W. Ould, Jr., Assistant General Counsel

May 5, 1954

R. G. Humphries, Assistant Director, Contract Division

RENEWAL OF CONTRACT NO. AT-(40-1)-263 - UNIVERSITY OF VIRGINIA

**SYMBOL: ADA:ARB**

Enclosed is an approved proposal for renewal of subject contract for a period of one year beginning July 1, 1954. This approval action is covered by Procurement Directive No. M-54-204, dated March 29, 1954, in the amount of \$8,966.00.

It is requested that you prepare an appropriate modification to renew this contract for a period of one year, beginning July 1, 1954, and provide for the payment of \$8,966.00.

Signed by R. G. Humphries

R. G. Humphries

**Enclosures:**

1. Request for Contract Action
2. Budget
3. Resume
4. Memo fr LaFevre dtd 3/29/54
5. Ltr fr Gemill dtd 4/20/54
6. Gy Estimated Budget
7. Renewal Proposal

CC: C. S. Sheup  
L. D. MacKay  
Ed Kiegler, w/Encls. 1, 2, 3  
J. Nicholson

Brom:arb



111065

1. TO: **J. R. Moore** Chairman Contract Board. From: **Research & Medicine Div.**

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:

2. Nature of Action Requested

Selection of New Contractor and Negotiation of Contract.

Modification of Contract No. AT-(40-1)-263

Contractor: University of Virginia Charlottesville, Virginia

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) **Research**

4. Funding

Amount to be Obligated by this Contract Action \$ 8,966.00

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-54-204 Dated 3-29-54

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

1111066

6. Contract Board Docket  
No. \_\_\_\_\_  
(To be assigned by  
Board Secretary)

7. Request Submitted By: (Signed) \_\_\_\_\_  
Date: \_\_\_\_\_ Title: \_\_\_\_\_

8. Complete Description of Services to be Furnished by Contractor:

Washington designated research contract.

Title - The Metabolic Exchange of Radioactive Phosphorus and Potassium  
in Labeled Cell Systems"

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

9. Description of other changes to be covered by Modification:

Renewal of the contract for a period of one year beginning July 1, 1954,  
with new funds in the amount of \$8,966.

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

10. Negotiated Contracts. (Show why it appears desirable to negotiate new contract or to negotiate  
modification to existing contract)

Memo - P. G. LeFevre to K. Kasschau dated March 29, 1954.

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

11. Contracts, Subcontracts, or Purchase Orders Submitted for Review and Approval: (Furnish brief descrip-  
tion of action in this space and attach pertinent documents)

None

12. Disputes:

Attach a statement summarizing the dispute together with pertinent documents and Background  
Material.

None

OK  
A  
5/5

Budget for Contract No. AT-(10-1)-263

|   |          |                    |
|---|----------|--------------------|
| Salaries and Wages:   |          | \$10,802.00        |
| Dr. C. L. Gemmill (10% of time for 9 months -<br>Full time 2 summer months) | 3,384.00 |                    |
| Other Faculty   | 4,018.00 |                    |
| Technician  | 3,000.00 |                    |
| Secretarial Services  | 200.00   |                    |
| Janitor Service   | 200.00   |                    |
| 2 Equipments:   |          | 4,000.00           |
| Supplies:   |          | 1,400.00           |
| Travel:   |          | 300.00             |
| Overhead and Operating Expenses:  |          | <u>2,664.16</u>    |
|   |          | <u>\$19,166.16</u> |

The Commission's contribution to the above budget is \$8,966.

## Resume

Contract No. AT-(40-1)-263

Attention will be directed towards a detailed study of the phosphate uptake by erythrocytes of the chicken which, in contrast to mammalian erythrocytes, have an oxidative system. The importance of this system will be that a distinction can be made between the previous work on red blood cells not containing an oxidative system and those which do have a complete system for oxidizing substrates to carbon dioxide and water. Newer methods for fractionating phosphates will be used employing ion exchange columns. It will be possible to study changes in phosphate uptake by chicken erythrocytes under both aerobic and anerobic conditions. Also, the work on radioautographs of the red blood cells labelled with  $P^{32}$  will be continued.

The study of potassium turnover in skeletal muscle will be continued. Different concentrations of insulin will be employed. The work will be extended by using epinephrine which may influence potassium movement across cell boundaries.

The general program of thyroxine activity carried out in this department will be continued. The findings of last summer on the effect of light on thyroxine will be extended by the use of monochromatic light. A Bausch and Lomb monochromatic source of light has been purchased and will be used in this study in order to define more closely the wave lengths of light responsible for this effect. Other radiant energy will be employed. It may be that in thyroxine there is a resonating system that is very sensitive to radiant energy of various types. Work on the effect of thyroxine on succinate oxidation by heart homogenates will be continued, by using labelled C-14 succinate in order to determine more closely the mechanisms involved in this effect.

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

DATE: MAR 29 1954

TO : Kenneth Kasschau, Director, Office of  
Research and Medicine, Oak Ridge  
FROM : P. G. Lefevre, Assistant to Chief (Research), Medical Branch  
SUBJECT: TRANSMITTAL OF RESEARCH PROPOSAL FOR CONTRACT NEGOTIATION  
SYMBOL : BMM:FGL

Le J

This letter with enclosure, 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: University of Virginia Medical School
  2. Investigator (s): C. L. Gemmill
  3. Title: "The Metabolic Exchange of Radioactive Phosphorus and Potassium in Labeled Cell Systems"
  4. ( ) New Contract or  Renewal of Contract No. AT(40-1)263
  5. Duration - From: July 1, 1954 to June 30, 1955
  6. AEC Technical Supervision: Medical Branch
  7. Recommended Support: \$8,966
- Authorized by Procurement Directive No. BM54-204  
Issued MAR 9 1954 \$ 8,966  
Activity No. 6300
8. Other Comments:

1111070

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 will be required or developed, no personnel security requirements should be imposed.

10. Reports: (X) 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:
- (X) "A" - Proposal, dated 2/20/54, also statement of expenses
  - ( ) "B" - Notification letter, dated \_\_\_\_\_ and estimated cost
  - ( ) "C" - Other correspondence, \_\_\_\_\_ letters
  - (X) "D" - Procurement Directive BM54-204

Distribution:

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

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

DATE: JAN 27 1949

TO : Kenneth Kasschau, Director, Office of  
Research and Medicine, Oak Ridge  
FROM : P. G. LeFevre, Assistant to Chief (Research), Medical Branch  
SUBJECT: TRANSMITTAL OF RESEARCH PROPOSAL FOR CONTRACT NEGOTIATION  
SYMBOL : BMM:FOL

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: University of Virginia Medical School
2. Investigator (s): G. L. Gamell
3. Title: <sup>"The Metabolic Exchange of Radioactive Phosphorus and</sup> Potassium in Labeled Cell Systems"
4. ( ) New Contract or <sup>AT(40-1)263</sup> ( ) Renewal of Contract No. \_\_\_\_\_
5. Duration - From: July 1, 1954 to June 30, 1955
6. AEC Technical Supervision: Medical Branch
7. Recommended Support: \$8,966  
Authorized by Procurement Directive <sup>8454-204</sup> \_\_\_\_\_  
Issued \_\_\_\_\_ 8,966  
Activity No. 6300
8. Other Comments:

1111072

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 will 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 2/20/51, also statement of expenses  
( ) "B" - Notification letter, dated \_\_\_\_\_ and estimated co  
( ) "C" - Other correspondence, \_\_\_\_\_ letters  
(  "D" - Procurement Directive RF51-204

Distribution:

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

DEPARTMENT OF PHARMACOLOGY  
UNIVERSITY OF VIRGINIA MEDICAL SCHOOL  
CHARLOTTESVILLE, VIRGINIA

April 20, 1954

Doctor C. S. Shoup  
Chief Biology Branch  
Research and Medicine Division  
United States Atomic Energy Commission  
Oak Ridge, Tennessee

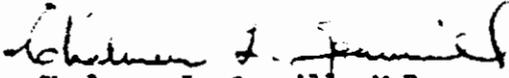
Reference: OR:JER

Dear Doctor Shoup:

I received your letter of April 15th, 1954 concerning our contract No. AT-(40-1)-263 and I would like to advise you that we will have no unexpended balance as of June 30th, 1954.

With personal regards, I am

Sincerely yours,

  
Chalmers L. Gemmill, M.D.  
Professor of Pharmacology

mci

APR 22 1954

D-2177

1111074

**ESTIMATED COSTS COVERED UNDER INSTITUTIONAL BUDGET:**  
 (all of these items supplied by the University of Virginia).

**SALARIES:**

|                                   |           |
|-----------------------------------|-----------|
| Dr. C. L. Connill (10% of time)   | \$1050.00 |
| Dr. D. Gourlay (50% of time)      | \$2750.00 |
| Janitors (10% of time)            | \$200.00  |
| Secretarial Service (10% of time) | \$200.00  |

**\$4200.00**

**EQUIPMENT:**

|   |           |
|---|-----------|
| Permanent:<br>Warburg apparatus, Autosolar, Detecting<br>Equipment, glassware, chemicals, Beckman<br>Spectrophotometer (already purchased from<br>other sources besides former A.E.C. grants) | \$4000.00 |
| **Laboratory space, utilities, shop,<br>chemicals and library services.   | \$2000.00 |

**\$6000.00**

Total from University  
Proposed from A.E.C.

\$10,200.00  
\$2966.16

Total for project

**\$19,166.16**

Per cent of total from A.E.C.

**46.8 per cent**

\*\*Difficult to estimate.

RENEWAL PROPOSAL FOR  
ATOMIC ENERGY COMMISSION CONTRACT  
No. AT-(40-1)-263

THE METABOLIC EXCHANGE OF RADIOACTIVE ISOTOPES IN  
ISOLATED CELL SYSTEMS

Chalmers L. Connell, M.D.  
Professor of Pharmacology

Department of Pharmacology  
University of Virginia, Medical School  
Charlottesville, Virginia

February 20, 1954

1111076

During the past year the work under this contract has progressed along the following lines: (1) transport of labeled phosphate ( $P^{32}$ ) into red blood cells (2) uptake of radioactive potassium in muscle (3) effect of light on thyroxine. These studies are reported in the annual progress report of February 20, 1954. The published work is appended to this renewal proposal.

#### CONTINUATION PROPOSAL

Attention will be directed towards a detailed study of the phosphate uptake by erythrocytes of the chicken which, in contrast to mammalian erythrocytes, have an oxidative system. The importance of this system will be that a distinction can be made between the previous work on red blood cells not containing an oxidative system and those which do have a complete system for oxidizing substrates to carbon dioxide and water. Work along these lines has been started. Newer methods for fractionating phosphates will be used employing ion exchange columns. It will be possible to study changes in phosphate uptake by chicken erythrocytes under both aerobic and anaerobic conditions. Also, the work on radioautographs of the red blood cells labelled with  $P^{32}$  will be continued.

The study of potassium turnover in skeletal muscle will be continued. Different concentrations of insulin will be employed. The work will be extended by using epinephrine which may influence potassium movement across cell boundaries.

The general program of thyroxine activity carried out in this department will be continued. The findings of Dr. Gemmill of last summer on the effect of light on thyroxine will be extended by the use of monochromatic light. A Bausch and Lomb monochromatic source of light has been purchased and will be used in this study in order to define more closely the wave lengths of light responsible for this effect. Other radiant energy will be employed. It may be that in thyroxine there is a resonating system that is very sensitive to radiant energy of various types. Dr. Gemmill will also extend his work on the effect of thyroxine on succinate oxidation by heart homogenates (Amer. J. Physiol. 170, 502, 1952) by using labelled C-14 succinate in order to determine more closely the mechanisms involved in this effect.

#### PERSONNEL

Dr. C. L. Gemmill devoted his full time during our summer month in 1953 and part time during the remainder of the year. Dr. Gemmill will be available for two months this summer and part time during the remainder of the year. Dr. D. R. H. Gourley devoted two months last summer on this contract and approximately fifty per cent of his time during the year. He will be available for two months during this summer and approximately fifty per cent of his time during the remainder of the year. Dr. H. Jonas is the Research Assistant on this contract at the present time. He is looking for a position

giving more temure than the year-by-year contract. Therefore, Dr. Jenas may not be available for the coming year. It is thought that the obtaining of a well trained technician in order to assist Dr. Gourley would be the logical development in this work.

PROPOSED BUDGET FOR THE FISCAL YEAR

July 1, 1954 to June 30, 1955

Salaries:

|  |           |
|--|-----------|
| Full time salary for technician  | \$3000.00 |
| Summer salary for Dr. C.L. Gemmill, two months                         | \$2334.00 |
| Summer salary for Dr. D.R.H. Gourley<br>Research Assistant, two months | \$1268.00 |

The summer salaries have been obtained by dividing the University salaries by nine for the monthly rate which is the accepted practice of this University for obtaining the monthly rate of summer salaries.

|                    |                  |
|--------------------|------------------|
| Total for salaries | <u>\$6602.00</u> |
|--------------------|------------------|

Expendable Equipment:

|                      |          |
|----------------------|----------|
| Chemicals            | \$500.00 |
| Radioactive isotopes | \$400.00 |
| Animals              | \$200.00 |
| Glassware            | \$300.00 |

Travel:

|       |                  |
|-------|------------------|
| Total | \$300.00         |
|       | <u>\$8302.00</u> |

|  |          |
|--|----------|
| Overhead for University of Virginia (8%) | \$664.16 |
|--|----------|

TOTAL

\$8966.16

PUBLICATIONS AND REPORTS

ON CONTRACT NO. AEC-(40-1)-263 1953-54

- 1) Jonas, H., Observation on the uptake of radio phosphate by rabbit erythrocytes, *Biochim. Biophys. Acta*, in press.
- 2) Jonas, H., Influence of hematocrit and plasma on the mechanism of phosphate uptake by rabbit erythrocytes, *Biochim. Biophys. Acta*, in press.
- 3) Jonas, H. and Gourley, D.R.H., Effect of adenosine triphosphate magnesium and calcium on the phosphate uptake by rabbit erythrocytes, submitted to *Biochim. Biophys. Acta*.
- 4) Jonas, H., Effects of ATP and cations upon P32 uptake by erythrocytes, *Fed. Proc.* 12:74, 1953.
- 5) Jonas, H., Effects of ATP on the uptake of phosphate by rabbit erythrocytes, *Va. Acad. Sc.* 4:272, 1953.
- 6) Jonas, H., Effects of a Ig-ATP complex on uptake of orthophosphate by rabbit erythrocytes, *Fed. Proc.* 13: , 1954.
- 7) Gourley, D.R.H. and Jonas, H., Potassium turnover in rat skeletal muscle in vitro, *Fed. Proc.* 13: , 1954.
- 8) Gemmill, C.L. The Effect of Light on the Ultraviolet Absorbance of Thyroxine and its Derivatives. *Abstr. XIX Int. Congress.* 1953, 387.

1. **John E. Moore, Director** Chairman  
TO: **Contract Division** Contract Board. From: **Research & Medicine 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:

2. Nature of Action Requested

Selection of New Contractor and Negotiation of Contract.

Modification of Contract  
No. **AT-(40-1)-263**

Contractor: **Univ. of Va. Medical School  
Charlottesville, Va.**

Review and approval of Contract, Sub-contract or Purchase Order.  
Number: \_\_\_\_\_  
Name: \_\_\_\_\_

Other (Explain) \_\_\_\_\_

3. Nature of Services to be Covered by Contract

Construction

Architect-Engineer

Other

(Explain) **Research**

4. Funding

Amount to be Obligated by this Contract Action \$ ~~1000.00~~ **951.00**

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-53-187** Dated **4-1-53**

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

*Procurement Directive  
2. BM-53-187, 4/53,  
1,012.00*

## Office Memorandum • UNITED STATES GOVERNMENT

TO : W. W. Hill, Jr., Assistant General Counsel DATE: June 18, 1953

FROM : John R. Moore, Director, Contract Division

SUBJECT: RENEWAL OF CONTRACT NO. AT-(40-1)-263 - UNIVERSITY OF VIRGINIA  
MEDICAL SCHOOL

SYMBOL: AD:ARB

Enclosed is an approved proposal for renewal of subject contract for one year beginning July 1, 1953. This approval action is covered by Procurement Directive No. BM-53-187, dated April 1, 1953, in the amount of \$9,018.00.

It is requested that an appropriate modification be prepared to renew this contract for a period of one year beginning July 1, 1953, and provide for payment of \$9,018.00.

*John R. Moore*  
John R. Moore

## Enclosures:

1. Request for Contract Action
2. Budget
3. Resume
4. Memo fm Haggerty dtd 4/1/53
5. Op. Ltr fm Haggerty dtd 4/2/53
6. Ltr fm Shea dtd 5/8/53
7. Proposal for Renewal & Progress Report

CC: C. S. Shoup  
L. D. Mackay  
Ed Ziegler, w/Encl. 1  
J. Nicholson

/arb

1111083

|   |   |
|---|---|
| <p>6. <u>Contract Board Docket</u><br/>         No. _____<br/>         (To be assigned by<br/>         Board Secretary)</p>   | <p>Original signed by _____<br/>         7. Request Submitted By: (signed) _____<br/>         Date: _____<br/>         Assistant Director<br/> <b>RESEARCH AND MEDICINE DIVISION</b><br/>         Acting Assistant Director<br/>         Research and Medicine Division</p> |
| <p>8. <u>Complete Description of Services to be Furnished by Contractor:</u><br/> <b>Washington designated research contract</b><br/> <b>Title: The Metabolic Exchange of Radioactive Phosphorus and Potassium in Isolated Cell Systems</b><br/>         (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><br/> <b>Renewal of contract for period of one year, beginning July 1, 1953.</b><br/>         (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)<br/> <b>Memo J. F. Haggerty to Kenneth Kasschau dated April 1, 1953.</b><br/>         (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)<br/> <b>None</b></p>  |   |
| <p>12. <u>Disputes:</u><br/>         Attach a statement summarizing the dispute together with pertinent documents and Background Material.<br/> <b>None</b></p>   |   |

University of Virginia  
Contract No. AT-(40-1)-263 - Dr. Chalmers Gemmill, Project Leader

BUDGET

Salaries and Wages: \$7,350.00

Dr. C. L. Gemmill \$1170.00  
(one-month Summer)

Dr. D. R. H. Gourley 1180.00  
(two months)

Research Assistant 5000.00  
(Full time)

Supplies: 800.00

Chemicals 300.00

Radioactive Isotopes 300.00

Animals & Blood Donors 200.00

Travel: 200.00

---

\$8,350.00

Overhead 8% 668.00

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Total new funds \$9,018.00

1111085

UNIVERSITY OF VIRGINIA, SCHOOL OF MEDICINE, CHARLOTTESVILLE, VIRGINIA.

DEPARTMENT OF PHARMACOLOGY.

Dr. Chalmers Gemmill, Project Leader.

Contract No. AT-(40-1)-263.

THE METABOLIC EXCHANGE OF RADIOACTIVE ISOTOPES IN ISOLATED CELL SYSTEMS

RESUME'

An intensive study of the uptake of potassium by the isolated rat skeletal muscle under the influence of insulin will be made. In order to get a balance sheet of potassium interchange into muscle, it is proposed that radioactive potassium be used to correlate exchange with glycogen deposition and oxygen consumption. The distribution of radiophosphorus will be studied in the same preparation, with and without insulin. The uptake of radiophosphorus by red blood cells will be continued with studies on localization of P-32 in or on the cells. Radioautography will be applied. The uptake of radioactive thyroxine may be studied in nucleated and non-nucleated red blood cells, and incorporation and liberation of Iodine-131 into red cells may also be studied with methods developed for the phosphorus work.

C. S. Sheep

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

1057

DATE: *JFH*  
TO : Kenneth Kasschau, Director, Office of Research and Medicine  
FROM : Oak Ridge Operations Office  
James F. Haggerty, Medical Branch  
SUBJECT: TRANSMITTAL OF RESEARCH PROPOSAL FOR CONTRACT NEGOTIATION  
SYMBOL : BMM:JFH

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: University of Virginia Medical School
2. Investigator (s): Chalmers L. Gemmill, M. D.
3. Title: "The Metabolic Exchange of Radioactive Phosphorus and Potassium in Isolated Cell Systems"
4. ( ) New Contract or (X) Renewal of Contract No. AT(40-1)265
5. Duration - From: July 1, 1953 To: June 30, 1954
6. AEC Technical Supervision: Medical Branch
7. Recommended Support: \$9,018.00, including overhead at 8%  
Authorized by Procurement Directive No. BM53-187  
Issued \_\_\_\_\_ \$ 9,018.00  
Activity No. 6300
8. Other Comments:

1111087

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 will 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 February 20, 1953
- "B" - Notification letter, dated \_\_\_\_\_
- "C" - Other correspondence, \_\_\_\_\_ letters
- "D" - Procurement Directive BM53-187

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.) |                                      |

BM 1157H

Dr. Chalmers L. Gemmill  
Professor of Pharmacology  
University of Virginia Medical School  
Charlottesville, Virginia

Dear Doctor Gemmill:

I am pleased to inform you that our Research Contracts Committee has approved continuation of support of your studies on "The Metabolic Exchange of Radioactive Phosphorus and Potassium in Isolated Cell Systems", for an additional year. The contractual details will be handled in the usual manner by our Oak Ridge Operations Office, and you should hear from a representative of that office within a short time.

The Committee was pleased to note the progress made during the past year, and we trust that the ensuing year will be equally satisfactory.

Sincerely yours,

James P. Haggerty  
Medical Branch  
Division of Biology and Medicine

cc to OROO - att: K. Kasschau

HAGGERTY:rmk

Medical

1111089

UNIVERSITY OF VIRGINIA  
CHARLOTTESVILLE

OFFICE OF THE BURSAR June 8, 1953

United States Atomic Energy Commission  
Oak Ridge, Tennessee

Attention: Mr. C. S. Shoup, Chief, Biology Branch  
Research and Medicine Division

Subject : Contract No. AT-(40-1)-263

Gentlemen:

As requested by you in your letter to Dr. Chalmers L. Gemmill dated May 12, 1953, we are enclosing a statement of expenditures on the above referenced contract for the period July 1, 1952 through May 31, 1953. As the unexpended balance at May 31 is \$16.21, it is not anticipated that any balance will remain in the grant at June 30th.

The proposal for renewal of the contract submitted to you by Dr. Gemmill in the amount of \$9,018.00 is acceptable to the University of Virginia.

Very truly yours,

Vincent Shea, Comptroller

cc to: Dr. C. L. Gemmill

1111090

JUN 10 1953

C-2677

RENEWAL PROPOSAL FOR  
ATOMIC ENERGY COMMISSION CONTRACT  
NO. AT-(13-1)-263

THE METABOLIC EXCHANGE OF RADIOACTIVE ISOTOPES  
IN ISOLATED CELL SYSTEMS

CHARLES L. FENWICK, Ph. D.  
Professor of Pharmacology

DEPARTMENT OF PHARMACOLOGY  
University of Virginia Medical School  
Charlottesville, Virginia

February 20, 1953

1111091

During the past year, the work under this grant has progressed along the following lines: (1) additional information on the phosphate uptake of nucleated erythrocytes of the chicken has been obtained, (2) a detailed study of the effect of added adenosine triphosphate (ATP) on the phosphate uptake by mammalian erythrocytes (rabbit) has been made, (3) experiments on potassium uptake of isolated rat skeletal muscle have been started, (4) the possibility that a cobalt-thyroxine complex may take up oxygen has been investigated. These four studies are reported in the annual progress report of March 1, 1953. The published work is given in Appendix A for the past year.

Continuation Proposal: It is proposed to make an intensive study of the uptake of potassium by the isolated rat skeletal muscle under the influence of insulin. Preliminary experiments using nonradioactive potassium have demonstrated that such a transfer exists. In order to get an exact balance sheet of the interchange it is proposed to use radioactive potassium for this purpose in order to correlate the exchange of potassium with glycogen deposition and oxygen consumption in these experiments. At the same time, plans are being formulated to study the distribution of radioactive phosphorus in the same preparation

in orthophosphate or in ATP will serve as an index of  $P^{32}$  deposition in various stages of phosphate transfer. It may also elucidate various intermediates in the transfer process. The thyroxine work has reached the stage where the uptake of radioactive thyroxine may be studied in nucleated and non-nucleated red blood cells. The incorporation and liberation of radioactive iodine into red blood cells may also be followed by the methods developed for  $P^{32}$ .

Personnel: Dr. C. L. Gennill devoted his full time during one summer month in 1951 to this contract and part time during the remainder of the year. Dr. Gennill will be available again for one full month this summer and part time during the remainder of the year. Dr. D. E. H. Courley devoted two full months last summer on the contract and approximately 25% of his time during the year. He will be available for two full months this summer and will devote fifty per cent of his time during the remainder of the year on this contract, if renewed. Dr. H. Jonas is the research assistant on the grant at the present time. He will continue in this capacity if the contract is renewed. This continuity will make for greater efficiency since Dr. Jonas has been here since July, 1952 and is thoroughly acquainted with the methods and plans of this contract. A brief account of Dr. Jonas' training and experience is appended, (appendix B). Dr. Jonas' salary for the coming year is placed at \$5000.00 on a twelve month basis.

UNIVERSITY OF VIRGINIA

July 1, 1953 to June 30, 1954

Salaries

Full time salary for Research Assistant  
for 12 months.....\$5000.00  
Summer salary for Dr. C. L. Gemmill,  
Principal Investigator, one month..... 1170.00  
Summer salary for Dr. D. R. H. Courley,  
Research Assistant, two months..... 1180.00

The summer salaries have been obtained by dividing the University salaries by nine for the monthly rate which is the accepted practice of this University for obtaining the monthly rate of summer salaries.

Total for Salaries.....\$7350.00

Expendable Equipment

Chemicals.....\$ 300.00  
Radioactive isotopes..... 300.00  
Animals and blood donors..... 200.00

Total for Expendable Equipment.....\$ 800.00

Total..... 200.00     \$ 200.00

Total.....\$8350.00

Overhead for University of Virginia (2%).....\$ 668.00

Total.....\$9018.00

1. Gourley, D. R. H. The Role of Calcium in the Regulation of Phosphate Transport in Erythrocytes. *Fed. Proc.*, 11, 51, 1952.
2. Gourley, D. R. H. The Regulation of the Uptake of Inorganic Phosphate by Human, Rabbit, and Chicken Erythrocytes. *Virginia J. Science*, 3, 340, 1952.
3. Gourley, D. R. H. Failure of Phosphorus-32 to Exchange with Organic Phosphorus Compounds. *Nature*, 169, 192, 1952.
4. Gourley, D. R. H. Effect of Insulin in Vitro on Phosphate Uptake by Erythrocytes from Diabetic Humans. *Scand. J. of Clin. & Lab. Invest.*, 4, 79, 1952.
5. Gourley, D. R. H. The Role of Calcium in the Regulation of Phosphate Transport in Human Erythrocytes. *Annals of Biochem. & Biophysics*, 40, 1, 1952.
6. Gourley, D. R. H. The Role of Calcium in the Regulation of Phosphate Uptake in Human Erythrocytes. *Annals of Biochem. & Biophysics*, 40, 11, 1952.
7. Gourley, D. R. H. and J. L. Katschiner. Studies on Exchange of Phosphate Ions in Human, Rabbit and Chicken Erythrocytes. *J. Cell. & Comp. Physiol.*, 41, 1953, in press.
8. Gifford, C. L. The Oxygen Uptake of a Skeletal Muscle. *J. Exp. Therap. & Pharmac.*, 106, 388, 1952.
9. Gourley, D. R. H. Effects of Insulin on Intact Rat Leg Muscle. *Fed. Proc.*, 12, 1953, in press.
10. Jones, H. Effect of  $Ca^{++}$  and Calcium Upon  $^{32}P$  Uptake by Erythrocytes. *Fed. Proc.*, 12, 1953, in press.

James Hubert, B.S. 1941 (applied and general) University of Calif. Coll. of Agric.; Ph.D. 1947 (plant physics) U. of Calif.; 1940 and summers 1948 and 1949, agriculture research assoc. (soil analyses, crop surveys); 1941-42 chemist Poultry Producers of Central California; 1942-46 electrician and instr. (civilian) USN; 1946-49 grad. student (botany) U. of Calif. (effects of very high frequency radions on seed germination and metabolism, design and construction of equipment, carbohydrate analysis, germination and respiration experiments); 1950-51 agricultural chemist Pacific Guano Co., Berkeley, Calif.; 1951-53 research fellow Oak Ridge National Laboratory (Oak Ridge, Tenn.) in cold units in relation to ascorbic acid liberation).

| MEMO ROUTE SLIP<br>Form ABC-22 (Rev. May 14, 1947) |          | See me about this.<br>Note and return.                  | For concurrence.<br>For signature. | For action.<br>For information. |
|--|----------|---|------------------------------------|---------------------------------|
| TO (Name and unit)                                 | INITIALS | REMARKS<br><i>Re: Contract AT(40-1)-263</i>             |                                    |                                 |
|  | DATE     | <i>Current year contract amt. \$ 9158.00</i>            |                                    |                                 |
| TO (Name and unit)                                 | INITIALS | REMARKS<br><i>Expend. &amp; Com. to 6/30/52 8784.79</i> |                                    |                                 |
|  | DATE     | <i>Balance 373.21</i>                                   |                                    |                                 |
| TO (Name and unit)                                 | INITIALS | REMARKS<br><i>Expt. Budget. New York 8850.00</i>        |                                    |                                 |
|  | DATE     | <i>Less: Balance 373.21</i>                             |                                    |                                 |
|  |          | <i>Net amt. payment for New York 8476.79</i>            |                                    |                                 |
| OM (Name and unit)                                 | REMARKS  |   |                                    |                                 |
| PHONE NO.  | DATE     |   |                                    |                                 |

USE OTHER SIDE FOR ADDITIONAL REMARKS

16-50957-1 U. S. GOVERNMENT PRINTING OFFICE

1111097

# Office Memorandum • UNITED STATES GOVERNMENT

TO : J. Wallace Ould, Jr., Assistant General Counsel DATE: April 30, 1952

FROM : R. G. Humphries, Acting Director, Contract Division

SUBJECT: REQUEST FOR RENEWAL OF CONTRACT AT-(40-1)-263 WITH UNIVERSITY OF VIRGINIA MEDICAL SCHOOL

SYMBOL: DC:RGH

Forwarded is an approved proposal for the extension of subject contract for one year beginning July 1, 1952. This approval action is covered by Procurement Directive EM-52-218 dated April 10, 1952, in the amount of \$8,850.00.

There will be an unexpended balance of \$373.21 for use in partially funding the new period. Deducting this amount from the approved budget of \$8,850.00 will leave a total of \$8,476.79 to be paid for the new period.

It is requested that you prepare an appropriate modification to continue this contract for one year in the amount of \$8,476.79.

Dr. C. S. Shoup will act as technical advisor on this contract action.



R. G. Humphries

Enclosures:

1. Memo fm Kasschau 4-17-52
2. Memo fm Haggerty 4-10-52
3. Contractor's proposal

CC: Dr. C. S. Shoup  
Mr. A. A. Vergari  
Mr. Ed. Ziegler  
Mrs. J. Nicholson

/lm

Office Memorandum • UNITED STATES GOVERNMENT

TO : John R. Moore, Director, Contract Division      DATE: April 17, 1952

FROM : Kenneth Kasschau, Director of Research and  
Medicine

SUBJECT: RENEWAL OF CONTRACT WITH UNIVERSITY OF VIRGINIA MEDICAL  
SCHOOL (CONTRACT NO. AT-(40-1)-263)

SYMBOL: OR:AMC

We are enclosing a memorandum dated April 10, 1952, from the Division of Biology and Medicine, Washington, authorizing the renewal of the subject contract for one year, beginning July 1, 1952.

We would appreciate your preparing a modification to this contract. Dr. C. S. Shoup will act as technical advisor for this office.

*Kenneth Kasschau*  
Kenneth Kasschau

Enclosures:

1. Memo dtd 4-10-52 fm JFH to KK
2. Procurement Directive
3. Ltr dtd 4-10-52 to CLG fm JFH
4. Proposal and Progress Report

Corley:cc

*Copied by J. ...*  
*Director: BM-52-718*  
*4/10/52 - \$8,850.00*

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

DATE:

TO : Kenneth Kasschau, Director, Office of Research and Medicine  
Oak Ridge Operations Office  
FROM : James F. Haggerty, Medical Branch  
SUBJECT: TRANSMITTAL OF RESEARCH PROPOSAL FOR CONTRACT NEGOTIATION  
SYMBOL : BMD:JFH

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: University of Virginia Medical School
2. Investigator (s): Chalmers L. Gemmill, M. D.
3. Title: "The Metabolic Exchange of Radioactive Phosphorus and Potassium in Isolated Cell Systems"
4. ( ) New Contract or (X) Renewal of Contract No. AT(40-1)-263
5. Duration - From: July 1, 1952 To: June 30, 1953
6. AEC Technical Supervision: Medical Branch
7. Recommended Support: \$3,850.00

Authorized by Procurement Directive No. BM52-218  
Issued \_\_\_\_\_ \$ 8,850.00  
Activity No. 5300

8. Other Comments:

1111100

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 will be required or developed, no personnel security requirements should be imposed.

10. Reports: (X) 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: (X) "A" - Proposal, dated 2/19/52  
( ) "B" - Notification letter, dated \_\_\_\_\_  
( ) "C" - Other correspondence, \_\_\_\_\_ letters  
(X) "D" - Procurement Directive BM52-218

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.)

1111101

MM:JFH

APR 14 1952

Dr. Chalmers L. Scovill  
Department of Pharmacology  
University of Virginia Medical School  
Charlottesville, Virginia

Dear Doctor Scovill:

I am pleased to inform you that our Research Committee has approved support of your proposal for studies on "The Metabolic Exchange of Radioactive Phosphorus and Potassium in Isolated Cell Systems" for an additional year. The contractual details will be handled in the usual manner by our Oak Ridge Operations Office.

The Committee was pleased to note the progress made during the past year, and we trust that the ensuing year will be equally satisfactory.

Sincerely yours,

James F. Haggerty  
Medical Branch  
Division of Biology and Medicine

cc to K. Kasschau, CRCC

HAGGERTY:rnk

Medical

1111102

RENEWAL PROPOSAL FOR  
ATOMIC ENERGY COMMISSION GRANT

No. AT-(40-1)-263

THE METABOLIC EXCHANGE OF  
RADIOACTIVE PHOSPHORUS AND POTASSIUM  
IN ISOLATED CELL SYSTEMS

CHALMERS L. GEMMILL, M. D.  
Professor of Pharmacology

DEPARTMENT OF PHARMACOLOGY  
University of Virginia Medical School  
Charlottesville, Virginia

February 19, 1952

1111103

During the past year, the work under this grant has proceeded along several lines, (1) the distribution of radioactive phosphate in the organic phosphate fractions of the human red blood cell, (2) the uptake of radioactive phosphate by the nucleated red blood cell under aerobic and anerobic conditions, and (3) the effect of thyroxine on enzyme systems. In the previous proposal, March 20, 1951, it was stated that the uptake of radioactive potassium ions would be studied in tissues under the influence of insulin. This work has been delayed due to the continued interest in phosphate metabolism. The work on thyroxine on enzyme systems was started on this grant with the idea of eventually using radioactive iodine on the thyroxine molecule in order to trace the activity of thyroxine in enzymatic systems. The use of radioactive thyroxine has been delayed due to the fact that several interesting reactions were found with non-radioactive thyroxine. The work of the past year has been presented before several meetings and several papers published. In addition several additional presentations and publications will come out of this work before the close of the fiscal year. A progress report is appended giving the references in detail.

Continuation Proposal: It is proposed to continue the study of the uptake of radioactive phosphate by chicken red blood cells and to measure this activity both under aerobic and anerobic conditions. This work has been started and is covered in the appended progress report. By comparing the activity of the nucleated red blood cell to the non-nucleated cell, information may be obtained concerning the role of the nucleus in these cells. Work will be started in the near future on the uptake of radioactive

potassium in muscle under the influence of insulin. This work should give considerable information concerning the relationship of potassium, carbohydrate metabolism and insulin action. In addition, Dr. Gemmill is continuing his work on the effect of thyroxine on enzyme systems. If this work develops to the place where radioactive thyroxine may help in this problem, then this radioactive substance will be used. However, at present, there is considerable work which may be done with non-radioactive thyroxine. Therefore, additional aid from this grant will not be asked until the need for the use of radioactive thyroxine becomes apparent.

Personnel: Dr. C. L. Gemmill devoted his full time during the months of June, July and August, 1951, and part time during the remainder of the year on this grant. Dr. Gemmill will be available for one full month this summer and part time during the remainder of the year. Dr. D. R. H. Courley devoted full time to this grant until September 1, 1951 at which time he was appointed Assistant Professor of Pharmacology in this department and was paid by the University. He has, however, continued to work on the radioactive phosphorus phase of this work, devoting full time up to February 1, 1952 at which time our teaching semester started. He is devoting about 30 per cent of his time on this project and the remainder of his time until June 1, 1952 will be given over to teaching duties. He will be available for two months in the summer for full time work on this project. If he remains in the department next year (he has applied for a fellowship to study abroad) he will continue about 70 per cent of his time with this work although paid by the University from September 1, 1952 until June 1, 1953.

Mr. John Matschiner has been giving full time to this project. Mr. Matschiner has his B.S. and M.S. degrees in chemistry from the Univ. of Portland. His salary is paid from this contract as the research assistant. Mr. Matschiner is being paid at the rate of \$3600 for the year.

PROPOSED BUDGET FOR FISCAL YEAR, JULY 1, 1952 TO JUNE 30, 1953

Summer Salaries

Dr. C. L. Gemmill, Principal Investigator  
 1 month.....\$970.00  
 Dr. D. R. H. Gourley, Research Assistant  
 2 months at \$512.50 a month.....1025.00

These summer salaries have been obtained by dividing the University salaries by nine which is the accepted practice of this University for obtaining the monthly rate of summer salaries.

Full Time salary for research assistant for 12 months..\$4500.00

Total for Salaries \$6495.00

Expendable Equipment

Chemicals.....\$300.00  
 Radioactive phosphorus and potassium..... 300.00  
 Animals and blood donors..... 300.00

Total for expendable equipment \$ 900.00

Permanent Equipment

Warburg manometer and flasks.....\$300.00  
 Glassware..... 300.00  
 Travel..... 200.00

Total for permanent equipment \$ 800.00

Subtotal \$8195.00

Overhead for University of Virginia (8%) \$ 655.00

Total \$8850.00

Balance  
 new year payment 373.21  
 -----  
 \$ 8,476.79

1111107

EXPENDITURES FROM JULY 1, 1951 TO FEBRUARY 1, 1952

|  |                   |                      |
|--|-------------------|----------------------|
| Payroll.....                                 | \$5445.00         |                      |
| Equipment.....                               | 365.53            |                      |
| Chemicals and supplies.....                  | 175.34            |                      |
| Reprints and subscriptions.....              | 43.50             |                      |
| Travel.....                                  | 69.70             |                      |
| Overhead <sup>@ 8%</sup> for University..... | <del>678.00</del> | 6099.07 (1)          |
|  | 650.72            | 650.72               |
|  |                   | 6749.79              |
|  |                   | <del>\$6777.07</del> |
| <b>Total</b>                                 |                   |                      |

6099.07  
 2035.00  
 -----  
 8134.07  
 8  
 -----  
 650.7256

EXPECTED EXPENDITURES FROM FEBRUARY 1, 1952 TO JUNE 30, 1952

|                          |               |
|--------------------------|---------------|
| Salaries.....            | \$1500.00     |
| Travel.....              | 135.00        |
| Expendable supplies..... | <u>400.00</u> |
| <b>Total</b>             |               |

\$2035.00 (1)

Total to be expended by June 30, 1952

8784.79  
~~8812.07~~

Last year's contract amt.

9158.00  
 8784.79

Balance →

373.21

PROGRESS REPORT

ATOMIC ENERGY COMMISSION CONTRACT

No. AT-(40-1)-263

THE METABOLIC EXCHANGE OF RADIOACTIVE  
PHOSPHORUS AND POTASSIUM

CHALMERS L. GEMMILL, M. D.  
DESMOND R. H. GOURLEY, PH. D.

DEPARTMENT OF PHARMACOLOGY  
University of Virginia Medical School  
Charlottesville, Virginia

February 19, 1952

1111109

The study of the mechanism by which human erythrocytes take up inorganic phosphate ions which has been carried out for the past three years under the auspices of the Atomic Energy Commission has now reached a stage where the following conclusions may be drawn:

(a) Most of the phosphate ions which enter human erythrocytes do so by means of a chemical combination at the cell membrane rather than by simple diffusion through the membrane. This was indicated by the facts that the uptake of phosphate was markedly affected by relatively small changes in temperature, and could be inhibited by low concentrations of sodium fluoride or sodium iodoacetate or by decreasing the glucose concentration of the plasma. The absence of oxygen did not affect the uptake of phosphate ions by human erythrocytes indicating that the energy for the chemical reaction involved was derived from an anaerobic mechanism such as glycolysis.

(b) The chemical reaction at the membrane by which inorganic phosphate enters erythrocytes appears to be the combination of inorganic phosphate with either adenylic acid or adenosine diphosphate to form adenosine triphosphate.

The facts noted under (a) above have been published and a list of these publications was included in the last progress report. Two papers describing in detail the experiments in which chemical fractionation of all the acid-soluble organic phosphorus compounds in human erythrocytes was carried out, and which led to conclusion (b) above, have been completed and submitted to the Archives of Biochemistry and Biophysics for possible publication (6,7).

Preliminary experiments with chicken erythrocytes have been performed to compare the phosphate uptake of nucleated erythrocytes with that of non-nucleated (mammalian) erythrocytes. Whereas human or rabbit erythrocytes take up 50% of the added radioactive phosphate in two hours and over 90% in eight hours, an equivalent number of chicken erythrocytes take up a maximum of only 15% of the added phosphate in an eight-hour period. This decreased uptake may still be associated with ATP formation, however, since under anaerobic conditions the ATP content of chicken erythrocytes is quickly reduced to zero and practically no inorganic phosphate enters the cells.

The work on chicken erythrocytes is nearing completion. A detailed paper describing this work in relation to kinetic studies on human and rabbit erythrocytes is in preparation (8). Attention will then be focused on a different biological system, mammalian muscle, which is basically similar to the phosphate-erythrocyte system although considerably more complicated. Reference is made to the study of the uptake of potassium ions by isolated intact mammalian muscle which was outlined in the renewal proposal for this grant in 1951. Preliminary experiments have indicated that the isolated intact extensor digitorum longus muscle of rats weighing not more than 50 to 70 gm. is the tissue of choice for these experiments. This preparation has maintained its irritability in Ringer's solution at 5°C. for periods up to eight hours. It will be possible to relate the potassium uptake of this muscle to its oxygen consumption as measured with the Warburg technique and to study the effect of insulin on these mechanisms.

In addition to the phosphate transfer studies, work has been carried out on possible in vitro thyroxine mechanisms with the idea that radioactive thyroxine might prove useful in these studies. In the first study, it was shown that thyroxine stimulated the oxygen uptake during the oxidation of ascorbic acid catalyzed by ascorbic acid oxidase of plant source (9). Certain postulations concerning the mechanism of this reaction were made and are now being used as guides in the search for a similar thyroxine mechanism in animal tissues. It was also found that thyroxine inhibited the cupric ion catalyzed oxidation of ascorbic acid. The kinetics of this reaction were studied intensively and the results have been accepted for publication by the Archives of Biochemistry and Biophysics (10). Both of these studies (9,10) have also been prepared as AEC reports. The thyroxine work is being continued in this department although no additional support is being used from the present grant or will be sought in the continuing grant. However, if the need arises for the use of radioactive thyroxine in this work, support may be asked for this project from the Atomic Energy Commission.

The use of radioisotopes in this laboratory has been useful also in our teaching program. Demonstrations are given to medical students, faculty and to students in other departments. Dr. Correll has been giving a lecture on "The Use of Isotopes in Medical Research" on the program on "Medical Aspects of Special Weapons and Radioactive Isotopes" at the U.S. Naval Medical School at Bethesda, Md. (Program enclosed).

The publications during the past year of work carried out under this grant are appended as well as previous publications (Appendix B).

## APPENDIX A

## PUBLICATIONS AND PAPERS IN PREPARATION UNDER CONTRACT

No. AT-(40-1)-263 SINCE LAST REPORT

1. Gourley, D. R. H. Phosphate turnover in the human erythrocyte. Fed. Proc. 10: 300: 1951.
2. Gourley, D. R. H. A study of the phosphate turnover in the human erythrocyte. Virginia J. Sci. 2: 355: 1951.
3. Gourley, D. R. H. and Matschiner, J. T. Kinetics of phosphate transport in erythrocytes. Fed. Proc. 11: 1952 (in press).
4. Gourley, D. R. H. Failure of  $P^{32}$  to exchange with organic phosphorus compounds. Submitted in full as a report to the A.E.C.; accepted in abridged form for publication in Nature (London), 1952.
5. Gourley, D. R. H. Effect of insulin in vitro on phosphate uptake by erythrocytes from diabetic humans. Submitted in full as a report to the A.E.C.; accepted in abridged form for publication in the Scand. J. Clin. and Lab. Investigation, 1952.
6. Gourley, D. R. H. Phosphate transport and turnover in the human erythrocyte. Submitted for publication in the Arch. Biochem. and Biophys.
7. Gourley, D. R. H. Glycolysis and phosphate turnover in the human erythrocyte. Submitted for publication in the Arch. Biochem. and Biophys.
8. Gourley, D. R. H. and Matschiner, J. T. Kinetics of the uptake of radioactive phosphate by human, rabbit, and chicken erythrocytes. In preparation.

## APPENDIX I, continued

9. Gemmill, C. L. Effects of thyroxine, 3,5-diiodothyronine and thyronine on ascorbic acid oxidation. *Amer. Journ. Physiol.* 167: 349: 1951.
10. Gemmill, C. L. and Plunkett, R. L. The kinetics of the inhibition by thyroxine of the cupric chloride catalyzed oxidation of ascorbic acid. *Arch. Biochem. and Biophysics*, 1952, in press. (prepared also as an A.E.C. report).
11. Gemmill, C. L. The effect of thyroxine on ascorbic acid oxidation. *Int. Congress of Pure and Applied Chem.*, New York, Sept. 13, 1951.

## APPENDIX B

## PREVIOUS PUBLICATIONS UNDER CONTRACT No. AT-(40-1)-263

- Gourley, D. R. H. and Gemmill, C. L. Effect of temperature on uptake of radioactive phosphate by human erythrocytes. *Fed. Proc.*, 9: 277: 1950.
- Gourley, D. R. H. Studies on the process of phosphate uptake by human erythrocytes. *Virginia J. Sci.* 1: 388-389: 1950.
- Gourley, D. R. H. Inhibition of radioactive phosphate uptake in erythrocytes. *Am. J. Physiol.*, 163: 716: 1950.
- Gourley, D. R. H. and Gemmill, C. L. The effect of temperature upon the uptake of radioactive phosphate by human erythrocytes. AECU-733.
- Gourley, D. R. H. and Gemmill, C. L. The effect of temperature upon the uptake of radioactive phosphate by human erythrocytes. *J. Cell. & Comp. Physiol.* 35: 341-352: 1950.
- Gourley, D. R. H. Inhibition of the uptake of radioactive phosphate by human erythrocytes in vitro. AECU-872.
- Gourley, D. R. H. Inhibition of uptake of radioactive phosphate by human erythrocytes in vitro. *Am. J. Physiol.* 164: 213-220: 1951.
- Gemmill, C. L. and Bowman, E. M. Effects of mercurial compounds on saccharase. *Fed. Proc.* 9: 274: 1950.
- Gemmill, C. L. and Bowman, E. M. The effects of mercurial compounds on invertase. *Virginia J. Sci.* 1: 387: 1950.
- Gemmill, C. L. and Bowman, E. M. Reversibility of mercurial inhibition of invertase. *Am. J. Physiol.*, 163: 713: 1950.
- Gemmill, C. L. and Bowman, E. M. The effects of mercurial compounds on invertase. AECU-854.
- Gemmill, C. L. and Bowman, E. M. The effects of mercurial compounds on invertase. *J. Pharm. & Exper. Therap.* 100: 244-249: 1950.

RECORD OF NEGOTIATIONS  
AND AWARD

CONTRACT NO. AT-(40-1)-263

CONTRACTOR: RECTOR & VISITORS OF THE UNIVERSITY OF VIRGINIA

ADDRESS: CHARLOTTESVILLE, VIRGINIA

I - N - D - E - X

| <u>ITEM</u> | <u>DESCRIPTION</u>  |
|-------------|---|
| 1.          | RECORD FOR PROPOSED AWARD OF CONTRACT   |
| 2.          | MEMORANDUM RECORD OF NEGOTIATIONS (VANDEN BULCK TO FILES) DATED APRIL 7, 1949 |
| 3.          | RESEARCH PROJECT PROPOSAL SUBMITTED BY CONTRACTOR                             |
| 4.          | ROUGH AND FINAL DRAFTS OF CONTRACT  |
| 5.          | LETTER OF TRANSMITTAL OF CONTRACT TO CONTRACTOR                               |
| 6.          | BACK-UP FOR MODIFICATION NO. 1  |
| 7.          | BACK-UP FOR MODIFICATION NO. 2  |

CONTRACT No.: AT-(40-1)-263

a. Type of contract or subcontract (architect-engineer, construction, production, research, development, etc.): Research

b. Type of contract or subcontract payment (lump sum, unit price, cost or cost-plus-fixed-fee): Cost

c. Whether contract was negotiated or awarded on competitive basis: Negotiated.

d. Name and address of contractor:

Rector & Visitors of the University of Virginia  
Charlottesville, Virginia

PROJECT LEADER: Dr. Chalmers L. Gemmill

e. Description of work covered under the contract: Study of the effect of beta radiation on the distribution of phosphate in red blood cells and in cardiac muscle.

f. Remuneration (total lump sum consideration, unit prices upon which consideration is based, fixed-fee, total estimated cost of contract, etc., and reprints): Estimated cost during first period is in the amount of \$11,514. Two quarters estimated operating cost will be advanced to the Contractor at the start of the contract. Reimbursement of actual expenditures will be made thereafter on quarterly basis.

g. Brief description of any unusual or unique problems relating to the work to be performed that is the basis for any unusual contract provisions or departure from normal prices or fees:

The work will be performed in Contractor-owned facilities and will be administered by the Contractor in accordance with his normal procedure and policy as a part of the institutions regular program. In addition to furnishing the use of his facilities without cost there will be no charge made for the institutions general and administrative (executive) expenses.

h. Description of such unusual or important contract provisions:

In consideration of the Contractor's contribution (overhead use of facilities) title to all property acquired under the contract will vest in the Contractor, unless listed as an exception under Appendix "A". Funds will be advanced to the Contractor but he will not be required to establish a separate bank account since bills will be paid under his regular procedures. Also, reimbursement vouchers will be supported only by a simple certified listing of expenditures, in lieu of invoices, payrolls, etc., which are usually required. The budget article provides for recoupment of funds advanced but not obligated upon termination or expiration or for application of unobligated balances on the next years budget.

RECORD FOR PROPOSED AWARD OF CONTRACT

Contract No. AT-(40-1)-263

NAME OF CONTRACTOR: Rector & Visitors of the University of Virginia  
ADDRESS: Charlottesville, Virginia  
PROJECT LEADER: Dr. Chalmers L. Gemmill

BACKGROUND

The Commission's General Manager issued a policy statement on January 27, 1949, to the effect that the Commission would greatly expand Commission support of research projects in the fields of biology, medicine and biophysics. The Washington Division of Biology and Medicine was assigned the responsibility for approval of research proposals in these fields and for technical supervision of the resulting research contracts. The several operations offices were assigned the responsibility under an interim procedure for negotiating the contracts and for handling all phases of business administration. In this connection the Washington Division of Biology and Medicine recommends a budget but the Operations office is responsible for, and is authorized to negotiate the details of the budget in accordance with sound business judgment and in harmony with the requirements of the research project.

By memorandum dated February 8, 1949, Dr. L. W. Tuttle, Assistant Chief, Medical Branch, Division of Biology and Medicine, forwarded the approved research project with the University of Virginia Medical School, together with a recommended budget for the first year and requested ORD to negotiate a contract in accordance with the interim procedure approved by the General Manager in his memorandum referred to above.

BRIEF DESCRIPTION OF THE WORK

Study of the effect of beta radiation on the distribution of phosphate in red blood cells and in cardiac muscle.

AMOUNT OF CONTRACT

It is estimated that the cost of this contract will be \$11,514.00 during the first 15 months beginning April 1, 1949. Funds in the amount of \$11,514.00 have been obligated from Appropriation 8990100.001, Allotment 903-101, Program 620.

TIME OF COMPLETION

The work under this contract will probably continue for a number of years, however, funds will be made available after the initial period of the contract on a year to year basis.

Record for Proposed Award of Contract No. AT-(40-1)-263

SPECIAL CONTRACT PROVISIONS

Every effort has been made to develop a contract which will require a minimum of administrative effort commensurate with sound business practice and which will permit the contractor to conduct his research with the necessary latitude of action for work of this nature and with only slight interference with his normal procedures. The unusual provisions which have been incorporated in the contract are described below:

a. Property

In consideration of the contractor's contribution to the project the contract provides for vesting of title of all property acquired under the contract in the contractor. The contractor will furnish space, use of his facilities already on hand to the extent that such use will not interfere with programs already in progress, and all general and administrative overhead activities. Estimated equipment purchases during the initial period are in the amount of \$2,799.00 and represent items of very little future value in the Commission's program. This property provision will eliminate the need for special property accounting records during the course of the project and will eliminate property disposal problems at the end of the contract. Items of property which may arise in the future budgets and which are deemed to be of sufficient value to the Commission in its other programs will be listed as an exception of this provision in Appendix "A" to the contract. Exceptions to this provision vesting property in the contractor may be made by the Commission by listing in Appendix "A" specific items of property which are deemed by the Commission to be of value to the Commission in its future activities.

b. Advances and Reimbursement

Provision has been made to advance funds to the Contractor at the start of the contract. The contractor will estimate his requirements for the first two quarters. The amount of this estimate will be paid as an advance of funds. The contractor will not be required to establish a separate bank account. After the end of each quarter the contractor will submit a voucher supported by simple certified listing of his expenditures during the preceding quarter. Invoices, payrolls, and other normal types of supporting documents will not be required, however, the contractor agrees to keep records showing his expenditures and these records are open to AEC inspection at any time. The substitution of a certified schedule of expenditures for usual supporting documents is agreeable to the local General Accounting Office since the Comptroller General has previously approved this procedure for use on similar OSRD Research and Development contracts. Provision

Record for Proposed Award of Contract No. AT-(40-1)-263

is also made in the contract for recouping any portion of the advance not actually obligated by the Contractor in the performance of the contract. This adjustment will be made on an annual basis and the unobligated balance will either be recouped or applied on the next years budget.

## Office Memorandum • UNITED STATES GOVERNMENT

TO : The Files

DATE: April 7, 1949

FROM : C. Vanden Bulck, Special Assistant to the Manager

SUBJECT: NEGOTIATION OF RESEARCH CONTRACT WITH UNIVERSITY OF VIRGINIA MEDICAL SCHOOL ON MARCH 30, 1949

REFER TO

SYMBOL: SA:CV

On March 30, 1949, Dr. Holland and the writer met with Dr. Charles L. Gemmill, Project Leader, Dr. DuPard, Dean of the Medical School, and Mr. Shea, Bursar of the University. Mr. Yakimchick, who was scheduled to arrive in Charlottesville on the morning of the 30th, was delayed until late in the day due to a wreck on the N & W Railroad. In order to maintain our schedule Dr. Holland and the writer proceeded with an explanation of the contract terms and the negotiation thereof.

The original budget for the University involved overhead in the amount of \$935. The University agreed to eliminate charges for this item in lieu of obtaining title to the equipment purchased under the subject contract.

The negotiation was undertaken subject to a request contained in memorandum dated February 8, 1949, from Dr. L. W. Tuttle, Assistant Chief of the Medical Branch, Division of Biology and Medicine, Washington, D. C.

The period of the contract was to run from April 1, 1949, to March 31, 1950. At the cost of an additional \$1,000 this office was able to extend the contract for three active months so as to coincide with the Commission's fiscal year and the contract as finally negotiated runs from April 1, 1949, to June 30, 1950, with option for renewal subject to the submission of an acceptable program and budget.

The contract will be financed by Commission funds on the basis of the contractor's estimated expenditures for the first 6 months and review of actual expenditures on a quarterly basis thereafter. In no event will payments in excess of the contract amount, \$11,514, be made. If these funds are not actually expended during the contract period, as revised, the balance will be available for future extensions.

Mr. Yakimchick finally arrived at 3:30 p.m. and proceeded to Raleigh, North Carolina, for negotiation of two contracts with North Carolina State College.

*C. Vanden Bulck*  
C. Vanden Bulck

Vanden Bulck:lm

The Files

April 7, 1949

C. Vanden Bulek, Special Assistant to the Manager

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*C. Vanden Bulek*  
C. Vanden Bulek

Vanden Bulek:ln

In Reply Refer To:  
KRAM

Oak Ridge, Tennessee  
March 22, 1949

Mr. Chauncey L. Council  
University of Virginia Medical School  
Charlottesville, Virginia

Pursuant to your telephone conversation with Mr. Charles Vanden Balck of this office we have completed the preparation of the contract for the research program which you have presented to the Atomic Energy Commission.

Mr. Vanden Balck and I expect to be in Charlottesville at about 9:30 a.m. on Wednesday, March 23rd, for the purpose of completing negotiations with you and the other representatives of the University of Virginia.

Sincerely yours,

Albert E. Holland, Sr., M.D.  
Director of Research and Medicine

CC: C. Vanden Balck

Holland/sg

MAR 23 1949

OAK RIDGE RESEARCH

111123

**Office Memorandum • UNITED STATES GOVERNMENT**

TO : C. Vanden Bulck, Special Assistant to Manager      DATE: February 15, 1949

FROM : Albert H. Holland, Jr., M.D., Director, Office of  
Research and Medicine

SUBJECT: RESEARCH PROJECT - UNIVERSITY OF VIRGINIA MEDICAL SCHOOL

REFER TO

SYMBOL: RM:AMC

Transmitted herewith are the proposal and correspondence pertaining to the research project entitled: "The Effect of Beta Radiation on the Distribution of Phosphate in Red Blood Cells and in Cardiac Muscle".

It is requested that you initiate negotiation of the contract. The staff of the Office of Research and Medicine will furnish necessary assistance.



Albert H. Holland, Jr., M.D.

Attachments:

1. Memo frm L. Tuttle to J. C. Franklin  
dtd 2-8-49
2. Cpy of Proposal
3. Cpy of ltr to Gemmill

Corley:aw

C. Vanden Balck, Special Assistant to Manager

February 15, 1949

Albert H. Holland, Jr., M.D., Director, Office of  
Research and Medicine  
RESEARCH PROJECT - UNIVERSITY OF VIRGINIA MEDICAL SCHOOL

REFER TO  
SYMBOL: M-1480

Transmitted herewith are the proposal and correspondence pertaining  
to the research project entitled: "The Effect of Bone Phosphorus on  
the Metabolism of Phosphate in the Blood Cells and in other tissues."

It is requested that you initiate negotiation of the contract. The  
staff of the Office of Research and Medicine will handle necessary  
negotiations.

Albert H. Holland, Jr., M.D.

Attachments:

1. Memo from L. Tuttle to J. C. Franklin  
dtd 2-8-49
2. Copy of Proposal
3. Copy of ltr to Comill

Corleyson

## Office Memorandum • UNITED STATES GOVERNMENT

TO : Mr. John C. Franklin, Area Manager  
Office of Oak Ridge Operations

DATE: February 8, 1949

FROM : L. W. Tuttle, Asst. Chief, Medical Branch  
Division of Biology & Medicine, Washington *L. W. Tuttle*

SUBJECT: REQUEST TO NEGOTIATE CONTRACT FOR DIVISION OF BIOLOGY AND MEDICINE

REFER TO  
SYMBOL: BM:LWT  
001924

This Division has approved AEC support of a research project entitled: "The Effect of Beta Radiation on the Distribution of Phosphate in Red Blood Cells and in Cardiac Muscle," under the supervision of Dr. Chalmers L. Gemmill of the Department of Pharmacology, University of Virginia Medical School, Charlottesville, Virginia. The level of support authorized is not to exceed \$10,500. A copy of the proposal and pertinent correspondence are inclosed.

Under the provisions of the General Manager's "Interim Procedure for Handling Research Proposals and contracts in the field of Biology and Medicine and Biophysics" dated January 27, 1949, the Office of Oak Ridge Operations is requested to negotiate an appropriate contract.

In our opinion, restricted data is not likely to be used or developed in this investigation. The investigator is expected to publish his scientific results in the appropriate journals.

Progress reports at 6 month intervals (6 copies) sent to this office, with informal letter reports at the investigators discretion or when significant results accrue, are desired.

The Medical Branch of the Division of Biology and Medicine will have responsibility for technical supervision of the program and liaison with the Operations Office.

By copy of this memorandum, the Budget Branch is requested to allot funds in the amount of \$10,500 to the Office of Oak Ridge Operations for the above purpose.

Attachments:  
Cpy of Proposal  
Cpy of ltr. to Gemmill

MEDICINE, HEALTH & SAFETY

*R. W. Tuttle*  
FEB 11 1949

~~CONTRACTS~~ 1-1

LWT:ADR

EM: NT

February 3, 1948

Dr. Chalmers L. Gemmill  
Professor of Pharmacology  
Department of Pharmacology  
University of Virginia Medical School  
Charlottesville, Va.

Dear Dr. Gemmill:

The staff of this Division has reviewed your proposal for support of a project on "The Effect of Beta Radiation on the Distribution of Phosphate in Red Blood Cells and in Cardiac Muscle." We believe that the investigation is of fundamental importance and are prepared to recommend its support at the level of approximately \$10,000.

Inasmuch as your proposed budget shows substantial outlays for permanent equipment: autoscaler, centrifuge and a refrigerator; it is believed that the figure of \$1,000 for additional equipment should be subject to negotiation by the contracting office.

The proposed contract will be negotiated by the Office of Oak Ridge Operations and it should be noted that the business aspect of the contract including details of the budget will be handled by that office and that research should not be commenced or obligations incurred without prior agreement with that office.

You may look forward to hearing from the representative of the Office of Oak Ridge Operations in the near future.

Sincerely yours,

L. T. Tuttle,  
Asst. Chief, Medical Branch  
Division of Biology & Medicine

cc: Office of Oak Ridge Operations

*Attch. 4*

1111127

Application for a Grant from the Research Fund of the U. S. Atomic Energy Commission.

1. RESEARCH PROJECT

a. Title of Investigation: The effect of beta radiation on the distribution of phosphate in red blood cells and in cardiac muscle.

b. Responsible Investigator: Chalmers L. Gemmill, M.D., Professor of Pharmacology, University of Virginia, Charlottesville, Virginia.

c. Plan of Research: During the past year, a study has been made of the transfer of radioactive phosphorus from the plasma into the red blood cell under the influence of various anesthetics. Three facts came out of this work (1) the transfer of radioactive phosphorus is dependent on temperature and the concentration of glucose; (2) the rate of transfer varies in various samples of human blood; (3) certain anesthetics block this transfer. Factors (1) and (3) demonstrate that this transfer is dependent on metabolic activity of the red blood cell and that this transfer is not a simple process of diffusion. These results are being published in the Journal of Pharmacology and Experimental Therapeutics.

It is now proposed to continue these experiments with a study of phosphate distribution between the various carbohydrate factors in the

UNITED STATES ATOMIC ENERGY COMMISSION  
OAK RIDGE OPERATIONS  
POST OFFICE BOX E  
OAK RIDGE, TENNESSEE

RESEARCH CONTRACT

CONTRACT NO.: AT-(40-1)-263  
CONTRACTOR: Rector & Visitors of the University of Virginia  
ADDRESS: Charlottesville, Virginia  
PROJECT: Study of the Effect of Beta Radiation on  
the Distribution of Phosphate in Red Blood  
Cells and in Cardiac Muscle.  
PROJECT LEADER: Dr. Chalmers L. Gemmill  
AMOUNT OF CONTRACT: \$11,514.00  
CONTRACT ASSIGNED TO:

FOR TECHNICAL ADMINISTRATION

Medical Branch  
~~Division of Biology and Medicine~~

Atomic Energy Commission  
1901 Constitution Avenue, N. W.  
Washington 25, D. C.

FOR BUSINESS ADMINISTRATION

Office of Research and Medicine  
U. S. Atomic Energy Commission  
Oak Ridge Operations  
Post Office Box E  
Oak Ridge, Tennessee

1111129

THIS CONTRACT, entered into this 1st day of April, 1949, by the UNITED STATES OF AMERICA (hereinafter called the "Government"), acting through the UNITED STATES ATOMIC ENERGY COMMISSION (hereinafter called the "Commission") and RECTOR & VISITORS OF THE UNIVERSITY OF VIRGINIA (hereinafter called the "Contractor");

ARTICLE I - PURPOSE AND SCOPE

1. The Commission, in furtherance of its policy of assisting and fostering private research in the field of atomic energy, desires to support the Contractor's fundamental research in the field of biology and medicine.

2. The work shall consist of research and study of the effect of Beta Radiation on the distribution of phosphate in red blood cells and in cardiac muscle.

and submission of reports thereon. The plan of approach to the problem and the agreed upon program and budget for the project are described in Appendix "A" hereto.

3. The work will be carried out by the Contractor under the direction of Dr. Chalmers L. Gemmill.

ARTICLE II - TERM OF CONTRACT

The performance of work under this contract shall commence on April 1, 1949 and shall continue until June 30, 1950; provided, however, that the term of this contract may be extended by mutual agreement, it being recognized by the parties that completion of the research project described herein may involve a period of several years.

ARTICLE III - PROGRAM DEVELOPMENT AND FINANCING

1. PAYMENT

a. Payments to the Contractor by the Government under this contract during the period beginning April 1, 1949 and ending June 30, 1950, shall not exceed the sum of Eleven thousand five hundred fourteen (\$11,514.) and the Commission has obligated funds in this amount for such purposes. However, this sum may be revised at any time by mutual agreement of the parties with or without a formal modification of this contract.

b. On the effective date of this contract the Commission shall pay to the Contractor a sum which shall represent a mutually agreed upon estimate of the Contractor's cost of operations under this contract during the first two quarters. As soon as practicable after the end of the first quarter, and after the end of each succeeding quarter during the term of this contract, the Contractor shall submit to the Commission a certified voucher supported by a certified schedule of the Contractor's expenditures under this contract during the preceding quarter, and the Commission shall promptly pay all such vouchers. However, the initial advance payment, together with all quarterly payments, shall not exceed the total sum described in Section 1.a. of this Article, as such sum may be revised by mutual agreement.

2. PROGRAM AND BUDGET

Prior to April 1, 1950 the Contractor will submit to the Commission a proposed program and budget for the period July 1, 1950 through June 30, 1951, showing the proposed work to be financed by the Commission and the Contractor. Concurrently with the above program and budget submission the Contractor shall furnish the Commission with a financial statement showing the obligations incurred and the expenditures made in the preceding period. On or before June 1, 1950, or on such other date as may be agreed upon, the Contractor and the Commission shall negotiate as to the amount to be paid by the Commission for the services to be rendered by the Contractor in carrying on the work for the period July 1, 1950 through June 30, 1951. Such amount shall be incorporated in a formal modification to this contract. In negotiating the new budget for said period the unobligated balance of funds paid to the Contractor covering the budget for the preceding period shall be applied in reduction of funds required to cover the new budget. Upon completion of the contract work or upon earlier termination of this contract, the Contractor shall return to the Commission the unobligated portion of all payments made by the Commission to the Contractor under this contract.

ARTICLE IV - ADMINISTRATION OF CONTRACT BY COMMISSION

The Commission has assigned the responsibility for administering the technical and scientific aspects of this contract to:

Medical BranchDivision of Biology and Medicine

U. S. Atomic Energy Commission  
1901 Constitution Avenue, N. W.  
Washington 25, D. C.

Responsibility for administering the business aspects of this contract, including contract negotiations, budget, payment, audit, etc., has been assigned by the Commission to:

Office of Research & Medicine  
Oak Ridge Operations Office  
U. S. Atomic Energy Commission  
Post Office Box E  
Oak Ridge, Tennessee

The Contractor may, as necessary, communicate directly with the appropriate office, as indicated above. The Contractor shall furnish information copies of communications, memoranda of telephone conversations, or other contacts to Oak Ridge Operations Office on all direct dealings with the Washington Office.

ARTICLE V - REPORTS, RECORDS AND INSPECTION

1. The Commission shall have the right to inspect in such manner and at such times as it deems appropriate all activities of the Contractor arising in the course of the work under this contract.
2. The Contractor shall make quarterly progress reports to the Commission on all its activities under this contract, including a list of personnel working on the project. Names appearing for the first time should be accompanied by a brief statement of the individual's background, training and experience. As soon as practicable after the end of the term of this contract and any renewal thereof the Contractor shall make a technical report to the Commission of all its activities under this contract. In the interest of reducing the effort required in preparing these reports the Contractor may include as a part of such reports copies of pertinent technical papers prepared for publication in customary scientific publication channels. At the time technical papers prepared by the Contractor relating to the work hereunder are submitted for publication in customary scientific publication channels the Contractor shall furnish the Commission with information copies of such papers.
3. If, during the course of the Contractor's activities under this contract, any technical findings are made which, in the opinion of the Contractor, would be of special interest to the Commission, the Contractor shall immediately make a report of such technical findings to the Commission.
4. The Commission will require five (5) copies of all reports and papers. Two (2) copies shall be sent to Washington and three (3) copies to Oak Ridge, addressed as shown in Article IV of this contract. The Commission shall have the right to reproduce and distribute at its discretion all such reports and technical papers. Appropriate credit lines will be included in all such reproductions.
5. The Contractor agrees to keep records and books of account showing the manner of expenditures of all funds received by it pursuant to this contract.
6. The Commission shall at all times be afforded access to the premises and to all books, records, correspondence, instructions, drawings, receipts, vouchers, and memoranda of record value of the Contractor pertaining to said work.

ARTICLE VI - PROPERTY FURNISHED TO CONTRACTOR - LIABILITY

1. RESERVATION BY GOVERNMENT

The Government reserves the right to furnish any materials, equipment or supplies which may be required in the performance of this contract. Except as provided in paragraph 3 of this Article, all property so furnished shall be and remain the property of the Government. The Contractor shall, to the extent practicable, cause all capital items of Government property so furnished to be suitably marked with an identifying symbol indicating Government ownership and the uses and disposition of such items shall be made a matter of record.

2. LIABILITY FOR GOVERNMENT-OWNED PROPERTY

Except as otherwise specifically provided, the Contractor shall not be liable for loss or destruction of or damage to property of the Government in the possession or control of the Contractor in connection with this contract (hereinafter called "Government property") unless such loss, destruction or damage results from wilful misconduct or failure to exercise good faith on the part of the Contractor's corporate officers, Executive Director, or Director of any program administered by the Contractor in the performance of this contract.

3. TITLE TO PROPERTY PURCHASED BY CONTRACTOR

Notwithstanding any other provisions of this Article VI and in consideration of the Contractor's contribution to the research project described in Appendix "A" of this contract, title to all materials, tools, machinery, equipment and supplies, acquired from sources other than the Government, or manufactured by the Contractor under this contract (including items manufactured in whole or in part from property furnished by the Government but only to the extent the Government has not designated such property as capital), shall vest in the Contractor, except that title to items of property described in Section 2.c. of Appendix "A" shall vest in the Government.

ARTICLE VII - PURCHASE OF RADIOISOTOPES

The Contractor shall purchase, to the extent available in appropriate form, all radioisotopes required in the performance of the work hereunder, through the Commission's Isotope Division, Post Office Box E, Oak Ridge, Tennessee. (See

Article X) ARTICLE VIII - GENERAL PROVISIONS

The provisions of Appendix "B", attached hereto, are hereby made a part of this contract.

ARTICLE IX - AUTHORIZATION

This contract is authorized by and has been executed under the Atomic Energy Act of 1946.

ARTICLE X - ALTERATIONS

The following alterations to this contract were made by mutual agreement of the parties prior to its execution:

Add the words "stable isotopes, irradiation services and cyclotron time" after the word "radioisotopes" in the second line of Article VII.

IN WITNESS WHEREOF, the parties hereto have executed this contract the day and year first above written.

UNITED STATES OF AMERICA

BY: UNITED STATES ATOMIC ENERGY COMMISSION

BY: [Signature]  
R. W. Cook, Deputy Manager  
RECTOR AND VISITORS OF THE  
UNIVERSITY OF VIRGINIA  
(Contractor)

WITNESSES:

[Signature]  
Wayne M. Rule

BY: [Signature]  
TITLE: PRESIDENT

ACCEPTANCE BY PROJECT LEADER

I have read the foregoing contract and hereby agree to be bound by its provisions.

[Signature]  
Project Leader

Approved  
W. L. Lippard  
Dean

1. RESEARCH PROJECT

- a. Title of Investigation: The effect of beta radiation on the distribution of phosphate in red blood cells and in cardiac muscle.
- b. Responsible Investigator: Chalmers L. Gemmill, M.D., Professor of Pharmacology, University of Virginia, Charlottesville, Virginia.
- c. Plan Of Research: During the past year, a study has been made of the transfer of radioactive phosphorus from the plasma into the red blood cell under the influence of various anesthetics. Three facts came out of this work (1) the transfer of radioactive phosphorus is dependent on temperature and the concentration of glucose; (2) the rate of transfer varies in various samples of human blood; (3) certain anesthetics block this transfer. Factors (1) and (3) demonstrate that this transfer is dependent on metabolic activity of the red blood cell and that this transfer is not a simple process of diffusion. These results are being published in the *Journal of Pharmacology and Experimental Therapeutics*. It is now proposed to continue these experiments with a study of phosphate distribution between the various carbohydrate factors in the red blood cell and in the beating isolated heart. These experiments will give information concerning the metabolism of these two tissues. When a definite correlation is found for the distribution of phosphates, the concentration of radioactive phosphorus will be increased to a point where a change may be produced due to the primary effect of the beta radiation. If such an effect is obtained, a detailed analysis of the enzymes concerned in the uptake of phosphorus in the glycogen cycle will be undertaken.

The laboratory is equipped with an autoscaler, Geiger tubes and monitoring devices. It is also prepared and equipped to do the fractionation and analysis of the phosphate compounds in the glycogen cycle. There is need, however, for additional scaler and Geiger tubes. There is also need for a high speed centrifuge and a refrigerator. There is need for a trained research assistant and for a technician.

2. BUDGET

- a. The Contractor will furnish:
  - (1) A laboratory equipped with an autoscaler, Geiger tubes and monitoring devices.
  - (2) The Contractor is also prepared and equipped to do the fractionation and analysis of the phosphate compounds in the glycogen cycle.
  - (3) Services of Dr. Chalmers L. Gemmill as project leader during regular school term.

(4) Administrative and clerical assistance and other overhead.

- b. The Commission will furnish funds not to exceed \$11,514 to be expended roughly as follows:

Personnel

|                                  |          |          |
|----------------------------------|----------|----------|
| Project Leader (3 months salary) | \$2,100. |          |
| Research Assistant (10 months)   | 3,000.   |          |
| Technician (15 months)           | 2,500.   |          |
| Subtotal.....                    |          | \$7,600. |

Equipment

|                                 |        |          |
|---------------------------------|--------|----------|
| SC-Sample Holder and Tube Mount | \$ 29. |          |
| Washing Machine - Charlab       | 750.   |          |
| Equipment for Machine           | 100.   |          |
| Manostat                        | 95.    |          |
| SU-3 Beta-Gamma Monitor         | 310.   |          |
| One TGC Counter - 2 tubes       | 75.    |          |
| Two TGC Counters - 1 tube       | 100.   |          |
| 2000 Aluminum plates            | 240.   |          |
| 3 Thin Wall Beta Counters       | 75.    |          |
| Edge Service                    | 25.    |          |
| Glassware                       | 500.   |          |
| Other Apparatus                 | 500.   |          |
| Subtotal.....                   |        | \$2,799. |

Chemicals

|                 |         |         |
|-----------------|---------|---------|
| 150 m c P32     | \$ 315. |         |
| Liquid Air      | 100.    |         |
| Other Chemicals | 100.    |         |
| Subtotal.....   |         | \$ 515. |

Animals and Blood Donors 300.

Travel 300.

Total..... \$11,514.00

The above equipment will implement the Contractor's laboratory.

It is understood and agreed, by and between the parties hereto, that the Contractor, in expending the funds provided by the Government, shall be guided by, but not bound to conform to, the details of the program and budget set forth above.

- c. Items of property procured or manufactured by the Contractor under this contract, title to which will vest in the Government. See Article VI, Section 3.

QUANTITY

NONE

DESCRIPTION

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## APPENDIX "B"

### GENERAL PROVISIONS

#### 1. PATENTS

a. Whenever any patentable invention or discovery is made or conceived by the Contractor or its employees in the course of any of the work under this contract, the Contractor shall furnish the Commission with complete information thereon; and the Commission shall have the sole power to determine whether or not and where a patent application shall be filed, and to determine the disposition of the title to and rights under any application or patent that may result. The judgment of the Commission on these matters shall be accepted as final; and the Contractor, for itself and for its employees, agrees that the inventor or inventors will execute all documents and do all things necessary or proper to carry out the judgment of the Commission.

b. No claim for pecuniary award under the provisions of the Atomic Energy Act of 1946 shall be asserted by the Contractor or its employees with respect to any invention or discovery made or conceived in the course of any of the work under this contract.

c. Except as otherwise authorized in writing by the Commission, the Contractor will obtain patent agreements to effectuate the purposes of paragraphs a. and b. of this article from all persons who perform any part of the work under this contract, except clerical and manual labor personnel who will not have access to technical data.

d. Except as otherwise authorized in writing by the Commission, the Contractor will insert in all subcontracts provisions making paragraphs a., b., and c. of this Article applicable to the subcontractor and its employees.

#### 2. PUBLICATIONS

The Contractor shall have full freedom of publication of the results of the research under this contract and the Contractor is urged to disseminate the results of the work through customary scientific publication channels, except that "restricted data" as defined in the Atomic Energy Act of 1946 shall be governed by the provisions of Paragraph 3 of this Appendix "B". All publications shall include a reference that the results were developed under a Commission sponsored project.

#### 3. DISCLOSURE OF INFORMATION

a. It is understood that the work under this contract will not involve restricted data and the Contractor will perform such work as unclassified work. However, if in the course of such work any disclosures are made or any data used or developed that constitute restricted data, the Contractor shall promptly inform the Commission and shall classify and safeguard all

discoveries and data in accordance with the requirements of the Commission. It is understood that the person directing research work under this contract shall have been cleared by the Commission for access to restricted data. The Contractor agrees that it will not permit any individual to have access to restricted data until the Federal Bureau of Investigation shall have made an investigation and report to the Commission of the character, associations and loyalty of such individual and the Commission shall have determined that permitting such person to have access to restricted data will not endanger the common defense or security. If doubt exists as to whether any discovery or data developed constitute restricted data, prior to the release of those data and before permitting any individual who has not received clearance from the Commission to have access to such data, the Contractor shall seek guidance from the Commission. Furthermore, the Commission reserves the right to require the classification of work whenever in its opinion restricted data are involved.

b. The continuation by the Contractor of work found to involve restricted data will be subject to mutual agreement of the Commission and the Contractor and shall be covered by a modification of this agreement. The phrase "restricted data" as defined in the Atomic Energy Act of 1946 and employed in this section shall mean "all data concerning the manufacture or utilization of atomic weapons, the production of fissionable material, or the use of fissionable material in the production of power, but shall not include any data which the Commission from time to time determines may be published without adversely affecting the common defense and security".

#### 4. DISPUTES

Except as otherwise specifically provided in this contract, all disputes which may arise under this contract and which are not disposed of by mutual agreement shall be decided by a representative of the Commission duly authorized to supervise and administer performance under this contract, who shall reduce his decision to writing and cause a copy thereof to be mailed to the Contractor; said decision shall be final and conclusive, subject to the provisions of the sentence next following. Within thirty (30) days from the date of such mailing, the Contractor may appeal in writing to the Commission, whose written decision thereon, or that of its duly authorized representative, representatives, or board not including the representative mentioned in the preceding sentence, shall be final and conclusive. Pending decision of a dispute hereunder, the Contractor shall proceed with the performance of its undertakings under this contract.

#### 5. SAFETY AND ACCIDENT PREVENTION - INSPECTIONS

The Contractor will comply with health and safety regulations of the Commission required for work of this nature, and permit the Commission and its designees to inspect the work conducted under this agreement.

#### 6. OFFICIALS NOT TO BENEFIT

No member of or Delegate to Congress, or Resident Commissioner shall be admitted to any share or part of this contract or to any benefit that may arise therefrom, but this provision shall not be construed to extend to this contract if made with a corporation for its general benefit.

7. ANTI-DISCRIMINATION

The Contractor, in performing the work required by this contract, shall not discriminate against any employee or applicant for employment because of race, creed, color, or national origin.

8. CONVICT LABOR

The Contractor shall not, in the performance of this contract, employ any person undergoing sentence of imprisonment at hard labor.

9. TERMINATION

a. The Commission may at any time upon 120 days written notice terminate this contract in whole or in part.

b. In the event of termination pursuant to subsection a. the Contractor

UNITED STATES ATOMIC ENERGY COMMISSION  
OAK RIDGE OPERATIONS  
POST OFFICE BOX E  
OAK RIDGE, TENNESSEE

RESEARCH CONTRACT

CONTRACT NO.: AT-(40-1)-263

CONTRACTOR: University of Virginia Medical School

ADDRESS: Charlottesville, Virginia

PROJECT: Study of the Effect of Beta Radiation on  
the Distribution of Phosphate in Red Blood  
Cells and in Cardiac Muscle.

PROJECT LEADER: Dr. Chalmers L. Gemmill

AMOUNT OF CONTRACT: \$9,350.00

CONTRACT ASSIGNED TO:

FOR TECHNICAL ADMINISTRATION

Medical Branch  
Division of Biology and Medicine  
Atomic Energy Commission  
1901 Constitution Avenue, N. W.  
Washington 25, D. C.

FOR BUSINESS ADMINISTRATION

Office of Research and Medicine  
U. S. Atomic Energy Commission  
Oak Ridge Operations  
Post Office Box E  
Oak Ridge, Tennessee

1111140

1st  
April  
called the "Government" acting under the authority of the ATOMIC ENERGY ACT of 1946 hereinafter called the "Commission" and  
**UNIVERSITY OF VIRGINIA MEDICAL SCHOOL** (hereinafter called the "Contractor")

ARTICLE I - PURPOSE AND SCOPE

1. The Commission, in furtherance of its policy of assisting and fostering private research in the field of atomic energy, desires to support the Contractor's fundamental research in the field of biology and medicine.

2. The work shall consist of research and study of the effect of Beta Radiation on the distribution of phosphate in red blood cells and in cardiac muscle.

of reports thereon. The plan of approach, progress reports, and other data shall be submitted to the Commission and the Comision de Asistencia Atomsica, A. H. hereinafter

Dr. Chalmers L. Gemmill.

ARTICLE II - TERM OF CONTRACT

The contract shall be in effect from the date hereinafter set forth on April 1, 1949 and shall continue until March 31, 1950. The term of this contract may be extended by mutual agreement, it being recognized by the parties that completion of the research project described herein may involve a period of several years.

1. PAYMENT

a. Payments to the Contractor by the Government under this contract during the period beginning April 1, 1949 and ending March 31, 1950, shall not exceed the sum of Nine Thousand, Three Hundred Fifty (\$9,350.00) and the Commission has obligated funds in this amount for such purposes. However, this sum may be revised at any time by mutual agreement of the parties with or without a formal modification of this contract.

b. On the effective date of this contract the Commission shall pay to the Contractor a sum which shall represent a mutually agreed upon estimate of the Contractor's cost of operations under this contract during the first two quarters. As soon as practicable after the end of the first quarter, and after the end of each succeeding quarter during the term of this contract, the Contractor shall submit to the Commission a certified voucher supported by a certified schedule of the Contractor's liabilities under this contract during the preceding quarter, and the Commission shall promptly pay all such vouchers. However, the initial advance payment, together with all quarterly payments, shall not exceed the total sum described in section 1(a) of this article, and this sum may be revised by mutual agreement.

2. PROGRAM AND BUDGET

Prior to January 1, 1950 the Contractor will submit to the Commission a proposed program and budget for the period April 1, 1950 through June 30, 1951, showing all proposed work to be financed by the Government and the amount to be concurrently with the above program and budget submitted the contractor shall furnish the Commission with a financial statement showing the obligations incurred and the expenditures made in the preceding period. On or before March 1, 1950, or on such other date as may be agreed upon, the Contractor and the Commission shall negotiate as to the amount to be paid by the Commission for the services to be rendered by the Contractor in carrying on the work for the period April 1, 1950 through June 30, 1951. Such amount shall be incorporated in a formal modification to this contract. In negotiating the new budget for said period the unobligated balance of funds paid to the Contractor covering the budget for the preceding period shall be applied in reduction of funds required to cover the new budget. Upon completion of the contract work or upon earlier termination of this contract, the Contractor shall return to the Commission the unobligated portion of all payments made by the Commission to the Contractor under this contract.

1111142

THE UNITED STATES OF AMERICA  
 FEDERAL BUREAU OF INVESTIGATION

The Commission is hereby notified that the Contractor has accepted the terms and conditions of the contract.

**Medical Branch**

**Division of Biology and Medicine**

1401 ...  
 Washington 25

Responsibility for administration of the contract, including contract negotiations, shall be the responsibility of the Commission to:

Office of Research & Development  
 Oak Ridge Operations Office  
 U. S. Atomic Energy Commission  
 Post Office Box E  
 Oak Ridge, Tennessee

The Contractor may, as necessary, furnish data directly to the appropriate office, as indicated above. The Contractor shall furnish information copies of communications, memoranda of telephone conversations, or other contracts to Oak Ridge Operations Office on all direct communication with the Commission.

**ARTICLE V - REPORTS, RECORDS AND INFORMATION**

1. The Commission shall have the right to request in such manner and at such times as it deems appropriate the submission of the Contractor's reports in the course of the work under this contract.
2. The Contractor shall retain all original reports, data, and records on all its activities under this contract, including all data, reports, and statements of the individual's budget and accounting and other data, and shall make a technical report of the Contractor's work under this contract. In the interim, the Contractor shall retain all pertinent technical papers prepared for publication or distribution through channels. As the Contractor's work progresses, the Contractor shall, through channels, the Commission with copies of pertinent reports.
3. If, during the course of the Contractor's work, any technical findings are made which are of special interest to the Commission, the Contractor shall immediately make a report of such technical findings to the Commission.
4. The Commission will receive five (5) copies of all reports and papers. Two (2) copies shall be sent to Washington and three (3) copies to Oak Ridge addressed as shown in Article II of this contract. The Commission shall have the right to reproduce and distribute a limited number of all such reports and papers. Appropriate credit lines will be included in all such reproduction.
5. The Contractor agrees to keep records and books of account showing the manner of expenditures of all funds received by it pursuant to this contract.
6. The Commission shall at all times be afforded access to all premises and to all books, records, correspondence, instructions, drawings, receipts, vouchers, and memoranda of record value of the Contractor's work under this contract.

ARTICLE VI PROPERTY FURNISHED BY CONTRACTOR - LIABILITY

1. RESERVATION BY GOVERNMENT

The Government reserves the right to furnish any materials, equipment or supplies which may be required in the performance of this contract. Except as provided in paragraph 3 of this Article, all property so furnished shall be and remain the property of the Government. The Contractor shall, to the extent practicable, cause all non-expendable items of Government property so furnished to be suitably marked with an identifying symbol indicating Government ownership and the uses and disposition of such items shall be made a matter of record.

2. LIABILITY FOR GOVERNMENT-OWNED PROPERTY

Except as otherwise specifically provided, the Contractor shall not be liable for loss or destruction of or damage to property of the Government in the possession or control of the Contractor in connection with this contract (hereinafter called "Government property") unless such loss, destruction or damage results from wilful misconduct or failure to exercise good faith on the part of the Contractor's corporate officers, Executive Director, or Director of any program administered by the Contractor in the performance of this contract.

3. TITLE TO PROPERTY PURCHASED BY CONTRACTOR

Notwithstanding any other provisions of this Article VI and in consideration of the Contractor's contribution to the research project described in Appendix "A" of this contract, title to all materials, tools, machinery, equipment and supplies, acquired from sources other than the Government, or manufactured by the Contractor under this contract (including items manufactured in whole or in part from property furnished by the Government but only to the extent the Government has not designated such property as capital), shall vest in the Contractor, except that title to items of property described in Section 2.c. of Appendix "A" shall vest in the Government.

The University of Virginia is hereby authorized to accept and execute on behalf of the University of Virginia the purchase order for the purchase of the work to be done at Oak Ridge National Laboratory operated by General Electric and Carbon Chemicals Corporation a Commission contractor at Oak Ridge, Tennessee. All such orders will be placed through the Commission's Isotope Division, Post Office Box 8, Oak Ridge, Tennessee.

ARTICLE VIII - GENERAL PROVISIONS

The provisions of Appendix "B", attached hereto, are hereby made a part of this contract.

ARTICLE IX - AUTHORIZATION

This contract is authorized by and has been executed under the Atomic Energy Act of 1946.

IN WITNESS WHEREOF the parties hereto have executed this contract this day and year first above written

BY: UNITED STATES ATOMIC ENERGY COMMISSION  
BY: \_\_\_\_\_

WITNESSES

UNIVERSITY OF VIRGINIA MEDICAL SCHOOL

BY: \_\_\_\_\_

TITLE: \_\_\_\_\_

ACCEPTANCE BY PROJECT LEADER

I have read the foregoing contract and hereby agree to be bound by its provisions.

\_\_\_\_\_  
Project Leader

**1. RESEARCH PROJECT**

- a. Title of Investigation: The effect of beta radiation on the distribution of phosphate in red blood cells and in cardiac muscle.
- b. Responsible Investigator: Chalmers L. Gemmill, M. D., Professor of Pharmacology, University of Virginia, Charlottesville, Virginia.
- c. Plan of Research: During the past year, a study has been made of the transfer of radioactive phosphorus from the plasma into the red blood cell under the influence of various anesthetics. Three facts came out of this work (1) the transfer of radioactive phosphorus is dependent on temperature and the concentration of glucose; (2) the rate of transfer varies in various samples of human blood; (3) certain anesthetics block this transfer. Factors (1) and (3) demonstrate that this transfer is dependent on metabolic activity of the red blood cell and that this transfer is not a simple process of diffusion. These results are being published in the Journal of Pharmacology and Experimental Therapeutics. It is not proposed to continue these experiments with a study of phosphate distribution between the various carbohydrate factors in the red blood cell and in the beating isolated heart. These experiments will give information concerning the metabolism of these two tissues. When a definite correlation is found for the distribution of phosphates, the concentration of radioactive phosphorus will be increased to a point where a change may be produced due to the primary effect of the beta radiation. If such an effect is obtained, a detailed analysis of the enzymes concerned in the uptake of phosphorus in the glycogen cycle will be undertaken.

The laboratory is equipped with an autoscaler, Geiger tubes and monitoring devices. It is also prepared and equipped to do the fractionation and analysis of the phosphate compounds in the glycogen cycle. There is need, however, for additional scaler and Geiger tubes. There is also need for a high speed centrifuge and a refrigerator. There will be need for lead bricks for protection in case radioactive phosphorus in high concentrations is used. It is hoped, however, that changes will be observed at levels just above tracer dosages and such large doses will not be required in this work.

There is need for a trained research assistant and for a technician.

**2. BUDGET**

- a. The Contractor will furnish:
  - (1) A laboratory equipped with an autoscaler, Geiger tubes and monitoring devices.
  - (2) The Contractor is also prepared and equipped to do the fractionation and analysis of the phosphate compounds in the glycogen cycle.
  - (3) Services of Dr. Chalmers L. Gemmill as project leader.

(4) Administrative and clerical assistance and other overhead.

- b. The Commission will pay the Contractor the sum of \$9,350.00 to be expended roughly as follows:

|  |            |
|--|------------|
| Research Assistant                     | \$4,000.00 |
| Technician                             | 2,000.00   |
| Additional autoscaler and Geiger tubes | 1,000.00   |
| Centrifuge (High speed)                | 500.00     |
| Refrigerator                           | 350.00     |
| Additional Equipment                   | 1,000.00   |
| Animals                                | 300.00     |
| Travel                                 | 200.00     |
|  | <hr/>      |
|  | \$9,350.00 |

The above equipment will implement the Contractor's laboratory. There will be need for lead bricks for protection in case radioactive phosphorus in high concentrations is used.

It is understood and agreed, by and between the parties hereto, that the Contractor, in expending the funds provided by the Government, shall be guided by, but not bound to conform to, the details of the program and budget set forth above.

- c. Items of property procured or manufactured by the Contractor under this contract, title to which will vest in the Government. See Article VI, Section 3.

QUANTITYDESCRIPTION

None

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1. Assignment

a. Whenever any patentable invention or discovery is made or discovered by the Contractor or by its employees in the course of the performance of this contract, the Contractor shall furnish the Commission with complete information thereon, and the Commission shall give the inventor an opportunity to determine whether or not and where a patent application shall be filed and to determine the disposition of the title to and rights under any application or patent that may result. The judgment of the Commission on these matters shall be accepted as final; and the Contractor, for itself and for its employees, agrees that the inventor or inventors will execute all documents and do all things necessary or proper to carry out the judgment of the Commission.

b. No claim for ownership and control of inventions or discoveries under the Energy Act of 1974 shall be asserted by the Contractor or its employees with respect to any invention or discovery made or conceived in the course of any of the work under this contract.

c. The Contractor shall not, in the course of the performance of this contract, disclose to any person other than the Commission or its employees the results of the work under this contract, and the Contractor shall not, in the course of the performance of this contract, disclose to any person other than the Commission or its employees any information which is classified as secret or confidential under the provisions of the Atomic Energy Act of 1954 and which is not otherwise available to the public.

d. The Contractor shall not, in the course of the performance of this contract, disclose to any person other than the Commission or its employees any information which is classified as secret or confidential under the provisions of the Atomic Energy Act of 1954 and which is not otherwise available to the public.

2. Publication

The Contractor shall have full authority to publish the results of the research under this contract and the Contractor is urged to disseminate the results of the work through such publications as the Commission may recommend. Publications shall be governed by the provisions of Paragraph 3 of this Appendix "B". All publications shall include a statement that the results were developed under a Commission sponsored project.

3. DISSEMINATION OF INFORMATION

a. It is understood that the work under this contract will not involve restricted data and the Contractor will perform such work as unclassified work. However, if in the course of such work any discoveries are made or any data used or developed that would be classified as secret or confidential, the Contractor shall promptly inform the Commission and shall classify and control all

investigation and report to the Commission. The Contractor, its agents and employees of each individual and the Commission shall be deemed to have permitted such person to have access to restricted data will not endanger the common defense or security. If doubt exists as to whether any discovery or data developed constitute restricted data, prior to the release of these data and before permitting any individual who has not received clearance from the Commission to have access to such data, the Contractor shall seek guidance from the Commission. Furthermore, the Commission reserves the right to require the classification of work whenever in its opinion restricted data are involved.

b. The continuation by the Contractor of work found to involve restricted data will be subject to mutual agreement of the Commission and the Contractor and shall be covered by a modification of this agreement. The phrase "restricted data" as defined in the Atomic Energy Act of 1954 and employed in this section shall mean "all data concerning the manufacture, application or storage under the production of fissionable material, or the use of fissionable material in the production of power, but shall not include any data which the Commission from time to time determines may be published without adversely affecting the common defense and security."

**4. DISPUTES**

Except as otherwise specifically stated in this contract, all disputes which arise under this contract and which are not disposed of by mutual agreement shall be decided by a representative of the Atomic Energy Commission. The representative of the Commission shall be appointed by the Commission and shall have the right to examine and cause a copy thereof to be mailed to the Contractor. His decision shall be final and conclusive, subject to the review of the Secretary of the Commission. Within thirty days from the date of such a decision the Contractor may appeal in writing to the Commission whose written decision thereon or that of the representative mentioned in the preceding sentence shall be final and conclusive. Pending decision of a dispute hereunder the Contractor shall proceed with the performance of the work under this contract.

**5. SAFETY AND ACCIDENT PREVENTION - INSPECTION**

The Contractor will comply with health and safety regulations of the Commission required for work of this nature, and permit the Commission and its designees to inspect the work conducted under this agreement.

**6. OFFICIALS NOT TO BENEFIT**

No member of or Delegate to Congress, or Resident Commissioner shall be admitted to any share or part of this contract or to any benefit that may arise therefrom, but this provision shall not be construed to extend to this contract if made with a corporation for its general benefit.



a. The contractor ~~will~~ furnish:

- (1) A laboratory equipped with an autoscaler, Geiger tubes and monitoring devices. The contractor
- (2) is also provided and equipped to do the fractionation and analysis of the phosphate compounds in the glycogen cycles.
- (3) Services of Dr. Chalmers L. Gemmill as project leader.
- (4) Administration and clerical assistance and other overhead.

b. The Commission will pay the contractor the sum of ~~\$9,350.00~~ \$9,350.00 to be expended roughly as follows:

|   |             |
|---|-------------|
| Research Assistant                      | 4,000.00    |
| Technician                              | 2,000.00    |
| Additional Autoscalers and Geiger tubes | 1,000.00    |
| Centrifuge (High speed)                 | 500.00      |
| Refrigerator                            | 350.00      |
| Additional Equipment                    | 1,000.00    |
| Animals                                 | 300.00      |
| Travel                                  | 200.00      |
|   | <hr/>       |
|   | \$ 9,350.00 |

The above equipment will implement the contractor's laboratory. There will be need for lead bricks for protection in case radioactive phosphorus in high concentrations is used.

In Reply Refer to  
SA:CV

Oak Ridge, Tennessee  
April 14, 1949

Rector & Visitors of the University of Virginia  
Charlottesville, Virginia

Attention: Dr. Chalmers L. Gemmill

Dear Dr. Gemmill:

There are enclosed for signature four copies of the research contract which was discussed with you and other University officials on March 30, 1949.

It is requested that you sign the acceptance by the Project Leader indicated on page 5 of the document and that the proper contracting officer of the University sign immediately above that and have his signature witnessed. All copies should be signed and returned to this office. You will be furnished with a signed copy and a conformed copy for your files upon signature by the Commission contracting officer.

It is also requested that at the time you return these contracts that you have the Bureau's office of the University enclose the Standard Form 1034, requesting the payment of funds provided for under Paragraph 1 b. of Article III. Advance payment of your estimated expenditure will be made immediately upon receipt of the voucher.

In order to permit this office to comply with Commission instructions, there are enclosed PSQ forms which it is requested that you complete and submit to this office in order that "Q" security clearance be provided.

Very truly yours,

G. Vanden Bulek  
Special Assistant to the Manager  
Oak Ridge Operations

Encls.:  
Cont. AT-(10-1)-263 (in quad.)  
PSQ form, fingerprint card, etc.  
in connection w/"Q" clearance

Vanden Bulek:lm

1111152

| MEMO ROUTE SLIP<br>FORM ABC-66 (Rev. May 14, 1967)                           |                        | See me about this.<br>Note and return.                 | For concurrence.<br>For signature. | For action.<br>For information. |
|--|------------------------|--|------------------------------------|---------------------------------|
| TO (Name and unit)<br><i>W. Winkler<br/>Off. Asst. Sec.<br/>Off. Council</i> | INITIALS<br><br>DATE   | REMARKS<br><i>Univ of Virginia Cont. AT-(40-1)-263</i> |                                    |                                 |
| TO (Name and unit)<br><i>Expenditures thru 6/30/50 (1st year)</i>            | INITIALS               | <i>11,430.00</i>                                       |                                    |                                 |
| <i>Approved Budget (2nd year)</i>  | DATE                   | <i>10,000.00</i>                                       |                                    |                                 |
| TO (Name and unit)<br><i>Adjusted Budget (2 years)</i>                       | INITIALS               | <i>\$ 21,430.00</i>                                    |                                    |                                 |
| <i>Paid 6/1/50</i>   | DATE                   | <i>4,500.00</i>  |                                    |                                 |
| <i>Bal. to be paid</i>   |                        | <i>\$ 16,930.00</i>                                    |                                    |                                 |
| FROM (Name and unit)<br><i>R. S. Humphreys</i>                               | REMARKS                | <i>58465</i>   |                                    |                                 |
|  |                        | <i>convert to lump sum</i>                             |                                    |                                 |
|  |                        | <i>no budget</i>                                       |                                    |                                 |
| PHONE NO.  | DATE<br><i>6/19/50</i> |  |                                    |                                 |

USE OTHER SIDE FOR ADDITIONAL REMARKS

16-50067-1 U. S. GOVERNMENT PRINTING OFFICE

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TO USAEC OAK RIDGE TENN

AEC GRNC

FOR ALBRECHT FROM TUTTLE

AUTHORIZATION IS HEREBY GIVEN TO RENEW CONTRACT AT-746-1/-263 GEMMILL -

UNIVERSITY OF VIRGINIA AT A LEVEL OF \$10000 INCLUDING OVERHEAD X - INDS 703<sup>5</sup>

OFFICE QUESTIONS THE DESIRABILITY OF PROVIDING ADDITIONAL FLOW-TYPE

COUNTER AND DENSITOMETER X GEMMILL HAS BEEN SO ADVISED X END REF AEC-M

LESEE END REF AEC-149

~~SEN AT-746-1/-263 SINGLE AEC-149~~

12/2310Z MAY

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Application for a renewal of a Research  
Grant from the U.S. Atomic Energy Commission

Contract No. AT-(40-1)-263

Project: Study of the Effect of Beta Radiation on the Distribution  
of Phosphate in Red Blood Cells and in Cardiac Muscle.

Project Leader: Dr. Chalmers L. Gennill  
Department of Pharmacology  
Medical School  
Charlottesville, Virginia

Summary of work done on grant:

A detailed summary of the work done on this grant is being prepared and will be submitted to the Atomic Energy Commission on March 15, 1950. The major portion of this work consisted of defining the conditions for the uptake of radioactive phosphorus in the form of phosphate by the red blood cells. The former methods used by Pertsoff and Gemmill (Journ. Pharm. Exp. Therap., 95, 1949, 106) were modified by placing 2 ml. of blood in Warburg vessels and 0.1 ml. of P 32 solution in the side arm. The reaction was started by tipping the vessels after temperature equilibrium was reached. By removing the vessels at regular intervals and analyzing for the P 32 content of the plasma, the radioactivity of the plasma was determined. Good agreement was obtained for the disappearance of P 32 from the plasma in many samples of blood. (Fig. 1). The uptake process has the characteristics of a first order reaction.

Following the standardization of the uptake curve at 37°C., numerous experiments were carried out at temperatures varying from 15° to 40°C. The uptake of phosphate was small below 22°C., while above 22°C., the uptake increases with temperature (Fig. 2). Using the Arrhenius equation, the activation energy,  $u$ , for this process is 16,700 calories. This work has been submitted for publication to the Journal of Cellular and Comparative Physiology under the title "The Effect of Temperature upon the Uptake of Radioactive Phosphate by Human Erythrocytes in vitro" by Desmond R. H. Gourley and Chalmers L. Gemmill.

In addition to this work, the uptake of radioactive phosphate was studied in diabetic bloods. In the majority of these bloods, there was a delay in the uptake indicating a change in this fundamental mechanism. However, insulin added to the diabetic bloods did not restore the uptake function to normal. Monoiodacetate delays the uptake of radioactive phosphorus in normal bloods. The greater part of this work was carried out by Dr. D. R. H. Gourley, the research assistant supported on this grant.

Another phase of this work was carried out by Dr. Gemmill and Mrs. J. G. Bowman, the technician supported by this grant. In order to get a base line for radiation, it was decided to standardize carefully the kinetics of an enzyme reaction. The enzyme selected was saccharase on account of the simplicity of its activity and the ease of procurement. The kinetics of the reaction has been obtained and the effect of various inhibitors on the reaction has been described. The inhibitors were mainly of the mercury series. This mercury inhibition has been reversed by BAL and increased by cysteine. This work is being prepared for publication. An abstract will be presented at the Federation Meetings at Atlantic City this spring.

In addition, attempts are being made to radioautograph the red blood cells in order to obtain an idea of the distribution of radioactivity in these cells.

#### Plans for Future Work:

Dr. Gourley spent a week with Dr. Sacks at Brookhaven observing Dr. Sacks' methods for the fractionation of phosphate compounds. The major program for the remainder of this year and for part of next year will be to study the various carbohydrate fractions of the red blood cell in an attempt to determine where the phosphate goes in the transfer process. The fact that this reaction is so sensitive to temperature changes, is blocked by metabolic inhibitors and is changed in the diabetic blood indicate the importance of carbohydrate metabolism in this study. Following a thorough study of this mechanism, a similar study will be made on cardiac muscle. Along with this work, the effects of radiation on the kinetics of the saccharase system will be continued.

In the original proposal, it was stated that the concentration of radioactive phosphorus would be raised to a point where the effects of beta radiation may be noticed on these transfer mechanisms. This approach will

not be undertaken until the more fundamental changes in red blood cell, cardiac muscle and the saccharase systems are undertaken and completely explored.

Money needed for Equipment and Personnel:

The chief item of equipment needed is a flow type counter and a scaler. This type of counter is of special use in the phosphate fractionations. A densiometer is needed in connection with the radioautograph methods. The calorimeter is needed for the phosphate determinations. The perfusion apparatus and isolated tissue baths will be used in the heart muscle work. The remainder of the budget is very similar to that of this year. Dr. Gourley is willing to remain for another year. He has shown himself to be a well trained scientist and is doing excellent work.

Budget for July 1, 1950 to June 30, 1951:

Personnel:

|                                 |         |         |
|---------------------------------|---------|---------|
| Project Leader (3 month salary) | 2100.00 |         |
| Research Assistant (12 months)  | 4400.00 |         |
| Technician (12 months)          | 2000.00 | 8300.00 |
|                                 | 8300.00 | 300.00  |

Equipments:

|   |                   |                |
|---|-------------------|----------------|
| 4 stainless steel trays @25.00          | 100.00            |                |
| <del>Flow type counter and scaler</del> | <del>800.00</del> |                |
| Calorimeter                             | 200.00            |                |
| Perfusion apparatus for heart           | 140.00            |                |
| Stand for apparatus                     | 60.00             |                |
| 2 isolated tissue baths @25.00          | 50.00             |                |
| <del>Densiometer</del>                  | <del>350.00</del> |                |
| Badges                                  | 25.00             |                |
| Glassware                               | 300.00            | 200.00         |
| Other apparatus                         | 160.00            | 60.00          |
|   | 2185.00           | 200.00         |
| Chemicals                               | 100.00            | 100.00         |
| Radioactive Phosphorus                  | 315.00            | 315.00         |
| Animals and Blood Donors                | 300.00            | 300.00         |
| Travel                                  | 300.00 / 50.00    | 300.00 / 50.00 |
| Totals                                  |                   | 11500.00       |

\$10,000.00

Contract No. AT-(40-1) 263

Contractor Rector and Visitors of the University of Virginia

RECORD OF EXPENDITURES

| PROJECT   | CONTRACT AMOUNT | EXPENDITURES TO<br>4-30-1950 | BALANCE UNEXPENDED<br>AS OF 4-30-1950 | ESTIMATED EXPENDITURES |                        | ESTIMATED BALANCE<br>UNEXPENDED 6-30-1950 |
|-----------|-----------------|------------------------------|---------------------------------------|------------------------|------------------------|---|
|           |                 |                              |                                       | PERIOD 5/1 - 6/30/1950 | PERIOD 5/1 - 6/30/1950 |   |
| TITLE I   | 11,514.00       | 10,629.24                    | 884.76                                | 800.00                 |                        | <i>See<br/>Sheet</i>                      |
| TITLE II  |                 |                              |                                       |                        |                        |   |
| TITLE III |                 |                              |                                       |                        |                        |   |
| TITLE IV  |                 |                              |                                       |                        |                        |   |
| TITLE V   |                 |                              |                                       |                        |                        |   |
| TOTAL     | 11,514.00       | 10,629.24                    | 884.76                                | 800.00                 |                        | <i>84.76<br/>See</i>                      |

RECORD OF PAYMENTS RECEIVED BY CONTRACTOR

PROJECT

|   | TITLE I | TITLE II | TITLE III | TITLE IV | TITLE V | TOTAL |
|---|---------|----------|-----------|----------|---------|-------|
| INITIAL VOUCHER<br>(ADVANCE OF FUNDS)   | 4500.00 |          |           |          |         |       |
| REIMBURSEMENTS<br>(Subsequent Vouchers) | -       |          |           |          |         |       |
| TOTAL                                   | 4500.00 |          |           |          |         |       |

REPORT SUBMITTED BY:  
Rector and Visitors of the  
University of Virginia

BY: *[Signature]*  
(Contractor)

DATE: MAY 29, 1950

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Contract No. AT-(40-1) 263

Contractor Rector and Visitors of the University of Virginia

RECORD OF EXPENDITURES

| PROJECT      | EXPENDITURES TO  |                  | ESTIMATED EXPENDITURES |                        | ESTIMATED BALANCE<br>UNEXHIBITED 6/30/1950 |
|--------------|------------------|------------------|------------------------|------------------------|--|
|              | CONTRACT AMOUNT  | 4-30-1950        | AS OF 4-30-1950        | PERIOD 5/1 - 6/30/1950 |  |
| TITLE I      | 11,514.00        | 10,629.24        | 884.76                 | 900.00                 | 84.76                                      |
| TITLE II     |                  |                  |                        |                        |  |
| TITLE III    |                  |                  |                        |                        |  |
| TITLE IV     |                  |                  |                        |                        |  |
| TITLE V      |                  |                  |                        |                        |  |
| <b>TOTAL</b> | <b>11,514.00</b> | <b>10,629.24</b> | <b>884.76</b>          | <b>900.00</b>          | <b>84.76</b>                               |

RECORD OF PAYMENTS RECEIVED BY CONTRACTOR

PROJECT

|   | TITLE I        | TITLE II | TITLE III | TITLE IV | TITLE V | TOTAL |
|---|----------------|----------|-----------|----------|---------|-------|
| INITIAL VOUCHER<br>(ADVANCE OF FUNDS)   | 4500.00        |          |           |          |         |       |
| REIMBURSEMENTS<br>(Subsequent Vouchers) |                |          |           |          |         |       |
| <b>TOTAL</b>                            | <b>4500.00</b> |          |           |          |         |       |

REPORT SUBMITTED BY:  
Rector and Visitors of the  
University of Virginia

BY: *[Signature]*  
(Contractor)

DATE: **May 29, 1950**

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## Office Memorandum • UNITED STATES GOVERNMENT

TO J. Wallace Culd, Jr., Assistant General Counsel DATE May 22, 1951

FROM R. G. Humphries, Contract Coordinator

SUBJECT RENEWAL OF CONTRACT AT-(40-1)-263 - UNIVERSITY OF VIRGINIA

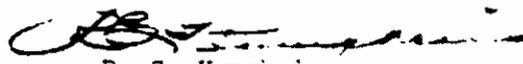
SYMBOL: CO:RGH

Forwarded is an approved proposal for renewal of subject contract for another year, until June 30, 1952. The approved budget as set forth in the Contractor's proposal is in the amount of \$9,158.

This action is covered by Procurement Directive EM-51-160. The Contractor has reported by letter dated May 14, 1951, that there will be no balance of funds available at the end of June 1951.

Accordingly, it is requested that you prepare an appropriate modification to extend this contract on a lump sum basis for another year covering the program and budget outlined in the Contractor's proposal and providing for an additional lump sum payment of \$9,158.

Dr. Edward McCrady will act as technical advisor on this contract action.

  
R. G. Humphries

## Enclosures:

Memo fm Woodruff 4-20-51 w/  
Contractor's ltr 5-14-51  
Memo fm Tuttle 4-5-51 and  
Contractor's proposal

CC: Dr. Edward McCrady  
Mr. Ed. Ziegler

Humphries:lx

1111161

18/ 62

# Office Memorandum • UNITED STATES GOVERNMENT

TO : R. G. Humphries, Contract Coordinator                      DATE: April 20, 1951

FROM : Nathan H. Woodruff, Acting Director, Office of Research and Medicine

SUBJECT: RENEWAL OF CONTRACT AT-(40-1)-263 - UNIVERSITY OF VIRGINIA

SYMBOL: RM:EC

Enclosed is a memorandum from the Division of Biology and Medicine, Washington, authorizing renewal of the subject contract for a period of one year.

Dr. Edward McCrady will act as technical advisor for this office.

*Nathan H. Woodruff*  
Nathan H. Woodruff

Encl.:  
File

Cressman:ec

*Approved by  
Prominent Director  
BM-51-160  
noted 4/5/51  
\$ 9,700.*

*Total App. Budget - \$ 9,158.00  
new year  
no balance as of 6/30/51  
see contract files  
of 5/14/51*

DEPARTMENT OF PHARMACOLOGY  
UNIVERSITY OF VIRGINIA MEDICAL SCHOOL  
CHARLOTTESVILLE, VIRGINIA

May 14, 1951

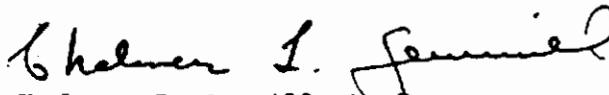
Mr. Nathan E. Woodruff  
Acting Director  
Office of Research & Medicine  
U. S. Atomic Energy Commission  
Oak Ridge, Tennessee

Dear Mr. Woodruff:

In reply to your letter of May 4, 1951, I am enclosing a current statement of our expenditures on our Contract No. AT-(40-1)-263. You will notice in this statement that our balance for the two year period is \$280. This amount will be spent during the next two months, and, therefore, there will be no money left over on the present grant as of June 30, 1951.

I wish to thank you for your aid and interest in this matter.

Sincerely yours,

  
Chalmers L. Gemmill, M. D.  
Professor of Pharmacology

acw

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A-3392

SUMMARY OF EXPENDITURES  
ATOMIC ENERGY COMMISSION GRANT  
CONTRACT NO. AT-(40-1)-263

DEPARTMENT OF PHARMACOLOGY  
University of Virginia Medical School  
Charlottesville, Virginia

Total Amount of grant for Period  
April 1, 1949 to June 30, 1951.....\$21,430.00

Expenditures

April 1, 1949 to June 30, 1949.....\$2778.53

July 1, 1949 to June 30, 1950..... 9761.11

July 1, 1950 to April 30, 1951

Payroll..... \$6680.98  
Travel Expenses..... 200.00  
Petty Cash..... 131.11  
Reprints..... 60.08  
Chemicals..... 211.63  
Equipment..... 1243.80  
Photography..... 23.38  
Film Badge Service... 58.50

8609.54

Total Expenditures for period  
April 1, 1949 to April 30, 1951..... 21,149.18

Balance..... 280.82

Follow-up file

7-0-1-D  
for receipt  
of from

Oak Ridge, Tennessee  
May 4, 1951

Dr. Chalmers L. Sumrell  
Department of Pharmacology  
University of Virginia Medical School  
Charlottesville, Virginia

Dear Dr. Sumrell:

Your renewal proposal dated March 20, 1951, for Contract No. AT-(40-1)-263 has been approved by the Commission's Division of Biology and Medicine in Washington and is now in this office for preparation of the supplemental agreement to cover the new title and budget under the present contract. Your budget, as presented, has been approved with the exception of the allowance of overhead to the University. This item has been reduced from 10% to 8% in accordance with the Commission's established policy, making an allowance of \$678.00 for overhead, and a total budget of \$9,158.00.

It is noted that your renewal proposal does not contain a current statement of your expenditures and an estimate of your expenses to be incurred during the remaining period of this term as contemplated by the provisions of Section 3 of Article III in Modification No. 1 to your Contract No. AT-(40-1)-263.

It will be necessary for us to have this information before the new supplemental agreement can be processed to cover the renewal period, since we must determine the amount of new funds to be added to any balance you estimate you will have as of June 30, 1951, in order to properly cover your approved budget of \$9,158.00 for the year beginning July 1, 1951. It is suggested that you submit the record to show your actual expenditures through the month of April 1951, with the estimate covering May and June 1951. If your estimate of expenditures for May and June 1951 should indicate a monthly rate of expenditures greater than the monthly rate of expenditures experienced in the first ten months of the yearly period, it is requested that you furnish such two months estimate in some detail together with an explanatory statement.

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Dr. Chalmers L. Gammill

- 2 -

May 4, 1951

You may be assured that we will promptly process the renewal supplemental agreement upon receipt of the above information. Your cooperation in furnishing this report will be appreciated.

Very truly yours,

Nathan H. Goodraff  
Acting Director  
Office of Research & Medicine

Humphries:jm

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

DATE: APR 5 1951

TO : Dr. John Roberson, Director, Research  
and Medicine, Oak Ridge Operations Office  
FROM : L. W. Tuttle, Asst. Chief, Medical Branch *LWT*  
SUBJECT: TRANSMITTAL OF RESEARCH PROPOSAL FOR CONTRACT NEGOTIATION  
SYMBOL : BMM:LWT

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: University of Virginia Medical School
2. Investigator (s): Chalmers L. Gemmill, M.D.
3. Title: "The Metabolic Exchange of Radioactive Phosphorus and Potassium in Isolated Cell Systems"
4. ( ) New Contract or (X) Renewal of Contract No. AT(40-1)-263
5. Duration - From: July 1, 1951 To: June 30, 1952
6. AEC Technical Supervision: Medical Branch
7. Recommended Support: \$9,200 including overhead at 8 percent  
Authorized by Procurement Directive No. BM-51-160  
Issued APR 5 1951 \$ 2,200 including 8% overhead  
Activity No. 6300
8. Other Comments: *Dated 4/5/51*

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A-2398

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.

The research program proposed involves essentially zero chance that restricted data will be required or developed during the course of investigation. It is recommended that the program be established without security requirements.

- 10. Reports: (x) 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:
- (x) "A" - Proposal, dated March 20, 1951
  - (x) "B" - Notification letter, dated \_\_\_\_\_
  - ( ) "C" - Other correspondence, \_\_\_\_\_ letters
  - (x) "D" - Procurement Directive BI-51-160

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.) |                                      |

RENEWAL PROPOSAL FOR  
ATOMIC ENERGY COMMISSION GRANT

No. AT-(40-1)-263

NEW TITLE

THE METABOLIC EXCHANGE OF  
RADIOACTIVE PHOSPHORUS AND POTASSIUM  
IN ISOLATED CELL SYSTEMS

CHALMERS L. GEMMILL, M. D.  
Professor of Pharmacology

DEPARTMENT OF PHARMACOLOGY  
University of Virginia Medical School  
Charlottesville, Virginia

March 20, 1951

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(1)

a. Background

*The Contractor has conducted a project on*  
During the past two years, ~~this department has had a grant from the Atomic Energy Commission for the study of~~ The Effect of Radiation on the Distribution of Phosphate in Red Blood Cells and in Cardiac Muscle. ~~AT (10-1) 26~~ Under this ~~grant~~ <sup>project</sup> a study was undertaken of the factors affecting the uptake of radioactive phosphate by human erythrocytes. It was found that this process was very sensitive to temperature changes and various inhibitory agents. In addition, studies were made on the effects of mercurial compounds on invertase. These were undertaken as part of the general program of the laboratory on enzyme reactions. ~~The technician supported by the grant from the A. E. C. aided in this work.~~ Twelve publications (~~References 1-12~~) resulted from this work: six abstracts, three AECU publications and three complete publications. ~~The list of publications are appended to this report.~~ There are several more publications in preparation.

<sup>current</sup>  
The ~~present~~ work concerns a fractionation of the several acid-soluble phosphorus-containing organic compounds in red blood cells after several hours of contact with radioactive phosphate. <sup>(see results of this)</sup> This work will be reported at <sup>seminar, etc.</sup> the ~~Federation~~ <sup>of P.S.I.</sup> Meetings ~~this~~ spring, and a detailed publication will be prepared ~~this~~ <sup>in the</sup> summer. In addition, a study has been made of the uptake of radioactive phosphate by red blood cells at various intervals of time after the blood has been removed from the body. It has been found that nine hours after removal from the body the phosphate uptake by these cells diminishes. It can be restored by the addition of glucose. These facts may be of interest to the blood bank program for it would give a measure of "viability" of the red blood cells.

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Scope and Program

Continuation Proposal: <sup>This project will:</sup> ~~It is proposed to~~ continue to study the effect of various factors on the uptake of radioactive phosphate by human red blood cells and to continue the fractionation of the phosphorus compounds in the cell. The chief factor under consideration will be time after removal from the body. The methods developed in <sup>the Contracting</sup> ~~this~~ laboratory may be very useful as a measure of "viability" of the red blood cell. Blood will be preserved by the usual methods and stored. At various intervals of time, the uptake of radioactive phosphate will be determined. If it is diminished, attempts will be made to restore this activity. Experiments mentioned above have been carried out for nine-hour periods only. It is now planned to carry out such experiments over periods of days.

In addition, a new departure from the former work will be an investigation of the uptake of radioactive potassium by skeletal muscle under the influence of insulin. There is no well developed theory of potassium behavior. Scattered references indicate an implication of K in carbohydrate metabolism. For example:

1. The fall in blood sugar following insulin administration is accompanied by a simultaneous fall of K.
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4. Adrenalin liberates both K and glucose from liver.
5. The work of Roberts et al. with bacteria indicates that K is bound as salts of hexose phosphates.

6. It has been demonstrated that insulin accelerates the uptake of K in rat diaphragm (Willebrands et al.) and in frog muscle (Manery et al.). Very small concentrations of insulin will produce this effect ( $10^{-7}$  units per ml. in rat diaphragm and  $10^{-3}$  units per ml. in frog muscle).

~~It is~~ therefore, <sup>(the Contractor will)</sup> ~~proposed to~~ investigate the uptake of radioactive potassium by skeletal muscle under the influence of insulin. This method will avoid the errors in determining small amounts of potassium by previous methods and give exact information concerning the relationship of potassium and carbohydrate metabolism and insulin action. In 1940-41, Dr. Gemmill studied an insulin effect on rat diaphragm, and Dr. Gourley wrote his Ph. D. thesis on an oxidative effect of the hormone ~~(ref-erences 13-17)~~. Therefore, a background of knowledge is present which will be very useful in this work.

c. Materials, Equipment and Facilities: <sup>Contractor's</sup> This Laboratory is well equipped for this proposed work. The equipment for radioactivity research is adequate. Therefore, permanent equipment needs will be minor for the continuation of this project. Space is limited; however, by next fall, ~~our~~ space will be increased 50 per cent by the addition of a new building.

Personnel:

Chalmers L. Gemmill, B. S., M. D. Principal Investigator.

Desmond R. H. Gourley, B. A., Ph. D. Research Assistant.

Dr. Gourley is a graduate of the [REDACTED] and has been in this department two years working full-time on this project. He is well trained to continue

is work. After Sept. 1, he will be an Assistant Professor in this department and the services of another investigator will be obtained if this grant is renewed. Dr. Courley will continue to work 60 per cent of his time on these projects. Dr. Gemill will devote about 30 per cent of his time. The research assistant will give full time.



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BUDGET

Summer Salary

Chalmers L. Gemmill  
Principal Investigator, 3 months.....\$2860.00

Full Time Salary, 12 months  
Research Assistant..... 4500.00

Expendable Equipment  
Chemicals..... 300.00  
Radioactive phosphorus & potassium..... 300.00  
Animals & Blood Donors..... 300.00

Travel..... 200.00

Total.....\$8150.00

Overhead to University, ~~10~~<sup>8</sup>%..... ~~515.00~~ 678.00

Total Budget.....~~\$9328.00~~

9158.00

C O P Y

DEPARTMENT OF PHARMACOLOGY  
University of Virginia Medical School  
Charlottesville, Virginia

March 14, 1951

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

Dear Sir:

I am enclosing five copies of a renewal proposal on our grant No. AT-(40-1)-263. It has a new title, The Metabolic Exchange of Radioactive Phosphorus and Potassium in Isolated Cell Systems, due to the fact that we wish to direct our attention toward the influence of insulin on the uptake of radioactive potassium in skeletal muscle. We plan to continue our present program at the same time that this newer type of work will be carried out;

Sincerely yours,

/s/

Chalmers L. Gemmill, M.D.  
Professor of Pharmacology

acw

Enclosures

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RENEWAL PROPOSAL FOR  
ATOMIC ENERGY COMMISSION GRANT

No. AT-(40-1)-263

NEW TITLE

THE METABOLIC EXCHANGE OF  
RADIOACTIVE PHOSPHORUS AND POTASSIUM  
IN ISOLATED CELL SYSTEMS

CHALMERS L. GEMMILL, M. D.  
Professor of Pharmacology

DEPARTMENT OF PHARMACOLOGY  
University of Virginia Medical School  
Charlottesville, Virginia

March 20, 1951

(1)

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Continuation Proposal: It is proposed to continue to study the effect of various factors on the uptake of radioactive phosphate by human red blood cells and to continue the fractionation of the phosphorus compounds in the cell. The chief factor under consideration will be time after removal from the body. The methods developed in this laboratory may be very useful as a measure of "viability" of the red blood cell. Blood will be preserved by the usual methods and stored. At various intervals of time, the uptake of radioactive phosphate will be determined. If it is diminished, attempts will be made to restore this activity. Experiments mentioned above have been carried out for nine-hour periods only. It is now planned to carry out such experiments over periods of days.

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It is therefore proposed to investigate the uptake of radioactive potassium by skeletal muscle under the influence of insulin. This method will avoid the errors determining small amounts of potassium by previous methods and give exact information concerning the relationship of potassium and carbohydrate metabolism and insulin action. In 1940-41, Dr. Gemmill studied an insulin effect on rat diaphragm, and Dr. Gourley wrote his Ph. D. thesis on an oxidative effect of the hormone (References 13-17). Therefore, a background of knowledge is present which will be very useful in this work.

Materials, Equipment and Facilities: This laboratory is well equipped for this proposed work. The equipment for radioactivity research is adequate. Therefore, permanent equipment needs will be minor for the continuation of this project. Space is limited; however, by next fall, our space will be increased 50 per cent by the addition of a new building.

**Personnel:**

Chalmers L. Gemmill, B. S., M. D. Principal Investigator.

Desmond R. H. Gourley, B. A., Ph. D. Research Assistant.

Dr. Gourley is a graduate of the [REDACTED] and has been in this department two years working full-time on this project. He is well trained to continue



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BUDGET

Summer Salary

Chalmers L. Gemmill  
Principal Investigator, 3 months.....\$2880.00

Full Time Salary, 12 months  
Research Assistant..... 4500.00

Expendable Equipment

Chemicals..... 300.00  
Radioactive phosphorus & potassium..... 300.00  
Animals & Blood Donors..... 300.00

Travel..... 200.00

Total.....\$1400.00  
Overhead to University, 10 %..... 528.00

Total Budget.....\$9328.00

B W:LNT

2 1 1951

Chalmer L. Gemmill, M.D.  
Department of Pharmacology  
University of Virginia Medical School  
Charlottesville, Va.

Dear Dr. Gemmill:

I am glad to be able to inform you that your request for continued support of "The Metabolic Exchange of Radioactive Phosphorus and Potassium in Isolated Cell Systems" has been approved by the Division of Biology and Medicine. The contractual details will be handled in the usual manner by our Oak Ridge Operations Office.

We are glad to note the significant progress made during the past year and are looking forward to an equally successful year.

Sincerely yours,

L. W. Tuttle  
Asst. Chief, Medical Branch  
Division of Biology & Medicine

CC: Office of Oak Ridge Operations

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

DATE: 100 7 1951

TO : Dr. John Roberson, Director, Research  
and Medicine, Oak Ridge Operations Office  
FROM : L. W. Tuttle, Asst. Chief, Medical Branch  
SUBJECT: TRANSMITTAL OF RESEARCH PROPOSAL FOR CONTRACT NEGOTIATION  
SYMBOL : BMM:LWT

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: University of Virginia Medical School
2. Investigator (s): Chalmers L. Goumill, M.D.
3. Title: "The Metabolic Exchange of Radioactive Phosphorus and Potassium in Isolated Cell Systems"
4. ( ) New Contract or (X) Renewal of Contract No. AT(40-1)-265
5. Duration - From: July 1, 1951 To: June 30, 1952
6. AEC Technical Supervision: Medical Branch
7. Recommended Support: \$9,200 including overhead at 8 percent  
Authorized by Procurement Directive No. BK-51-160  
Issued \_\_\_\_\_ \$ 9,200 including 8% overhead  
Activity No. 6500
8. Other Comments:

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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.

The research program proposed involves essentially zero chance that restricted data will be required or developed during the course of investigation. It is recommended that the program be established without security requirements.

- 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 March 20, 1961
  - ( )  "B" - Notification letter, dated APR 5 1961
  - ( ) "C" - Other correspondence, \_\_\_\_\_ letters
  - ( )  "D" - Procurement Directive BS-61-160

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.) |                                      |

RENEWAL PROPOSAL FOR  
ATOMIC ENERGY COMMISSION GRANT

No. AT-(40-1)-263

NEW TITLE

THE METABOLIC EXCHANGE OF  
RADIOACTIVE PHOSPHORUS AND POTASSIUM  
IN ISOLATED CELL SYSTEMS

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Professor of Pharmacology

DEPARTMENT OF PHARMACOLOGY  
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Charlottesville, Virginia

March 20, 1951

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1111190

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