

UNITED STATES GOVERNMENT

Memorandum

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F.

TO : Ralph Elson, Director
Contract Division

FROM : Herman M. Roth, Director
Laboratory and University Division

SUBJECT: REQUEST FOR CONTRACT ACTION

DATE: OCT 29 1968

OLE:LM

REPOSITORY Oak Ridge Operations Ofc.
Records Holding Area
 COLLECTION Documents 1944-1994
 BOX No. A-59-3 Bldg. 2714-H
Cont. 3734 CA
 FOLDER Univ of Miami 10-29-68

It is requested that you take the necessary steps to process the following described contract action:

1. Nature of Action Requested:

Selection of New Contractor and/or
Negotiation of Contract
Number:
Contractor:

Modification of Contract
Number: AJ(40-1)-3734
Contractor: University of Miami
Miami, Florida

2. Nature of Services to be Covered by Contract: Research

Title: "Evaluation of the Absorbed Dose from the Diagnostic Use of Radiopharmaceuticals."

3. Type of Contract: Support Agreement Cost Type Other

4. Amount of AEC Funds to be Obligated by this Contract Action: \$35,930

5. AEC Percentage of Estimated Total Cost to be Shown by this C/A: 72%

6. Description of Other Changes to be Covered by Contract Action:

Modify contract to provide for the performance of additional research to be completed during the period October 15, 1968 through October 14, 1969. The AEC support ceiling for the extended period is \$35,930. Title to equipment shall vest in the contractor under authority of the Atomic Energy Act of 1954 since the contractor's contribution is expected to equal or exceed the value of the equipment.

CONTRACTS-3734/m

7. Authority:

Form AEC-481 (Contract Authorization) from John R. Trotter to S. R. Sapiric dated October 18, 1968.

R 7211

Herman M. Roth
Herman M. Roth

OLA
C83ho.
10-29-

A. E. Medley
10-29-68

1033824

October 16, 1968

Dr. Edward M. Smith
Department of Radiology
School of Medicine
University of Miami
Biscayne Annex
P. O. Box 875
Miami, Florida 33152

Dear Dr. Smith:

I am pleased to inform you that the Research Committee of the Division of Biology and Medicine has recommended renewal of your contract, AT(40-1)3734, "Evaluation of the Absorbed Dose from the Diagnostic Use of Radiopharmaceuticals," for an additional year at the requested level.

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

With best wishes for a successful year, I am

Sincerely,

bcc: OR ✓

Robert W. Wood, Chief
Radiological Physics and
Instrumentation Branch
Division of Biology and Medicine

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RPIB
Wood:mfb
10/16/68

310505
1968

UNITED STATES GOVERNMENT

Memorandum

*142
file*

TO : **John R. Totter, Director
Division of Biology and Medicine, HQ**

DATE: **September 25, 1968**

FROM : **Herman M. Roth, Director
Laboratory and University Division, OR**

SUBJECT: **RENEWAL OF CONTRACT NO. AT-(40-1)- 3734 WITH THE UNIVERSITY
OF MIAMI (DR. EDWARD M. SMITH)**

OLE:LM

We are submitting for your review and appropriate action the following information concerning the contract which will expire on

- 1. Renewal Proposal (4)
- 2. Progress Report (1)*
- 3. Financial Statement (4)
- 4. 200-Word Summary (3)

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

Herman M. Roth
Herman M. Roth

Enclosures:
As Listed Above

***Additional copies of the Progress Report have been requested.**

BC: C. S. Shoup, w/cy encls.
D. S. Zachry, w/cy progress report
Alice Brown

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R 6417

Adm. Ser. Br.
Medley
Medley:nhb
9/25/68

CONTRACTS - 3734/m

October 16, 1968

Dr. Edward M. Smith
Department of Radiology
School of Medicine
University of Miami
Biscayne Annex
P. O. Box 875
Miami, Florida 33152

Dear Dr. Smith:

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

With best wishes for a successful year, I am

Sincerely,

bcc: OR ✓

Robert W. Wood, Chief
Radiological Physics and
Instrumentation Branch
Division of Biology and Medicine

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10/21/68

U.S. Atomic Energy Commission, Research and Development Division
 Post Office Box E Oak Ridge, Tennessee

Report of Expenditures - Contract AEC AT (40-1) 3734 Period 10/15/67 thru 6/31/68 Anticipated Expenditures remainder of Contract Period

Allocation	Expenditures	Balance	Anticipated Expenditures remainder of Contract Period
Salary and Wages:			
Dr. Edward M. Smith	\$ 3,750.00	\$ 700.23	\$700.23
L. Katchis, Physicist	4,200.00	(360.00)	(360.00)
Vijay Chowdhary, Tech.	3,300.00	2,300.90	2,300.90
Retirement	619.00	230.67	230.67
Social Security	495.00	151.46	151.46
Insurance	26.00	4.86	4.86
Supplies	2,550.00	2,226.22	2,226.22
Services	1,750.00	1,603.88	1,603.88
Equipment	12,500.00	6,529.84	6,529.84
Travel	300.00	247.84	247.84
Communications & Publ.	335.00	117.38	117.38
Sub Total	\$29,825.00	\$ 13,753.28	\$13,753.28
Indirect Costs 49% S &	5,816.00	1,407.37	1,407.37
Wages			
TOTAL	\$35,641.00	\$ 15,160.65	\$15,160.65

UNIVERSITY OF MIAMI CONTRIBUTION

Salaries & Wages:			
Albert J. Gilson, M.D.	\$1,600.00	\$ 1,600.00	\$ 1,600.00
Vijay Chowdhary, Tech.	3,300.00	2,300.90	2,300.90
S.M. Clawser, Secty. III	1,200.00	769.50	769.50
Retirement	336.00	336.00	336.00
Social Security	268.00	205.10	205.10
Supplies	1,500.00	1,000.00	1,000.00
Sub Total	\$ 8,204.00	\$6,211.50	\$ 6,211.50
Ind. Costs 49% of S & W	3,154.00	2,453.50	2,453.50
Total	\$11,358.00	\$8,665.00	\$ 8,665.00

I certify that the above information based upon the accounting records of the University of Miami, is true and correct to the best of my knowledge and belief.

UNIVERSITY OF MIAMI

Edward M. Smith, D.Sc.
 Principal Investigator

F. Kunkel
 Research Accountant

RENEWAL RESEARCH PROPOSAL

for

EVALUATION OF THE ABSORBED DOSE FROM THE
DIAGNOSTIC USE OF RADIOPHARMACEUTICALS

Submitted to

U.S. Atomic Energy Commission

Washington, D. C.

Proposed by

Edward M. Smith, D.Sc.

Division of Nuclear Medicine, Department of Radiology

University of Miami School of Medicine; Miami, Florida

August 1, 1968

Authentication

Date

8/1/68

Date

Eugene E. Cohen

Vice President for Financial Affairs
and Treasurer, University of Miami

Edward M. Smith, D.Sc.

Edward M. Smith, D.Sc.

Assistant Professor of Radiology

University of Miami School of Medicine

The investigations encompassed by this application have been or will be approved by the Committee of Associates of the Investigator(s) in accordance with this institution's assurance on clinical research dated October 24, 1966.

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CONTRACTS - 3734 (Miami)
SEP 16 1968

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1. Title of Project

Evaluation of the Absorbed Dose from the Diagnostic Use of Radiopharmaceuticals.

2. Institution

University of Miami School of Medicine, Department of Radiology, Division of Nuclear Medicine, 1700 N. W. 10th Avenue, Miami, Florida 33136

3. Project Abstract

The evaluation of the absorbed dose received by a patient resulting from a diagnostic procedure employing a radiopharmaceutical is essential if the maximum benefit is to be derived by the patient. Even when the most sensitive and sophisticated instrumentation is used, the quantity of activity administered to the patient limits the quality of the diagnostic information extractable from the study. To obtain the necessary data to calculate the absorbed dose, the tissue distribution of the radionuclide incorporated into the radiopharmaceutical will be studied "in vivo", and the activity concentration in tissue specimens and body fluids will be measured. Acute and chronic toxicological data will be collected in rats, rabbits and dogs for newly introduced radiopharmaceuticals. The physical parameters required for absorbed dose calculations will be experimentally determined, and correlated with theoretically calculated values. The results of these investigations will yield a reliable estimate of the absorbed dose received by various body tissues from new radiopharmaceuticals as they are introduced into use, as well as from the routine radiopharmaceuticals in current use. Since detailed data on tissue distribution with respect to time will be obtained, potentially new clinical applications may evolve from these studies.

4. Scientific Background

The scientific background for this renewal research proposal was presented in the original research proposal dated December 1, 1966.

5. Scientific Scope

A. Objectives

- (1) The collection of clinical data yielding information on the tissue distribution with respect to time of the radionuclide incorporated into the radiopharmaceutical under study.
- (2) Acute and chronic toxicological data for newly introduced radiopharmaceuticals that are studied under this research proposal.

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- (3) Experimental verification of the physical parameters such as absorbed fractions and build-up factors required in the absorbed dose calculation.
- (4) The actual calculation and dissemination of the calculated values for the absorbed dose.

B. Relationship of proposed research to present knowledge and comparable work in progress elsewhere

This material was presented in the original research proposal dated December 1, 1966.

C. General Plan for the Work

The outline presented in this section is for the second year of this project.

(1) Radiopharmaceuticals to be studied

(a) Work will be completed on the radiopharmaceuticals outlined in the original research proposal.

(b) Rhenium-188 as a possible substitute for therapeutic uses of I-131 for thyroid disease and metastatic thyroid cancers will be studied. This radionuclide is available from New England Nuclear Corporation as the W^{188} - Re^{188} generator system. Physical characteristics: W^{188} , $T_{1/2} = 69d$; Re^{188} , $T_{1/2} = 17h$; Δ_{n-p} for $Re^{188} \approx 1.2$ g-rad/ μ Ci-h; and $\Delta_p \approx 0.09$ g-rad/ μ Ci-h. Chemical characteristics: rhenium as perrhenate (ReO_4) behaves as a pseudohalogen and should be concentrated by functioning thyroid tissue. These physical and chemical characteristics should make rhenium-188 a good substitute for I-131. Animal distribution, pharmacological and toxicological studies will be performed before the material is studied clinically.

(c) Metabolizable albumin microspheres labeled with Tc-99m and In-113m will be studied. These particles (3M Company, St. Paul, Minn.) are supplied in a sterile, non-pyrogenic form, and may be labeled as needed with Tc-99m, In-113m and I-131 (Wagner, 1968).

(2) Collection of tissue distribution data

The methods to be employed in the collection of tissue distribution data were presented in the original research proposal dated December 1, 1966. These methods will be varied as required for the particular radiopharmaceutical under study.

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(3) Pharmacological and Toxicological Studies

Toxicologically, metallic indium and rhenium have had adequate study. However, little data is available concerning the toxicology and pharmacology of these ions in their radiopharmaceutical form. It is our intent to perform in depth electrocardiogram and arterial pressure studies on beagle dogs to determine the threshold at which changes in these parameters can be detected, to establish dose-response curves and to ascertain if autonomic stimulation is responsible for the observed responses. The radiopharmaceutical form of these ions will then be used in vascular clearance determinations on the same animals. Erythrocyte and bone marrow studies will be performed on rats. These animals will be exposed both chronically and acutely by venal injection. Microscopic morphological changes, if any, and the threshold at which these changes occur will be determined.

(4) Experimental determination of the physical parameters required in absorbed dose calculations

The methods to be employed in these studies were described in our original research proposal. The progress to date is given in the attached progress report.

(5) Calculation of the Absorbed Dose

The methods described in our original research proposal will be used.

(6) Comparison of the absorbed dose versus the information content of a clinical study

This work was initiated during the first year of our contract, and the results obtained to date are reviewed in our progress report. The objective of this study is to evaluate the interrelationship of the radiopharmaceuticals, radionuclides and organ visualization system on the resultant absorbed dose to a patient having a clinical study versus the clinical information that may be obtained from the study. The approach used in this study is outlined in our progress report.

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6., Scientific Personnel

A. Edward M. Smith, D.Sc., Principal Investigator

This information was provided in the original research proposal dated December 1, 1966. A minimum of 20 per cent of Dr. Smith's time will be devoted to this project.

B. Albert J. Gilson, M.D., Co-Investigator

This information was provided along with my letter dated May 15, 1967, to Dr. Robert Wood. A minimum of 20 per cent of Dr. Gilson's time will be devoted to this project.

C. George W. James, Ph.D., Radiopharmacologist

Education:

Wake Forest College, Wake Forest, N. C., 1945-1949.

B.S. in General Science

University of Florida, Gainesville, Florida, 1949-1952.

B.S. in Pharmacy

University of Miami, Coral Gables, Florida, 1963-1968.

Ph.D. in Pharmacology

Professional Experience:

1. University of Miami School of Medicine; Miami, Florida (1968-present); Division of Nuclear Medicine, Department of Radiology; Postdoctoral Fellowship in Radiological Research from James Picker Foundation (1968-1969).
2. Palm Springs General Hospital; Hialeah, Florida (1965-1966); Chief Pharmacist.
3. Hialeah Hospital; Hialeah, Florida (1961-1963); Chief Pharmacist.
4. North Miami General Hospital; North Miami, Florida (1960); Chief Pharmacist.
5. Key Pharmaceuticals, Inc.; Miami, Florida (1956-1959).
 - a. Development New Dosage Forms
 - b. Preparation NDA
 - c. Production Supervisor

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6. East Hialeah Pharmacy; Hialeah, Florida (1959-1962); Registered Pharmacist and Manager.
7. Weaver Drug; Miami, Florida (1955-1956); Registered Pharmacist and Manager.
8. Model Pharmacy (1952-1955); Registered Pharmacist.

Research Activities:

1. Effect of 60-Co Irradiation on Erythrocytes of Female Fischer Rats.
2. Metabolism and Tissue Specificity of 3-Nitro-3-hexene, A Carcinogenic Constituent of Smog.
3. Acute Toxicity of Tungsten X-ray Contrast Agent.
4. Vascular Permeability of Sodium Diatrizoate.
5. Tetraiodothyronine Evaluations by an In Vitro Method Using 125-I.
6. The In Vitro and In Vivo Effects of Sodium Diatrizoate on Rabbit and Human Erythrocytes.
7. Intra-Cisternal LD₅₀ of Sodium Diatrizoate in Rabbits.
8. Vascular Clearance of 125-I Labeled Sodium Diatrizoate Following Intracarotid Injection.
9. Pharmacology of Short-Lived Radiopharmaceuticals.

Publications:

1. The Central Nervous System Complications of Cerebral Angiography. Dissertation for University of Miami, Coral Gables, Florida.
2. Ring, G., Dauer, M., and James, G. Effects of Gamma Irradiation with 60-Co on Erythrocytes of Female Fischer Rats. J. Gerontology, Vol. 22, No. 4, 1967.
3. Vascular Permeability of Water Soluble Contrast Media. Int. Cong. of Lymphology, March 1968. Publication Pending.

A minimum of 40 per cent of Dr. James' time will be devoted to this project.

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7. Other Personnel

- A. Louis Katchis, M.S.E.E., Physicist-Electrical Engineer. This individual will devote 10 per cent of his time to this project in the area of instrument design and maintenance.
- B. Pablo Larrea, B.S., Systems Programmer. This individual will devote 10 per cent of his time to this project in the area of programming and data processing.
- C. Talib Aziz Haider, B.Sc., Research Technologist. This individual will devote 100 per cent of his time to this project.
- D. Emily W. Soskis, Medical Secretary. This individual will devote 25 per cent of her time to this project.

8. Other Financial Assistance

In addition to U. S. A. E. C. funds, the personnel involved in this project will be supported by University of Miami, Mount Sinai Hospital or Dade County funds.

9. Premises, Facilities, Equipment and Materials to be Furnished by the Contractor

The facilities and equipment described in the original research proposal are still in use. Additional equipment and facilities have been made available to us at Mount Sinai Hospital, which is a University affiliated hospital. These facilities include an Anger Camera which will be connected on a real-time basis to a 2116B Hewlett-Packard computer as well as additional clinical and research laboratory space.

AEC Contract No. AT-(40-1)-3734
 Dr. Edward M. Smith, Radiology
 University of Miami
 10/15/68 - 10/14/69

10. Budget

1. Salaries and Wages

Name	Position	Per Cent of Effort	Requested from AEC	Support from UM, JMH or External Funds
a. Edward M. Smith, D.Sc. Asst. Prof. of Radiology	Principal Investigator	20	3400*	-0-
b. Albert J. Gilson, M.D. Assoc. Prof. of Radiology Dir., Div. of Nuc. Med.	Co-Investigator	20	1000*	1600
c. George W. James, Ph.D.	Radiopharmacologist	40	2500**	2500
d. Louis Katchis, M.S.E.E.	Physicist - Elect. Eng.	10	1200	-0-
e. Pablo Larrea, B.S.	Systems Programmer	10	-0-	1000
f. Talib Aziz Haider, B.Sc.	Research Technologist	100	4000	2600
g. Emily W. Soskis	Medical Secretary	25	-0-	1000
Total			\$12,100	\$8,700

Employee Benefits

F.I.C.A. (4.7)	569	409
Retirement (5.5)	666	479
*Group Insurance (0.007)	31	0
**Group Insurance (0.007) for 6 mos. only (Apr. 15- Oct. 14)	9	9
	1275	897

Overhead - 49 per cent x \$12,766 (AEC) and
 49 per cent x \$9,179 (other funds) 6255 4498

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2. Supplies

a. Radionuclides and Radiopharmaceuticals	1500	-0-
b. Glassware and Chemical Supplies	1500	-0-
c. Thermoluminescent Dosimetry Material	1000	-0-
d. Phantom Material	1000	-0-
e. Electronic Components	1000	-0-
f. Office Supplies, Reference Materials, etc.	200	-0-
g. Dogs, Rabbits and Rats	1000	-0-
	Total	
	\$7,200	-0-

3. Equipment

a. Two channel portable polygraph (blood pressure and EKG)	2500	-0-
b. Stepping motor and assoc. control electronics for generating line spread functions	1000	-0-
	Total	
	\$3,500	-0-

4. Publications and Communications

500 -0-

5. Travel

500 -0-

6. Other

a. Computer Time	1500	-0-
b. Animal Care	300	-0-
c. Subjects for Study and Travel for Subjects (20 at \$100)	2000	-0-
d. Consultation: Dr. John G. McAfee	400	-0-
Dr. James M. Mozley	400	-0-
	Total	
	\$4,600	-0-

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Grand Total	\$35,930	\$14,095
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Justification and Description of Items in Second Year Budget

1. Two channel portable polygraph:

This item of equipment will be used in conjunction with the pharmacological studies on the various pharmaceutical forms of Indium-113m. We have been using such an item of equipment, but it is located approximately fifty miles from our animal facilities and the nuclear medicine laboratory. We are therefore asking that we may obtain such an item of equipment so that our studies may be performed more smoothly and be properly integrated with the tissue distribution studies that we are performing in the animals. This is an essential piece of equipment in the pharmacological studies.

2. Stepping motor and associated control electronics for generating line spread functions:

This piece of equipment will be built so that we may obtain information regarding the characteristics of the collimators that are used in our studies. This equipment is not available commercially nor is it available on our campus. A similar system has been built by Dr. James Mozley, Upstate Medical Center, Syracuse, New York. This work will be done in collaboration with Doctors McAfee and Mozley.

3. Subjects for study and travel for subjects:

This item in our budget is so that we may reimburse subjects who participate in our body distribution studies for their expenses as well as provide them with a small honorarium. It is anticipated that these subjects will spend one to three days at the Metabolic Ward of the National Children's Cardiac Hospital.

4. Consultation by Dr. John G. McAfee and Dr. James M. Mozley:

These individuals have been asked to be Consultants on this project for support in two areas. It was indicated by some of the comments for our initial research proposal that we lacked breadth in the scientific capabilities of the people on our contract. Dr. John G. McAfee will add capabilities in the area of Anatomy for microscopic and macroscopic absorbed dose calculations. Dr. James M. Mozley will add depth to the project in the areas of response of organ visualization systems and methods of intercomparing these results.

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This work has already been started with these individuals as can be seen from the results in our Progress Report. These funds will be used for transportation and other expenses for Dr. McAfee and Dr. Mozley to come to Miami.

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PUBLICATION BY AEC AUTHORIZED

NOTICE OF RESEARCH PROJECT SCIENCE INFORMATION EXCHANGE SMITHSONIAN INSTITUTION

SIE NO.

U.S. ATOMIC ENERGY COMMISSION

AEC CONTRACT NO. AT-(40-1)-3734

SUPPORTING DIV. OR OFFICE: Division of Biology and Medicine

NAME & ADDRESS OF CONTRACTOR OR INSTITUTION: (State the division, department, or professional school, medical, graduate or other, with which this project should be identified.)

Division of Nuclear Medicine; Department of Radiology; University of Miami School of Medicine; Miami, Florida.

TITLE OF PROJECT:

EVALUATION OF THE ABSORBED DOSE FROM THE DIAGNOSTIC USE OF RADIOPHARMACEUTICALS

NAMES, DEPARTMENT, AND OFFICIAL TITLES OF PRINCIPAL INVESTIGATORS AND OTHER PROFESSIONAL SCIENTIFIC PERSONNEL: (not including graduate students) engaged on the project, and fraction of man-year devoted to the project by each person.

Edward M. Smith, D.Sc., Asst. Prof. of Radiology	20 per cent
Albert J. Gilson, M.D., Assoc. Prof. of Radiology	20 per cent
George W. James, Ph.D., Post-Doctoral Fellow	40 per cent
Louis Katchis, Jr., M.S.E.E., Research Assoc.	10 per cent
Pablo Larrea, B.S., Research Assoc.	10 per cent

NO. OF GRADUATE STUDENTS ON PROJECT: _____ NO. OF GRADUATE STUDENT MAN-YEARS: 1/2

SUMMARY OF PROPOSED WORK: (200-300 words, omit Confidential Data). Summaries are exchanged with government and private agencies supporting research, are supplied to investigators upon request, and may be published in AEC documents. Make summaries substantive, giving initially and for each annual revision the following: OBJECTIVE; SCIENTIFIC BACKGROUND FOR STUDY; PROPOSED PROCEDURE; TEST OBJECTS AND AGENTS.

The evaluation of the absorbed dose received by a patient resulting from a diagnostic procedure employing a radiopharmaceutical is essential if the maximum benefit is to be derived by the patient. Even when the most sensitive and sophisticated instrumentation is used, the quantity of activity administered to the patient limits the quality of the diagnostic information extractable from the study. To obtain the necessary data to calculate the absorbed dose, the tissue distribution of the radionuclide incorporated into the radiopharmaceutical will be studied *in vivo*, and the activity concentration in tissue specimens and body fluids will be measured. The physical parameters required for absorbed dose calculations will be experimentally determined, and correlated with theoretically calculated values. The results of these investigations will yield a reliable estimate of the absorbed dose received by various body tissues from new radiopharmaceuticals as they are introduced into use, as well as from the routine radiopharmaceuticals in current use.

RESULTS TO DATE:

	PROGRAM CATEGORY NO.
BUDGET	
PRIMARY	
SECONDARY	

Edward M. Smith, D.Sc.
Signature of Principal Investigator

DATE: 8/1/66

INVESTIGATOR - DO NOT USE THIS SPACE

APPENDIX "A"

For the Contract Period October 15, 1968 through October 14, 1969.

A-I RESEARCH TO BE PERFORMED BY CONTRACTOR

The contractor will continue studies and evaluation of the absorbed dose received by patients from diagnostic procedures with selected radioisotopes. Work will be directed to collection of clinical data yielding information on tissue distribution, acute and chronic toxicological data, particularly for the new radiopharmaceuticals, experimental verification of the physical parameters such as absorbed fractions and the build-up factors for the absorbed dose calculations, and the actual calculation and arrangement of the calculated values for absorbed dose for important radiopharmaceuticals with studies of Rhenium-188, Technecium-99m and possibly other nuclides.

The Principal Investigator expects to devote approximately 20% of his time or effort to the work.

A-II WAYS AND MEANS OF PERFORMANCE(a) Items Included in Total Estimated Cost:(1) Salaries and Wages: \$20,800.00

Dr. E. M. Smith - Principal Investigator (20% of time)
 Research Associate (20% of time)
 Radiopharmacologist (40% of time)
 Physicist (10% of time)
 Systems Programmer (10% of time)
 Research Technologist (100% of time)
 Medical Secretary (25% of time)

(2) Employee Benefits: 2,172.00(3) Materials and Supplies: 7,200.00

Radionuclides, radiopharmaceuticals,
 thermoluminescent dosimetry material,
 electronic components, office supplies,
 reference materials, dogs, rabbits
 and rats.

(4) Equipment: 3,500.00

Two channel portable polygraph, and stepping motor
 and associated control electronics.

(5) <u>Publications and Communications:</u>	\$ 500.00
(6) <u>Travel:</u>	500.00
(7) <u>Expenses for Participants in Body Distribution Studies:</u>	2,000.00
(8) <u>Services:</u>	2,600.00
Computer time, animal care, and consultation.	
(9) <u>Overhead (49% of salaries and wages plus retirement):</u>	10,753.00

(b) Items Significant to the Performance of This Contract,
But Excluded From Computation of Total Cost and From
Consideration in Proportioning Costs:

None

(c) Time or Effort of Principal Investigator Contributed
by Contractor:

None under this paragraph

-III The total estimated project cost of A-II (a) above for the contract
period stated above is \$50,025.

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U. S. ATOMIC ENERGY COMMISSION
CONTRACT AUTHORIZATION

1. DATE
OCT 18 1968

2. AUTHORIZATION NO.
MT-69-215

3.A. TO **S. R. Kaprio, Manager
Oak Ridge Operations Office**

3.B. FROM **John H. Tetter, Director
Division of Biology and Medical
Headquarters**

4. CONTRACTOR (Name, Address, Department, etc.)
**Department of Radiology, School of Medicine
University of Miami, P. O. Box 875
Biscayne Annex, Miami, Florida 33152**

4.B. PRINCIPAL INVESTIGATOR(S)
Edward M. Smith, Sc.D.

5. NEW CONTRACT RENEWAL OTHER

6. TERM OF CONTRACT
10/15/68 thru 10/14/69

7. CONTRACT NUMBER
AT(40-1)3734

8. RECOMMENDED TYPE OF CONTRACT:
 FIXED PRICE OTHER
 COST REIMBURSEMENT
 SPECIAL RESEARCH SUPPORT AGREEMENT (SRSA)

9. PROPERTY TITLE TO VEST IN:
 AEC
 CONTRACTOR

10. SECURITY CLASSIFICATION:
Work to be performed is under category **I**
as defined by AEC Manual Appendix 3401.

11. PROJECT TITLE **"Evaluation of the Absorbed Dose from the Diagnostic Use of Radiopharmaceuticals."**

12. HEADQUARTERS TECHNICAL CONTACT
Dr. Robert W. Wood

13. FINANCING

A. OPERATING EXPENSES

New AEC Funds (Initial AEC Support ceiling, if SRSA)	\$35,930.00
Estimated AEC Balance From Prior Term, if any	\$ 0
Total AEC Funding (If SRSA, <u>72</u> % of Total Cost, up to Maximum of)	\$35,930.00
Estimated Contractor Contribution, if any	\$14,095.00
Total Estimated Project Cost	\$50,025.00

Budget and Reporting Classification: **06 06 01**
Allotment Transfer: **06-91-91 (24)**

B. PLANT AND CAPITAL EQUIPMENT \$

Budget and Reporting Classification:
Allotment Transfer:

14. SPECIAL PROVISIONS AND INSTRUCTIONS:

The technical aspects of the proposed work have been reviewed and are approved. A need currently exists for the results of the research or other work that is to be undertaken. None of the AEC funds shall be used to confer a fellowship.
Please keep us informed as to any problems encountered in your negotiations, as well as the date of execution of this contract and the amount of funds obligated. If the budget as negotiated differs substantially from that in the proposal, please forward a copy of the revised budget to Headquarters.
If not already submitted, a 200-word summary of the proposed work should be forwarded by the contractor as soon as possible after negotiation of the contract.

15. SCOPE OF WORK

A study of radioactivity distribution throughout the body following administration of selected radioisotopes for use in dosimetry calculations.

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