Reports File
Posted

GEORGIA INSTITUTE OF TECHNOLOGY
OFFICE OF RESEARCH ADMINISTRATION

RESEARCH PROJECT INITIATION

Date: June 9, 1971

Project Title: Biomedical Sciences Support Grant

Project No: B-1408

Principal Investigator: Dr. E. L. Fincher, Dr. C. Orr, Dr. A. L. Stanford

Sponsor: Public Health Service, NIH

Agreement Period: From June 1, 1971 Until May 31, 1972

Type Agreement: Grant No. 5 S05 RR07024-06

Amount: $19,107

Note: Continuation of Engineering Experiment Station Project B-382.

Reports Required: Annual Narrative Progress Report - due August 31, 1972

Sponsor Contact Person (s):
Administrative Contact:
Dr. H. E. Bredeck
Biomedical Sciences Support Grant Program
General Research Support Branch
Division of Research Resources
National Institutes of Health
Bethesda, Maryland 20014

Assigned to: School of Biology

COPIES TO:

Principal Investigator	Library
School Director	Rich Electronic Computer Center
Dean of the College	Photographic Laboratory
Director, Research Administration	Project File
Deputy Controller (2)	
Security-Reports-Property Office	
Patent Coordinator	Other

RA-3 (2-71)

Reports File
Posted

GEORGIA INSTITUTE OF TECHNOLOGY

OFFICE OF RESEARCH ADMINISTRATION

RESEARCH PROJECT TERMINATION

Date: 21 June 1972

Project Title: Biomedical Sciences Support Grant

Project No: G-32-602

Principal Investigator: Dr. E. L. Fincher

Sponsor: Public Health Service

Effective Termination Date: 31 May 1972

Clearance of Accounting Charges: Charges should clear by 30 June 1972.

Grant/Contract Closeout Actions Remaining:

1. Annual Narrative Report due by August 31, 1972
2. Annual Expenditures Report due by August 31, 1972
3. Annual Invention Statement

NOTE: Continued as G-32-604. All unexpended balance from G-32-602 will be credited to G-32-604, upon submission of Annual Expenditures Report.

Assigned to: School of Biology

COPIES TO:

- Principal Investigator
- School Director
- Dean of the College
- Director, Research Administration
- Director, Financial Affairs (2)
- Security-Reports-Property Office ✓
- Patent and Inventions Coordinator
- Library, Technical Reports Section
- Rich Electronic Computer Center
- Photographic Laboratory
- Project File
- Other _____

RA-4 (6-71)

Reports File Sk B

GEORGIA INSTITUTE OF TECHNOLOGY
OFFICE OF RESEARCH ADMINISTRATION

RESEARCH PROJECT INITIATION

Date: May 11, 1972

Project Title: Biomedical Sciences Support Grant

Project No: G-32-604

Principal Investigator: Dr. ~~Edward L. Fincher~~ J.W. Crenshaw

Sponsor: Public Health Service, NIH

Agreement Period: From June 1, 1972 Until May 31, 1973

Type Agreement: Grant No. 5 S05 RR07024-07

Amount: $44,153

Reports Required: Annual Narrative Progress Report

Sponsor Contact Person (s):

Administrative

Dr. Robert J. Gibbs, Chief
General Research Support Branch
Division of Research Resources
Public Health Service
National Institutes of Health
Bethesda, Maryland 20014

Continuation of G-32-602

Assigned to: School of Biology

COPIES TO:

Principal Investigator	Library
School Director	Rich Electronic Computer Center
Dean of the College	Photographic Laboratory
Director, Research Administration	Project File
Director, Financial Affairs (2)	
Security-Reports-Property Office ✓	
Patent Coordinator	Other

RA-3 (6-71)

Rpts File
B
Posted

GEORGIA INSTITUTE OF TECHNOLOGY

OFFICE OF RESEARCH ADMINISTRATION

RESEARCH PROJECT TERMINATION

Date: December 6, 1973

Project Title: "Biomedical Sciences Support Grant"

Project No: G-32-604

Principal Investigator: Dr. John W. Crenshaw

Sponsor: General Research Support Branch, PHS, NIH

Effective Termination Date: May 31, 1973

Clearance of Accounting Charges: Charges should be clear by November 30, 1973

Funds from G-32-604 supported the following internal grants.

G-32-606
G-32-607
G-35-605
G-33-664
G-33-663
G-33-665
G-41-626
G-42-620
E-19-615
E-19-614
B-415
B-416
B-417

Unexpended funds from G-32-604 are to be transferred to G-32-608

COPIES TO:

- Principal Investigator
- School Director
- Dean of the College
- Director of Research Administration
- Associate Controller (2)
- Security-Reports-Property Office
- Patent and Inventions Coordinator
- Library, Technical Reports Section
- Rich Electronic Computer Center
- Photographic Laboratory
- Terminated Project File No. _____
- Other _____

RA-4 (5/70)

G-32-602

OFFICE OF MANAGEMENT & BUDGET 68-R0938
EXPIRES DECEMBER 31, 1974

DEPARTMENT OF HEALTH, EDUCATION AND WELFARE
PUBLIC HEALTH SERVICE
NATIONAL INSTITUTES OF HEALTH

8/31

ANNUAL PROGRESS REPORT

1. NAME OF RECIPIENT INSTITUTION *(Identify Health Professional School Where Appropriate)* Georgia Institute of Technology Atlanta, Georgia 30332	*Check Type of Grant* ☐ GENERAL RESEARCH SUPPORT ☒ BIOMEDICAL SCIENCES SUPPORT **2. PHS GRANT NUMBER** 5 S05 RR07024-06

	a. FROM *(Month, Day, Year)*	b. TO *(Month, Day, Year)*
3. REPORTING PERIOD	June 1, 1971	May 31, 1972

4. NAME AND TITLE OF PROGRAM DIRECTOR *(Please Type)*

Edward L. Fincher, Acting Director
School of Biology

5. SIGNATURE OF PROGRAM DIRECTOR	**DATE** July 1, 1972 **TELEPHONE** *(Include Area Code)* (404) 894-3735

6. NAME AND TITLE OF AUTHORIZED OFFICIAL OF INSTITUTION *(Please Type)*

Harry L. Baker
Research Administration
Georgia Institute of Technology
Atlanta, Georgia 30332

7. SIGNATURE OF AUTHORIZED OFFICIAL OF INSTITUTION	**DATE** August 29, 1972 **TELEPHONE** *(Include Area Code)* (404) 894-4810

NIH-147-2
(Rev. 9-71)

ITEM 1
PERSONNEL RELATED TO GRANT

PART I – DESCRIPTION OF PROGRAM ACTIVITIES

GRANT NUMBER

(A) FULL NAME (A) (LAST) (FIRST) (MIDDLE INITIAL) (B) POSITION TITLE (C) SOCIAL SECURITY NUMBER *(For Consultants, Lecturers, etc., include institutional affiliation in lieu of Social Security Number)*	LEAVE BLANK (CODE X)	(B) HIGHEST DEGREE HELD (IF ANY)	LEAVE BLANK (CODE XIV)	(C) DEPARTMENT	(D) PROFESSIONAL FACULTY (CODE 01)	PROFESSIONAL NON-FACULTY (CODE 02)	GRADUATE STUDENTS (CODE 1/ 03)	ALL OTHER STAFF TECHNICAL (CODE 04)	ALL OTHER STAFF CLERICAL (CODE 05)	CONSULTANTS (CODE 06)	(E) SALARIES, WAGES AND FEES
					Check appropriate Box						
1. (A) Anderson, Gary L. (B) Asst. Professor (C)		Ph.D.		Biology	X						$ 0
2. (A) Crenshaw, John W. Jr. (B) Prof., Dir. Sch. of (C) Biology		Ph.D.		Biology	X						0
3. (A) Fetner, Robert H. (B) Professor (C)		Ph.D.		Biology	X						0
4. (A) (B) (C)											
5. (A) (B) (C)											
6. (A) (B) (C)											
A. TOTAL SALARIES, WAGES AND FEES											$ 0
B. TOTAL FOR FRINGE BENEFITS *(See Instructions)*											$ 0
C. TOTAL SUPPORT FOR PERSONNEL											$ 0 2/

NIH - 147-2
(REV. 9-71)

1/ *Do Not Include Trainees Receiving Stipend Support.*

2/ *Should agree with the total of lines 4A plus 4B of Annual Expenditures Report, NIH Form 174-3.*

Number additional pages 1-a, 1-b, etc.

NIH-147-2
(REV. 9-71)

PART I – DESCRIPTION OF PROGRAM ACTIVITIES

ITEM 2
NEW PILOT RESEARCH PROJECTS
(i.e., pilot projects initiated during this reporting period)

GRANT NUMBER: 5 S05 RR07024-06

	PROJECT TITLE [1/] (a)	NAME OF INVESTIGATOR (b)	AMOUNT [2/] (c)
1.	Oxygen Requirements, Cardiac Rhythm and Respiration of of Hypothermic Animals	Dr. Gary L. Anderson	$ 8,620.73
2.	Genetic Fitness of Small Animal Populations Exposed to Low-Level Gamma Radiation	Dr. John W. Crenshaw, Jr.	5,856.78
3.	Fluorescent Banding Patterns in Identification and Analysis of Human Chromosomes	Dr. Robert H. Fetner	174.55
4.			
5.			
6.			
7.			
8.			
9.		TOTAL FOR NEW PILOT RESEARCH PROJECTS	(ENTER ON ITEM 9, LINE 1(B) PAGE 7.) $ 14,652.06
		Portion of above total spent for salaries, wages, fees and fringe benefits. → (d)	(ENTER ON ITEM 9, LINE 1(A) PAGE 7.) $0

1/ *See page iii of instructions.*
2/ *Include salaries, wages, fees, fringe benefits (if a direct cost), equipment and all other direct costs. See page iii of instructions for method of prorating fringe benefits.*
Number additional pages 2-a, 2-b, etc.

NIH-1472
(REV. 9-71)

PART I – DESCRIPTION OF PROGRAM ACTIVITIES

ITEM 3
CONTINUATION PILOT RESEARCH PROJECTS
(i.e., pilot projects initiated prior to this reporting period)

GRANT NUMBER: 5 S05 RR07024-06

	PROJECT TITLE 1/ (a)	NAME OF INVESTIGATOR (b)	AMOUNT 2/ (c)
1.	NONE		$
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.	TOTAL FOR CONTINUATION PILOT RESEARCH PROJECTS		(ENTER ON ITEM 9, LINE 2(B) PAGE 7.) $
	Portion of above total spent for salaries, wages, fees and fringe benefits. (d)		(ENTER ON ITEM 9, LINE 2(A) PAGE 7.) $

1/ *See page iii of instructions.*
2/ *Include salaries, wages, fees, fringe benefits (if a direct cost), equipment and all other direct costs. See page iii of instructions for method of prorating fringe benefits.*
Number additional pages 3-a, 3-b, etc.

NIH-147-2
(REV. 9-71)

PART I – DESCRIPTION OF PROGRAM ACTIVITIES

ITEM 4
NEW REGULAR RESEARCH PROJECTS
(i.e., regular projects initiated during this reporting period)

GRANT NUMBER: 5 S05 RR07024-06

	PROJECT TITLE 1/ (a)	NAME OF INVESTIGATOR (b)	AMOUNT 2/ (c)
1.	NONE		$
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.	TOTAL FOR NEW REGULAR RESEARCH PROJECTS		(ENTER ON ITEM 9, LINE 3(B), PAGE 7.) $
	Portion of above total spent for salaries, wages, fees and fringe benefits. (d) →		(ENTER ON ITEM 9, LINE 3(A), PAGE 7.) $

1/ *See page iii of instructions.*
2/ *Include salaries, wages, fees, fringe benefits (if a direct cost), equipment and all other direct costs. See page iii of instructions for method of prorating fringe benefits.*
Number additional pages 4-a, 4-b, etc.

NIH-147-2
(REV. 9-71)

PART I – DESCRIPTION OF PROGRAM ACTIVITIES

ITEM 5
CONTINUATION REGULAR RESEARCH PROJECTS
(i.e., regular projects initiated prior to this reporting period)

GRANT NUMBER: 5 S05 RR 07024-06

	PROJECT TITLE 1/ (a)	NAME OF INVESTIGATOR (b)	AMOUNT 2/ (c)
1.	NONE		$
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.	TOTAL FOR CONTINUATION REGULAR RESEARCH PROJECTS		(ENTER ON ITEM 9, LINE 4(B), PAGE 7.) $
	Portion of above total spent for salaries, wages, fees and fringe benefits. (d)		(ENTER ON ITEM 9, LINE 4(A), PAGE 7.) $

1/ *See page iii of instructions.*
2/ *Include salaries, wages, fee, fringe benefits (if a direct cost), equipment and all other direct costs. See page iii of instructions for method of prorating fringe benefits.*
Number additional pages 5-a, 5-b, etc.

PART I – DESCRIPTION OF PROGRAM ACTIVITIES

GRANT NUMBER
5 S05 RR07024-06

ITEM 6 – CENTRAL RESEARCH RESOURCES AND FACILITIES

	RESOURCES	SALARIES, WAGES, FEES, AND FRINGE BENEFITS 1/	EQUIPMENT	OTHER EXPENDITURES	TOTAL
		(a)	(b)	(c)	(d)
(01)	Animal Facilities	$	$	$	$ 0
(60)	Central Laboratory Facilities				0
(30)	Computer/Data Processing Facilities				0
(10)	Equipment for General Use				0
(40)	Instrument Shop				0
(20)	Photography and Medical Arts				0
(90)	Other *(Specify)*				
	TOTALS	(ENTER ON ITEM 9, LINE 5(a), PAGE 7.) $	$	$	(ENTER ON ITEM 9, LINE 5(b), PAGE 7.) $ 0

ITEM 7 RESEARCH TRAINING PROGRAMS	AMOUNT
1. Total for Trainee Expenses *(From Lines 4J-1,2,3, and 4, Annual Expenditures Report, NIH-147-3)*	$ 0
2. Salaries, Wages, Fees and Fringe Benefits *(Associated with Research Training 1/ 2/)*	(ENTER ON ITEM 9, LINE 6(A), PAGE 7.) 0
3. Other Training Expenses 2/	0
4. TOTAL TRAINING COSTS	(ENTER ON ITEM 9, LINE 6(B), PAGE 7.) $ 0

1/ *See page iii of instructions for method of prorating fringe benefits.*
2/ *Lines 2 and 3 must not include any trainee expenses, but must include all direct costs for the training environment.*

PART I – DESCRIPTION OF PROGRAM ACTIVITIES

GRANT NUMBER
5 S05 RR07024-06

ITEM 7 (Continued)
RESEARCH TRAINING PROGRAMS

TRAINING PROGRAM TITLES AND DESCRIPTIONS	NUMBER OF TRAINEES SUPPORTED UNDER EACH PROGRAM
NONE	

ITEM 8 OTHER ACTIVITIES *(Specify)*		AMOUNT 1/
1. NONE		$ 0
2.		
3.		
4.	TOTAL FOR OTHER ACTIVITIES	$ ENTER ON ITEM 9, LINE 7(B), PAGE 7
5.	Portion of above total spent for salaries, wages, fees and fringe benefits.	$ ENTER ON ITEM 9, LINE 7(A), PAGE 7

ITEM 9 SUMMARY *(Taken from ITEMS 2 through 8, Pages 2 through 7.)*	(a) PERSONNEL	(b) TOTAL COSTS
Line 1. New Pilot Research Projects (Page 2)	$ 0	$ 14,652.06
Line 2. Continuation Pilot Research Projects (Page 3)		
Line 3. New Regular Research Projects (Page 4)		
Line 4. Continuation Regular Research Projects (Page 5)		
Line 5. Central Research Resources and Facilities (Page 6)		
Line 6. Research Training Programs (Page 6)		
Line 7. Other Activities (Page 7)		
TOTALS	$ 0 (Should agree with total of line 4A and 4B of Annual Expenditures Report, NIH form 147-3.)	$ 14,652.06 (Should agree with line 4L of Annual Expenditures Report, NIH form 147-3.)

GPO 919-285

1/ Include salaries, wages, fees, fringe benefits (if a direct cost), equipment, supplies, and all other direct costs. See page iii of instructions for method of prorating fringe benefits.

ITEM I. FLEXIBILITY OF FUNDS

Three projects represent the principal investment of funds under this grant for the current report period. Two of these projects are new pilot developments which are major additions to research capability in medically related life science studies, the third being a significant augmentation of existing research and laboratory resources in human cytogenetics.

A new laboratory of physiology has been made possible by these funds which enables continuation of research in mammalian physiology by Dr. Gary L. Anderson, a new addition to the faculty, School of Biology, who formerly was in the Department of Physiology, School of Medicine, University of Missouri. His principal area of continuing research interest is in mammalian (systems) physiology with studies on oxygen requirements, cardiac rhythm, and spontaneous respiration of hypothermic animals. Physiology is one of the principal life sciences areas which has a major interface with with engineering in the development of interdisciplinary studies on biomedical engineering problems. In support of developing interests in this field within the Georgia Institute of Technology, a research laboratory in physiology represents a significant contribution to available scientific resources. Funds available from this grant are important also in enabling a continuity of the research program of a new faculty member.

Such continuity has been provided also for a second new faculty member, Dr. John W. Crenshaw, Jr., who will also assume the responsibilities of Director, School of Biology. His studies will be on the effects of mutagenic agents on mammalian genetic systems, to include principally the effects of long-term exposure of small animal populations to gamma radiation as measured by the net inheritable effect on the genetic fitness of the population. Equipment provided under the biomedical sciences grant includes a Cobalt^{60} Gamma Irradiator and other resources in support of requirements to handle relatively large numbers of animals under conditions of radiation exposure. This new equipment will be accommodated in new physical facilities to be acquired in the near future. Studies on population genetics and radiation mutagens will contribute importantly to present research in radiation biology, radiation health physics, and nuclear reactor usage.

This grant has enabled a significant contribution of equipment to be made to an on-going research activity in human cytogenetics. Under the direction of Dr. R. H. Fetner this laboratory has developed equipment and techniques for computerized analysis of human chromosome karyotypes, work conducted in collaboration with medical researchers at the Georgia Mental Health Institute, Atlanta. The optical equipment acquired will enhance significantly the basic capability of this laboratory to broaden investigations in human cytogenetics, particularly in demonstrating fluorescent banding patterns in human chromosomes after quinicine mustard treatment which permits their identification and analysis.

Minor support has been provided by this grant toward the maintenance of a breeding colony of Chinese hamsters (Cricetulus griseus) which provides a valuable resource of biological material for education and research in physiology, cytogenetics, and cytology.

ITEM II. MAJOR SCIENTIFIC ACCOMPLISHMENTS

The principal effort during this report period has been to establish the two new faculty research laboratories. Their operation is getting underway at present with productive accomplishment to be expected within the next fiscal year. Insofar as proposed studies represent a continuation of research investigations conducted at other institutions, there is expected a minimum delay in the effective use of these new facilities.

ITEM III. IMPACT OF INSTITUTIONAL PROGRAMS

These grant funds were essential to establishing the described research activities, and in their absence of this funding an indeterminate discontinuity of time in the research programs of the new faculty would have occurred. In this regard, the availability of funding for avoiding this delay was undoubtedly a significant factor in attracting the new faculty who will strengthen interdisciplinary areas between the life sciences and engineering. These facilities represent new developments in the life sciences at the Institute and will serve to further strengthen broader areas of contiguous interests. The existing research laboratory of cytogenetics has been improved by the equipment additions which will be directly involved in interdisciplinary collaboration with studies in mental health. This collaborative research is evidenced by a research proposal now pending consideration.

The biomedical research grant has provided an extremely valuable capability of implementing new and innovative research and instructional programs, and should continue as a practical means of stimulating interdisciplinary efforts between the life sciences, engineering, and related medical areas.

ITEM IV. ATTRACTION OF OTHER FUNDS

There were no new projects secured as a result of expenditures of funds from the biomedical sciences grant during the period. It is expected that resources represented by the physiology and radiation laboratories will provide the basis for specific research proposals to be submitted during the next fiscal year.

ITEM V. PUBLICATIONS

None

ITEM VI. FOREIGN TRAVEL

None

ITEM VII. ALTERATIONS AND RENOVATIONS

None

ITEM VIII. SCIENTIFIC CONTROL OF FUNDS

Same

G-32-602

OFFICE OF MANAGEMENT & BUDGET 68-R0958
EXPIRES DECEMBER 31, 1974

DEPARTMENT OF HEALTH, EDUCATION AND WELFARE
PUBLIC HEALTH SERVICE
NATIONAL INSTITUTES OF HEALTH

ANNUAL PROGRESS REPORT

1. NAME OF RECIPIENT INSTITUTION *(Identify Health Professional School Where Appropriate)*

Georgia Institute of Technology
Atlanta, Ga. 30332

Check Type of Grant

☐ GENERAL RESEARCH SUPPORT

☒ BIOMEDICAL SCIENCES SUPPORT

2. PHS GRANT NUMBER

5 S05 PR07024-07

3. REPORTING PERIOD	a. FROM *(Month, Day, Year)*	b. TO *(Month, Day, Year)*
	June 1, 1972	May 31, 1973

4. NAME AND TITLE OF PROGRAM DIRECTOR *(Please Type)*

John W. Crenshaw, Jr., Director
School of Biology

5. SIGNATURE OF PROGRAM DIRECTOR

DATE

August 14, 1973

TELEPHONE *(Include Area Code)*

(404) 894-3735

6. NAME AND TITLE OF AUTHORIZED OFFICIAL OF INSTITUTION *(Please Type)*

Milton W. Bennett
Research Administration
Georgia Institute of Technology
Atlanta, Georgia 30332

7. SIGNATURE OF AUTHORIZED OFFICIAL OF INSTITUTION

DATE

8/28/73

TELEPHONE *(Include Area Code)*

(404) 894-4815

NIH-147-2
(Rev. 9-71)

PERSONNEL RELATED TO GRANT — PART I – DESCRIPTION OF PROGRAM ACTIVITIES

	(A) FULL NAME (A) (LAST) (FIRST) (MIDDLE INITIAL) (B) POSITION TITLE (C) SOCIAL SECURITY NUMBER *(For Consultants, Lecturers, etc., include institutional affiliation in lieu of Social Security Number)*	LEAVE BLANK (CODE X)	(B) HIGHEST DEGREE HELD (IF ANY)	LEAVE BLANK (CODE XIV)	(C) DEPARTMENT	(D) PROFESSIONAL: FACULTY (CODE 01)	PROFESSIONAL: NON-FACULTY (CODE 02)	GRADUATE STUDENTS (CODE 1/ 03)	ALL OTHER STAFF: TECHNICAL (CODE 04)	ALL OTHER STAFF: CLERICAL (CODE 05)	CONSULTANTS (CODE 06)	(E) SALARIES, WAGES AND FEES
						Check appropriate Box						
1.	(A) Mohr, William (B) Grad. Res. Assistant (C) 225-64-5065		B.S.		Geophysical Sciences			X				$ 600.00
2.	(A) Sikorski, M.E. (B) Senior Res. Scientist (C) 344-28-0780		M.S.		Engineering Experiment Station		X					784.66
3.	(A) Phillips, L.A. (B) Elec. Tech. III (C) 260-64-2606		B.S.		Engineering Experiment Station				X			1,200.45
4.	(A) Newsom, R.A. (B) Res. Tech. II (C) 252-70-5089		B.S.		Engineering Experiment Station				X			224.32
5.	(A) Hart, Raymond K. (B) Princ. Res. Scientist (C) 352-34-3092		Ph.D.		Engineering Experiment Station		X					1,498.00
6.	(A) Hicklin, W.H. (B) Res. Engineer (C) 311-10-0972		none		Engineering Experiment Station				X			208.65
	A. TOTAL SALARIES, WAGES AND FEES											$ -
	B. TOTAL FOR FRINGE BENEFITS *(See Instructions)*											$ -
	C. TOTAL SUPPORT FOR PERSONNEL											$ - 2/

NIH-147-2 (REV. 9-71)

1/ *Do Not Include Trainees Receiving Stipend Support.*

2/ *Should agree with the total of lines 4A plus 4B of Annual Expenditures Report, NIH Form 147-3.*

Number additional pages 1-a, 1-b, etc.

ITEM 1
PERSONNEL RELATED TO GRANT

PART I – DESCRIPTION OF PROGRAM ACTIVITIES

5 S05 PR07024-07
GRANT NUMBER

	(A) FULL NAME (A) (LAST) (FIRST) (MIDDLE INITIAL) (B) POSITION TITLE (C) SOCIAL SECURITY NUMBER *(For Consultants, Lecturers, etc., include institutional affiliation in lieu of Social Security Number)*	LEAVE BLANK (CODE X)	(B) HIGHEST DEGREE HELD (IF ANY)	LEAVE BLANK (CODE XIV)	(C) DEPARTMENT	(D) PROFESSIONAL: FACULTY (CODE 01)	PROFESSIONAL: NON-FACULTY (CODE 02)	GRADUATE STUDENTS (CODE 1/ 03)	ALL OTHER STAFF: TECHNICAL (CODE 04)	ALL OTHER STAFF: CLERICAL (CODE 05)	CONSULTANTS (CODE 06)	(E) SALARIES, WAGES AND FEES
						Check appropriate Box						
1.	(A) Rinehart, J.E. (B) Instrument Maker (C) 255-10-0905		none		Engineering Experiment Station				X			$ 492.78
2.	(A) McWhirter, D.T. (B) Machinist I (C) 257-01-4832		none		Engineering Experiment Station				X			188.02
3.	(A) Dameron, J.D. (B) Asst. Machine Shop Mgr. (C) 258-28-5021		none		Engineering Experiment Station				X			128.20
4.	(A) Beasley, L.S. (B) Clerk Typist III (C) 757-78-1012		none		Engineering Experiment Station					X		1.65
5.	(A) Bomar, S.H. (B) Senior Res. Engineer (C) 255-54-5633		Ph.D.		Engineering Experiment Station		X					313.42
6.	(A) Byers, S.A. (B) Research Engineer (C) 216-76-2317		Ph.D.		Engineering Experiment Station		X					1,009.59
	A. TOTAL SALARIES, WAGES AND FEES											$ -
	B. TOTAL FOR FRINGE BENEFITS *(See Instructions)*											$ -
	C. TOTAL SUPPORT FOR PERSONNEL											$ - 2/

NIH-147-2
(REV. 9-71)

1/ *Do Not Include Trainees Receiving Stipend Support.*
2/ *Should agree with the total of lines 4A plus 4B of Annual Expenditures Report, NIH Form 147-3.*
Number additional pages 1-a, 1-b, etc.

ITEM 1
PERSONNEL RELATED TO GRANT

PART I – DESCRIPTION OF PROGRAM ACTIVITIES

5 S05 PR07024-07
GRANT NUMBER

	(A) FULL NAME (A) (LAST) (FIRST) (MIDDLE INITIAL) (B) POSITION TITLE (C) SOCIAL SECURITY NUMBER *(For Consultants, Lecturers, etc., include institutional affiliation in lieu of Social Security Number)*	LEAVE BLANK (CODE X)	(B) HIGHEST DEGREE HELD (IF ANY)	LEAVE BLANK (CODE XIV)	(C) DEPARTMENT	(D) PROFESSIONAL FACULTY (CODE 01)	(D) PROFESSIONAL NON-FACULTY (CODE 02)	(D) GRADUATE STUDENTS (CODE 1/ 03)	(D) ALL OTHER STAFF TECHNICAL (CODE 04)	(D) ALL OTHER STAFF CLERICAL (CODE 05)	(D) CONSULTANTS (CODE 06)	(E) SALARIES, WAGES AND FEES
						Check appropriate Box						
1.	(A) Gorton, C.W. (B) Professor (C) 439-36-2548		Ph.D.		Chemical Engineering	X						$ 244.23
2.	(A) Walton, J.D. (B) Prin. Res. Engineer (C) 294-28-6970		B.Cer.E.		Engineering Experiment Station		X					238.07
3.	(A) Wellborn, H.W. (B) Asst. Res. Scientist (C) 257-62-3992		B.S.		Engineering Experiment Station		X					1,151.58
4.	(A) Logan, K.V. (B) Asst. Res. Scientist (C) 258-80-4263		B.S.		Engineering Experiment Station		X					32.10
5.	(A) Sales, A.T. (B) Res. Engineer (C) 257-50-9712		B.S.		Engineering Experiment Station		X					29.96
6.	(A) Swafford, C.J. (B) Admin. Specialist (C) 252-34-1259		none		Engineering Experiment Station					X		23.18
	A. TOTAL SALARIES, WAGES AND FEES											$ -
	B. TOTAL FOR FRINGE BENEFITS *(See Instructions)*											$ -
	C. TOTAL SUPPORT FOR PERSONNEL											$ - 2/

NIH-147-2
(REV. 9-71)

1/ *Do Not Include Trainees Receiving Stipend Support.*

2/ *Should agree with the total of lines 4A plus 4B of Annual Expenditures Report, NIH Form 147-3.*

Number additional pages 1-a, 1-b, etc.

ITEM 1
PERSONNEL RELATED TO GRANT

PART I – DESCRIPTION OF PROGRAM ACTIVITIES

GRANT NUMBER

	(A) FULL NAME (A) (LAST) (FIRST) (MIDDLE INITIAL) (B) POSITION TITLE (C) SOCIAL SECURITY NUMBER *(For Consultants, Lecturers, etc., include institutional affiliation in lieu of Social Security Number)*	LEAVE BLANK (CODE X)	(B) HIGHEST DEGREE HELD (IF ANY)	LEAVE BLANK (CODE XIV)	(C) DEPARTMENT	(D) PROFESSIONAL: FACULTY (CODE 01)	PROFESSIONAL: NON-FACULTY (CODE 02)	GRADUATE STUDENTS (CODE 1/ 03)	ALL OTHER STAFF: TECHNICAL (CODE 04)	ALL OTHER STAFF: CLERICAL (CODE 05)	CONSULTANTS (CODE 06)	(E) SALARIES, WAGES AND FEES
						Check appropriate Box						
1.	(A) Calhoun, M.L. (B) Mech. Tech III (C) 256-38-5002		none		Engineering Experiment Station				X			$ 1,041.16
2.	(A) Williams, J.K. (B) Sec. III (C) 174-20-7875		none		Engineering Experiment Station					X		33.65
3.	(A) Tucker, W.L. (B) Mech. Tech. III (C) 253-43-1658		none		Engineering Experiment Station				X			885.14
4.	(A) Roberts, T.L. (B) Mach. I (C) 553-64-5868		none		Engineering Experiment Station				X			34.87
5.	(A) Crowe, R.L. (B) Mach. I (C) 260-44-4192		none		Engineering Experiment Station				X			61.87
6.	(A) Keller, D.S. (B) Mach. I (C) 254-12-2983		none		Engineering Experiment Station				X			2.75
	A. TOTAL SALARIES, WAGES AND FEES											$ -
	B. TOTAL FOR FRINGE BENEFITS *(See Instructions)*											$ -
	C. TOTAL SUPPORT FOR PERSONNEL											$ - 2/

NIH-147-2
(REV. 9-71)

1/ *Do Not Include Trainees Receiving Stipend Support.*

2/ *Should agree with the total of lines 4A plus 4B of Annual Expenditures Report, NIH Form 147-3.*

Number additional pages 1-a, 1-b, etc.

ITEM 1
PERSONNEL RELATED TO GRANT

PART I – DESCRIPTION OF PROGRAM ACTIVITIES

GRANT NUMBER

	(A) FULL NAME (A) (LAST) (FIRST) (MIDDLE INITIAL) (B) POSITION TITLE (C) SOCIAL SECURITY NUMBER (For Consultants, Lecturers, etc., include institutional affiliation in lieu of Social Security Number)	LEAVE BLANK (CODE X)	(B) HIGHEST DEGREE HELD (IF ANY)	LEAVE BLANK (CODE XIV)	(C) DEPARTMENT	(D) PROFESSIONAL: FACULTY (CODE 01)	PROFESSIONAL: NON-FACULTY (CODE 02)	GRADUATE STUDENTS (CODE 1/ 03)	ALL OTHER STAFF: TECHNICAL (CODE 04)	ALL OTHER STAFF: CLERICAL (CODE 05)	CONSULTANTS (CODE 06)	(E) SALARIES, WAGES AND FEES
						Check appropriate Box						
1.	(A) Jain, Chhagan (B) Grad. Res. Asst. (C) 259-08-7852		B.S.		Chemistry			X				$ 416.66
2.	(A) Dixon, E.F. (B) Undergrad. Res. Asst. (C) 260-74-9795		none		Biology				X			45.00
3.	(A) Humphrey, C. (B) Grad. Res. Asst. (C) 254-92-6299		B.S.		Biology			X				294.60
4.	(A) Maxon, G.A. (B) Undergrad. Res. Asst. (C) 258-88-9085		none		Biology				X			146.85
5.	(A) Carr, Allan (B) Grad. Res. Assistant (C) 259-70-0206		B.S.		Physics			X				376.00
6.	(A) Sauers, Isidor (B) Grad. Res. Assistant (C) 255-80-0481		M.S.		Physics			X				424.00
	A. TOTAL SALARIES, WAGES AND FEES											$12,131.41
	B. TOTAL FOR FRINGE BENEFITS (See Instructions)											$ -0-
	C. TOTAL SUPPORT FOR PERSONNEL											$12,131.41 2/

NIH-147-2
(REV. 9-71)

1/ Do Not Include Trainees Receiving Stipend Support.

2/ Should agree with the total of lines 4A plus 4B of Annual Expenditures Report, NIH Form 147-3.

Number additional pages 1-a, 1-b, etc.

NIH-147-2
(REV. 9-71)

PART I – DESCRIPTION OF PROGRAM ACTIVITIES

ITEM 2
NEW PILOT RESEARCH PROJECTS
(i.e., pilot projects initiated during this reporting period)

GRANT NUMBER
5 S05 PR07024-07

	PROJECT TITLE [1] (a)	NAME OF INVESTIGATOR (b)	AMOUNT [2] (c)
1.	Geochemical Environment in Relation to Health and Disease	Beck, K.C. & C.E. Weaver	$ 675.52
2.	In Vitro Study of the Corrosion Release of Metalic Ions from Medical Implant Materials	Hochman, R.F. & M. Marek	-0-
3.	Investigation of Pressure Flow Instability in Cardio-Vascular Systems	McLeod, W.D. & P.V. Desai	2,508.05
4.	The Development of a Polygenic Method for Detecting Radiation Induced Mutational Events in Drosophila Melanogaster	Saitta, F.P.	486.45
5.	Surface Composition Determined by Analysis of Impact Radiation	Thomas, E.W.	800.00
6.	Elemental Material Distribution in Cells by Secondary Emission Techniques	Hart, R.K.	2,752.76
7.			
8.			
9.		TOTAL FOR NEW PILOT RESEARCH PROJECTS	(ENTER ON ITEM 9, LINE 1(B) PAGE 7.) $ 7,222.78
		Portion of above total spent for salaries, wages, fees and fringe benefits. (d)	(ENTER ON ITEM 9, LINE 1(A) PAGE 7.) $ 6,447.30

[1] *See page iii of instructions.*
[2] *Include salaries, wages, fees, fringe benefits (if a direct cost), equipment and all other direct costs. See page iii of instructions for method of prorating fringe benefits.*

Number additional pages 2-a, 2-b, etc.

NIH-1472
(REV. 9-71)

PART I – DESCRIPTION OF PROGRAM ACTIVITIES

ITEM 3
CONTINUATION PILOT RESEARCH PROJECTS
(i.e., pilot projects initiated prior to this reporting period)

GRANT NUMBER: 5 S05 PR07024-07

PROJECT TITLE [1] (a)	NAME OF INVESTIGATOR (b)	AMOUNT [2] (c)
1. Oxygen Requirements, Cardiac Rhythm and Respiration of Hypothermic Animals	Anderson, Gary L.	$ 4,326.73
2. Genetic Fitness of Small Animal Populations Exposed to Low-Level Gamma Radiation	Crenshaw, John W., Jr.	12,997.76
3. Fluorescent Banding Patterns in Identification and Analysis of Human Chromosomes	Fetner, Robert H.	2,024.20
4.		
5.		
6.		
7.		
8.		
9. TOTAL FOR CONTINUATION PILOT RESEARCH PROJECTS		(ENTER ON ITEM 9, LINE 2(B) PAGE 7.) $ 19,348.69
Portion of above total spent for salaries, wages, fees and fringe benefits. (d)		(ENTER ON ITEM 9, LINE 2(A) PAGE 7.) $ -0-

[1] *See page iii of instructions.*
[2] *Include salaries, wages, fees, fringe benefits (if a direct cost), equipment and all other direct costs. See page iii of instructions for method of prorating fringe benefits.*
Number additional pages 3-a, 3-b, etc.

NIH-147-2
(REV. 9-71)

PART I – DESCRIPTION OF PROGRAM ACTIVITIES

ITEM 4
NEW REGULAR RESEARCH PROJECTS
(I.e., regular projects initiated during this reporting period)

GRANT NUMBER
5 S05 PR07024-07

	PROJECT TITLE 1/ (a)	NAME OF INVESTIGATOR (b)	AMOUNT 2/ (c)
1.	Myocardial Anoxic Response: Kinetics and Metabolic Correlates	Andersen, G.L.	$ 32.45
2.	Development of Porous Alumina for Dental Implants	Byers, S.A.	5,551.39
3.	Chemical Interaction of Model Organic Compounds with Biosurfaces	Liotta, C.L. & J.D. Muzzy	538.16
4.	The Effects of Alcohol on Schedule-controlled Behavior in the Rat	Marr, M. Jackson	-0-
5.	Design and Synthesis of Elastase Inhibitors for the Treatment of Emphysema and Related Diseases	Powers, James C.	-0-
6.	Lasar Raman Studies on the Mechanism of Cataract Lens Formation	Yu, Nai-Teng	1,207.45
7.			
8.			
9.	TOTAL FOR NEW REGULAR RESEARCH PROJECTS		(ENTER ON ITEM 9, LINE 3(B), PAGE 7.) $ 7,329.45
	Portion of above total spent for salaries, wages, fees and fringe benefits. (d)		(ENTER ON ITEM 9, LINE 3(A), PAGE 7.) $ 5,684.11

1/ *See page iii of instructions.*
2/ *Include salaries, wages, fees, fringe benefits (if a direct cost), equipment and all other direct costs. See page iii of instructions for method of prorating fringe benefits.*

Number additional pages 4-a, 4-b, etc.

NIH-147-2
(REV. 9-71)

PART I – DESCRIPTION OF PROGRAM ACTIVITIES

ITEM 5
CONTINUATION REGULAR RESEARCH PROJECTS
(i.e., regular projects initiated prior to this reporting period)

GRANT NUMBER
5 S05 PR07024-07

	PROJECT TITLE 1/ (a)	NAME OF INVESTIGATOR (b)	AMOUNT 2/ (c)
1.	None		$
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.	TOTAL FOR CONTINUATION REGULAR RESEARCH PROJECTS		(ENTER ON ITEM 9, LINE 4(B), PAGE 7.) $
	Portion of above total spent for salaries, wages, fees and fringe benefits. (d) →		(ENTER ON ITEM 9, LINE 4(A), PAGE 7.) $

1/ *See page III of instructions.*
2/ *Include salaries, wages, fee, fringe benefits (if a direct cost), equipment and all other direct costs. See page iii of instructions for method of prorating fringe benefits.*

Number additional pages 5-a, 5-b, etc.

PART I – DESCRIPTION OF PROGRAM ACTIVITIES

GRANT NUMBER
5 S05 PR07024-07

ITEM 6 – CENTRAL RESEARCH RESOURCES AND FACILITIES

	RESOURCES	SALARIES, WAGES, FEES, AND FRINGE BENEFITS 1/ (a)	EQUIPMENT (b)	OTHER EXPENDITURES (c)	TOTAL (d)
(01)	Animal Facilities	$	$	$	$ 0
(60)	Central Laboratory Facilities				0
(30)	Computer/Data Processing Facilities				0
(10)	Equipment for General Use				0
(40)	Instrument Shop				0
(20)	Photography and Medical Arts				0
(90)	Other *(Specify)*				0
	TOTALS	(ENTER ON ITEM 9, LINE 5(a), PAGE 7.) $	$	$	(ENTER ON ITEM 9, LINE 5(b), PAGE 7.) $ 0

ITEM 7 RESEARCH TRAINING PROGRAMS	AMOUNT
1. Total for Trainee Expenses *(From Lines 4J-1,2,3, and 4, Annual Expenditures Report, NIH-147-3)*	$ 0
2. Salaries, Wages, Fees and Fringe Benefits *(Associated with Research Training 1/ 2/)*	(ENTER ON ITEM 9, LINE 6(A), PAGE 7.) 0
3. Other Training Expenses 2/	0
4. TOTAL TRAINING COSTS	(ENTER ON ITEM 9, LINE 6(B), PAGE 7.) $ 0

1/ *See page iii of instructions for method of prorating fringe benefits.*
2/ *Lines 2 and 3 must not include any trainee expenses, but must include all direct costs for the training environment.*

PART I – DESCRIPTION OF PROGRAM ACTIVITIES

GRANT NUMBER
5 S05 PR07024-07

ITEM 7 (Continued)
RESEARCH TRAINING PROGRAMS

TRAINING PROGRAM TITLES AND DESCRIPTIONS	NUMBER OF TRAINEES SUPPORTED UNDER EACH PROGRAM
None	

ITEM 8 OTHER ACTIVITIES *(Specify)*	AMOUNT 1/
1. None	$ 0
2.	
3.	
4. TOTAL FOR OTHER ACTIVITIES	$ ENTER ON ITEM 9, LINE 7(B), PAGE 7
5. Portion of above total spent for salaries, wages, fees and fringe benefits.	$ ENTER ON ITEM 9, LINE 7(A), PAGE 7

ITEM 9 SUMMARY *(Taken from ITEMS 2 through 8, Pages 2 through 7.)*	(a) PERSONNEL	(b) TOTAL COSTS
Line 1. New Pilot Research Projects (Page 2)	$ 6,447.30	$ 7,222.78
Line 2. Continuation Pilot Research Projects (Page 3)	-0-	19,348.69
Line 3. New Regular Research Projects (Page 4)	5,684.11	7,329.45
Line 4. Continuation Regular Research Projects (Page 5)	-0-	-0-
Line 5. Central Research Resources and Facilities (Page 6)	-0-	-0-
Line 6. Research Training Programs (Page 6)	-0-	-0-
Line 7. Other Activities (Page 7)	-0-	-0-
TOTALS	$12,131.41 (Should agree with total of line 4A and 4B of Annual Expenditures Report, NIH form 147-3.)	$ 33,900.92 (Should agree with line 4L of Annual Expenditures Report, NIH form 147-3.)

1/ Include salaries, wages, fees, fringe benefits (if a direct cost), equipment, supplies, and all other direct costs. See page iii of instructions for method of prorating fringe benefits.

ITEM I. FLEXIBILITY OF FUNDS

Research proposals in the Biomedical Sciences area were solicited from the Georgia Tech community and were judged by a committee of three faculty members in the Biomedical Science area. A total of twelve allocations were made to support projects submitted from eight different schools and administrative units. Six of the allocations were made to support projects which would be considered pilot research investigations. The other six were made to support projects expected to continue for extended periods of time, including both new and phases of ongoing investigations.

Four of the successful applicants for support were relatively youthful investigators seeking to initiate research programs. The remaining eight awarded projects were proposed by more senior investigators seeking support to initiate research for which other support was not immediately available or to carry out relatively limited pilot studies to determine feasibility of a particular approach. Virtually all of the studies had something of the element of developing preliminary information to determine whether applications for longer term grant support is reasonable and appropriate.

The investigations receiving support were quite variable in nature. Three of them were based upon attempts to use relatively recent techniques to aid in the chemical indentification of components of living tissues. One (by Dr. R.K. Hart) involved the use of secondary emission of Auger electrons in the identification of atoms in molecules of biological importance; another (by Dr. E.W. Thomas) the determination of surface composition by spectroscopic analysis of emission of light in response to low energy ion radiation; a third (by Dr. N.T. Yu) involved the analysis of protein structual changes associated with cataract formation carried out by Raman spectral analysis.

An additional three studies were concerned with the synthesis of materials of usefulness in solving biomedical problems. One (by Mr. S.A. Byers) involved a search for non-corrosive porous alumina of potential usefulness as dental implant material; a related study (by Drs. C.L. Liotta and J.D. Muzzy) involved an effort to synthesize adhesive material of usefulness in resolving dental problems. A third study (by Dr. J.C. Powers) was concerned with the synthesis of elastase inhibitors for use in the treatment of emphysema and related diseases. A seventh study of chemical orientation (by Drs. R.F. Hochman and M. Marek) was concerned with the corrosion release of metallic ions from medical and dental implant materials.

Of the remaining five research projects supported, one (by Drs. K.C. Beck and C.E. Weaver) attempts to determine if a correlation exists between cardiovascular disease and geographic areas in which high levels of cadmium occur. Another study (by Dr. F.P. Saitta) was concerned with the development of a method of detecting the cumulative effects of many minor genetic mutational events and therefore the identification of mutagenic substances. An investigation (by Dr. M.J. Marr) of the effects of alcohol in altering behavioral patterns in rats was included, and two studies were supported having to do with the cardiovascular system. One (by Dr. Gary L. Anderson) involved investigation of the kinetics of the heart muscle under conditions of anoxia; the other (by Drs. W.D. McLeod and P.V. Desai) proposed the development of an instrument employing an ultrasonic transducer to measure arterial diameters from the body surface.

ITEM II. MAJOR SCIENTIFIC ACCOMPLISHMENTS

The formation of a committee to allocate funds available under the subject grant was delayed because of complication steming from the replacement of the former Project Director during the year. Accordingly, allocations were made with about a month remaining before the end of the grant period and only three months before progress reports were due. Accordingly, progress in the studies reported is not as great as would be expected under ordinary conditions.

Three of the projects funded have not proceeded at this point beyond the initial phases of system development, sample acquisition, or construction of required equipment. In the Beck and Weaver study, designed to detect existing correlations between cardio-vascular disease and cadmium (and other trace metal) concentration in the environment, soil sample collections have been made at about 180 sites within the coastal plain and the lower piedmont of Georgia. Letters requesting hair samples have been sent to over 150 barbers throughout the state. Analysis of soil samples, already initated, is being carried out for trace metals, but insufficient data have been obtained for analysis at this point. In the Saitta study of the development of a system for ascertaining mutagenic agents, stocks of marked flies have been built up to the levels necessary for the extraction of chromosomes from wild flies. However, this phase of the study has not yet been initated. In the Thomas study, which was designed to determine surface composition by spectroscopic analysis of emission of light in response to low energy ion radiation, some delay in the delivery of necessary components of the system was encountered. It is expected that the use of the equipment will be initiated in August and the analysis of biological samples shortly thereafter.

In the project of McLeod and Desai a device capable of continuously monitering the diameter of arteries from the body surface has been constructed and its operation demonstrated. Experiments involving the use of the equipment have not yet been carried out, but it is hoped that a study of the arterial diameters of children, initially a normal group, may be initiated in the near future to determine a model of the normal compliance of the system to the pressure pulses.

The remaining eight studies have produced data from which tentative conclusions may be drawn. In the Hart investigation, a system has been developed to carry out studies based on Auger electron spectrometry. Initally tests were carried out with chemically cleaned surfaces of copper, nickel and of an evaporated carbon film coating on copper. The experimental values obtained were in good agreement with the expectations with the type of instrument employed. These preliminary results have led to the preparation of a grant application to the National Institutes of Health to continue the study of atoms in biological molecules from their Auger electron emissions.

In the Liotta and Muzzy project which proposed to synthesize adhesives of biomedical (dental) importance, it was demonstrated that certain classes of compounds actually form chemical bonds with tooth structure. Tooth collagen was isolated, and it was found that certain functional classes of organic compounds investigated are able to bond with collagen polypeptide. In general, compounds that undergo acid-base reactions were found to form moderately strong bonds, and organic substrates that undergo displacement reactions form very strong bonds. The latter classes are judged to be potential dental adhesives.

In a study similarly involving chemical synthesis, by Powers, most of the nine tri-and tetra-peptide chloromethyl keytones synthesized for testing as reversible inhibitors of elastase proved to be effective. An additional recently synthesized elastase inhibitor showed increased hydrophobic character and is expected to be more effective at penetrating intact membranes, and thus capable of inhibiting elastase in viable leukocytes. Experiments to test this hypothesis are in progress. Examples of an additional class of elastase inhibitors, peptide carbazates, are being synthesized. It is expected that these compounds also will prove to be effective inhibitors.

In the investigations of Hochman and Marek, experiments were carried out with implant grade stainless steel and cobalt-chromium-molybdenum implant alloy in 3.5% saline solutions, with and without constant intensity electrical current. Solutions were analyzed for metallic ion presence by atomic absorption spectrophotometry and differential pulse stripping polargraphy. Tests for molybdenum were unsuccessful because of unresolved technical difficulties. Corrosion release of metallic ions from stainless steel and cobalt-chromium-molybdenum alloy was demonstrated by cobalt and chromium ions from the latter and by iron and nickel in the case of stainless steel. Quantitative analysis indicated that chromium content was lower than expected from proportion of chromium in the alloy and that nickel ions were higher than would have been expected on the basis of proportion of of nickel in the stainless steel tested. These results will provide the basis for proposals to Federal Agencies to carry out further work in this area.

In the cardio-vascular investigation of Anderson, a system to carry out the proposed research was developed and limited data were developed. Although insufficient to determine if metabolic or biochemical differences exist during the early stages of anoxic exposure of heart muscle, certain preliminary conclusions may be drawn. It was found that anaerobic energy generation does not appear to be involved in maintaining developed tension in the isolated ventricle during anoxic exposure. It was also found that azide sensitivity depends upon the state of oxygenation of the isolated ventricle preparation. Finally, it was observed that exogenous glucose alters the changes in resting tension which occured during anoxic exposure. Whether or not this response depends upon anaerobic energy metabolism is not yet determined. Analysis of this question as well as additional studies of the effect of glucose upon recovery from anoxia are continuing.

In the investigations of Yu involved with determination of protein changes in cataract development, normal lenses from calves, rats, hogs, and rabbits have been obtained and subjected to Raman spectral analysis. A pair of cataractous lenses from rats are currently being analysed, but no clear evidence of protein change has been observed. Future studies will involve analysis of changes in protein structure induced by UV radiation. In the Marr study designed to determine the effect of alcohol upon established behavioral patterns, rats have been trained to the level necessary to carry out experiments, and limited data have been accumulated. These indicate that consumption of alcohol, on the order of 1 gm. per kg. of body weight, decreases the rate of behavioral response. The difference is particularly evident where controlled rates of response are highest. Alcohol resembles in these actions both D-amphetamine and pentobarbital. Alcohol tends to increase very slightly rates of response when the rates are low in control animals. Studies of the effect of alcohol on response to punishment are still underway.

In the project directed by Byers, ceramic foams produced by five different fabrication techniques were characterized with respect to physical properties such as rupture tendency, elastasity, porosity, specific gravity, bulk density and dry and fired shrinkage. These materials were treated for up to 30 days in a simulated body environment (warm Ringer's solution, 98° and 140°F) during which no significant effect on physical properties was observed in the porous alumina tested. These materials may thus be considered to be potentially useful as dental implant materials.

ITEM III. IMPACT OF INSTITUTIONAL PROGRAMS

Grant funds provided by the subject award to the Georgia Institute of Technology have been particularly welcome in view of the scarcity of grant monies from other sources. There is no question but that a good deal of highly meritorious research is not being carried out solely because of the difficulty or impossibility of obtaining support. Funds provided by the National Institutes of Health in the Biomedical Sciences Support Grant have been of great importance in providing support for young investigators who otherwise would find themselves unable to carry out research programs in the area of their training with the resulting frustration and inevitable injury to the research capability of our country. Experienced scientists have also been enabled to conduct exploratory investigations which might or might not prove the feasibility of a given line of research, but which would be almost impossible without support of this sort. These funds provide a virtually unique source of support for the project of limited dimensions, whether to test an idea or to help a young scientist initiate a research program.

Parenthetically, the research proposals awarded have contributed to research training in that a number of graduate students have been involved with the design and conduct of research programs. A limited amount of interdisciplinary collaboration has been supported, which in itself seems to be rather uncommon.

ITEM IV. ATTRACTION OF OTHER FUNDS

Most of the research projects funded may be or should be continued, and most of the data acquired are potentially useful in providing support for the attraction of funds from other sources. However, no funds have been obtained at this time as a result of the research projects supported. It has been pointed out above that the results of one set of data, those developed in the Hart project, have resulted in the submission of a grant application to the National Institutes of Health to continue studies of identification of atoms in biological molecules by Auger electron emission.

Although it is difficult to point to tangible results that support the point, there is little doubt that this kind of support does stimulate increased interest in biomedical research.

ITEM V. PUBLICATIONS

None

ITEM VI. FOREIGN TRAVEL

None

ITEM VII. ALTERATIONS AND RENOVATIONS

None

ITEM VIII. SCIENTIFIC CONTROL OF FUNDS

Same

ITEM IX. CURCUMSTANCES RESULTING IN CARRY-OVER

A carry-over of $10,571.43 was brought forward from Biomedical Grant 5-S05-RR07024-06 (Research Project G-32-602) to grant No. 5 S05 RR07024-07 (Research Project No. G-32-604). This carry-over resulted largely from funds which had been encumbered for the purchase, delivery, and installation of certain items of equipment which could not be expended during the grant period. Firm knowledge of the availability of these carry-over funds was not available at the time allocation of funds under project No. G-32-604 was carried out. At such time as final expenditure of the funds under this project is completed, the committee will consider applications for research support from whatever carry-over balance is available.

ITEM X. CRITICISMS OR SUGGESTIONS

Continued reduction of the funds allocated to institutions, such as have been experienced over the past few years, will be expected to reach a point very soon that only a very few research projects could be supported. While this is not to say that such monies could not be well spent, it is likely that the benefits steming from such limited funds would not be of the sort indicated above. It would be most desirable, particularly in these times of very limited support for biomedical research, if funding could be increased to something approaching former levels.

Annual Narrative Progress Report G-32-604

BIOMEDICAL SCIENCES SUPPORT
RESEARCH GRANT 5 S05 RR07024-07

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In the project of McLeod and Desai a device capable of continuously monitering the diameter of arteries from the body surface has been constructed and its operation demonstrated. Experiments involving the use of the equipment have not yet been carried out, but it is hoped that a study of the arterial diameters of children, initially a normal group, may be initiated in the near future to determine a model of the normal compliance of the system to the pressure pulses.

The remaining eight studies have produced data from which tentative conclusions may be drawn. In the Hart investigation, a system has been developed to carry out studies based on Auger electron spectrometry. Initally tests were carried out with chemically cleaned surfaces of copper, nickel and of an evaporated carbon film coating on copper. The experimental values obtained were in good agreement with the expectations with the type of instrument employed. These preliminary results have led to the preparation of a grant application to the National Institutes of Health to continue the study of atoms in biological molecules from their Auger electron emissions.

In the Liotta and Muzzy project which proposed to synthesize adhesives of biomedical (dental) importance, it was demonstrated that certain classes of compounds actually form chemical bonds with tooth structure. Tooth collagen was isolated, and it was found that certain functional classes of organic compounds investigated are able to bond with collagen polypeptide. In general, compounds that undergo acid-base reactions were found to form moderately strong bonds, and organic substrates that undergo displacement reactions form very strong bonds. The latter classes are judged to be potential dental adhesives.

In the project directed by Byers, ceramic foams produced by five different fabrication techniques were characterized with respect to physical properties such as rupture tendency, elastasity, porosity, specific gravity, bulk density and dry and fired shrinkage. These materials were treated for up to 30 days in a simulated body environment (warm Ringer's solution, 98° and 140°F) during which no significant effect on physical properties was observed in the porous alumina tested. These materials may thus be considered to be potentially useful as dental implant materials.

ITEM III. IMPACT OF INSTITUTIONAL PROGRAMS

Grant funds provided by the subject award to the Georgia Institute of Technology have been particularly welcome in view of the scarcity of grant monies from other sources. There is no question but that a good deal of highly meritorious research is not being carried out solely because of the difficulty or impossibility of obtaining support. Funds provided by the National Institutes of Health in the Biomedical Sciences Support Grant have been of great importance in providing support for young investigators who otherwise would find themselves unable to carry out research programs in the area of their training with the resulting frustration and inevitable injury to the research capability of our country. Experienced scientists have also been enabled to conduct exploratory investigations which might or might not prove the feasibility of a given line of research, but which would be almost impossible without support of this sort. These funds provide a virtually unique source of support for the project of limited dimensions, whether to test an idea or to help a young scientist initiate a research program.

Parenthetically, the research proposals awarded have contributed to research training in that a number of graduate students have been involved with the design and conduct of research programs. A limited amount of interdisciplinary collaboration has been supported, which in itself seems to be rather uncommon.

ITEM IV. ATTRACTION OF OTHER FUNDS

Most of the research projects funded may be or should be continued, and most of the data acquired are potentially useful in providing support for the attraction of funds from other sources. However, no funds have been obtained at this time as a result of the research projects supported. It has been pointed out above that the results of one set of data, those developed in the Hart project, have resulted in the submission of a grant application to the National Institutes of Health to continue studies of identification of atoms in biological molecules by Auger electron emission.

Although it is difficult to point to tangible results that support the point, there is little doubt that this kind of support does stimulate increased interest in biomedical research.

ITEM V. PUBLICATIONS

None

ITEM VI. FOREIGN TRAVEL

None

In a study similarly involving chemical synthesis, by Powers, most of the nine tri-and tetra-peptide chloromethyl keytones synthesized for testing as reversible inhibitors of elastase proved to be effective. An additional recently synthesized elastase inhibitor showed increased hydrophobic character and is expected to be more effective at penetrating intact membranes, and thus capable of inhibiting elastase in viable leukocytes. Experiments to test this hypothesis are in progress. Examples of an additional class of elastase inhibitors, peptide carbazates, are being synthesized. It is expected that these compounds also will prove to be effective inhibitors.

In the investigations of Hochman and Marek, experiments were carried out with implant grade stainless steel and cobalt-chromium-molybdenum implant alloy in 3.5% saline solutions, with and without constant intensity electrical current. Solutions were analyzed for metallic ion presence by atomic absorption spectrophotometry and differential pulse stripping polargraphy. Tests for molybdenum were unsuccessful because of unresolved technical difficulties. Corrosion release of metallic ions from stainless steel and cobalt-chromium-molybdenum alloy was demonstrated by cobalt and chromium ions from the latter and by iron and nickel in the case of stainless steel. Quantitative analysis indicated that chromium content was lower than expected from proportion of chromium in the alloy and that nickel ions were higher than would have been expected on the basis of proportion of of nickel in the stainless steel tested. These results will provide the basis for proposals to Federal Agencies to carry out further work in this area.

In the cardio-vascular investigation of Anderson, a system to carry out the proposed research was developed and limited data were developed. Although insufficient to determine if metabolic or biochemical differences exist during the early stages of anoxic exposure of heart muscle, certain preliminary conclusions may be drawn. It was found that anaerobic energy generation does not appear to be involved in maintaining developed tension in the isolated ventricle during anoxic exposure. It was also found that azide sensitivity depends upon the state of oxygenation of the isolated ventricle preparation. Finally, it was observed that exogenous glucose alters the changes in resting tension which occured during anoxic exposure. Whether or not this response depends upon anaerobic energy metabolism is not yet determined. Analysis of this question as well as additional studies of the effect of glucose upon recovery from anoxia are continuing.

In the investigations of Yu involved with determination of protein changes in cataract development, normal lenses from calves, rats, hogs, and rabbits have been obtained and subjected to Raman spectral analysis. A pair of cataractous lenses from rats are currently being analysed, but no clear evidence of protein change has been observed. Future studies will involve analysis of changes in protein structure induced by UV radiation. In the Marr study designed to determine the effect of alcohol upon established behavioral patterns, rats have been trained to the level necessary to carry out experiments, and limited data have been accumulated. These indicate that consumption of alcohol, on the order of 1 gm. per kg. of body weight, decreases the rate of behavioral response. The difference is particularly evident where controlled rates of response are highest. Alcohol resembles in these actions both D-amphetamine and pentobarbital. Alcohol tends to increase very slightly rates of response when the rates are low in control animals. Studies of the effect of alcohol on response to punishment are still underway.

ITEM VII. ALTERATIONS AND RENOVATIONS

None

ITEM VIII. SCIENTIFIC CONTROL OF FUNDS

Same

ITEM IX. CURCUMSTANCES RESULTING IN CARRY-OVER

A carry-over of $10,571.43 was brought forward from Biomedical Grant 5-S05-RR07024-06 (Research Project G-32-602) to grant No. 5 S05 RR07024-07 (Research Project No. G-32-604). This carry-over resulted largely from funds which had been encumbered for the purchase, delivery, and installation of certain items of equipment which could not be expended during the grant period. Firm knowledge of the availability of these carry-over funds was not available at the time allocation of funds under project No. G-32-604 was carried out. At such time as final expenditure of the funds under this project is completed, the committee will consider applications for research support from whatever carry-over balance is available.

ITEM X. CRITICISMS OR SUGGESTIONS

Continued reduction of the funds allocated to institutions, such as have been experienced over the past few years, will be expected to reach a point very soon that only a very few research projects could be supported. While this is not to say that such monies could not be well spent, it is likely that the benefits steming from such limited funds would not be of the sort indicated above. It would be most desirable, particularly in these times of very limited support for biomedical research, if funding could be increased to something approaching former levels.