

# **EXHIBIT 2**

## **Part 1 of 3**

**Exhibit 2043**  
05-12237-WGY

FORM APPROVED  
O.M.S. NO. 68-70247

DEPARTMENT OF HEALTH AND HUMAN SERVICES PUBLIC HEALTH SERVICE		LEAVE BLANK	
GRANT APPLICATION		TYPE	ACTIVITY
FOLLOW INSTRUCTIONS CAREFULLY		REVIEW GROUP	FORMERLY
		COUNCIL, BOARD (Month, year)	DATE RECEIVED
1. TITLE OF APPLICATION (Do not exceed 55 typewriter spaces)			
Erythropoietin: Purification, Properties, Biogenesis <span style="float: right;">Supplement</span>			
2. RESPONSE TO SPECIFIC PROGRAM ANNOUNCEMENT <input checked="" type="checkbox"/> NO <input type="checkbox"/> YES (If "YES," state RFA number and/or announcement title)			
4-1-93-6-30-93			
3. PRINCIPAL INVESTIGATOR/PROGRAM DIRECTOR			
3a. NAME (Last, first, middle)		3b. SOCIAL SECURITY NUMBER	
Goldwasser, Eugene		494-14-6535	
3c. MAILING ADDRESS (Street, city, state, zip code)		3d. POSITION TITLE	
The University of Chicago 920 East 58th Street Chicago, Illinois 60637		Professor	
3e. TELEPHONE (Area code, number and extension)		3f. DEPARTMENT, SERVICE, LABORATORY OR EQUIVALENT	
(312) 753-4911		Biochemistry	
3g. MAJOR SUBDIVISION		3h. RECOMBINANT DNA RESEARCH SUBJECT TO NIH GUIDELINES	
Biological Sciences Division		<input checked="" type="checkbox"/> NO <input type="checkbox"/> YES	
4. HUMAN SUBJECTS, DERIVED MATERIALS OR DATA INVOLVED		5. TOTAL DIRECT COSTS REQUESTED FOR PROJECT PERIOD (from page 5)	
<input type="checkbox"/> NO <input checked="" type="checkbox"/> YES (If "YES," form 295 374 required)		\$ 38,879	
6. DATES OF ENTIRE PROPOSED PROJECT PERIOD (This application)		8. DIRECT COSTS REQUESTED FOR FIRST 12-MONTH BUDGET PERIOD (from page 4)	
From: 04/01/83 Through: 06/30/85		\$ 10,632	
9. PERFORMANCE SITES (Organizations and addresses)		10. INVENTIONS (Competing continuation application only)	
The University of Chicago 920 East 58th Street Chicago, Illinois 60637		Were any inventions conceived or reduced to practice during the course of the project? <input type="checkbox"/> NO <input type="checkbox"/> YES - Previously reported <input type="checkbox"/> YES - Not previously reported	
17. ORGANIZATIONAL COMPONENT TO RECEIVE CREDIT FOR INSTITUTIONAL GRANT (See instructions)		11. APPLICANT ORGANIZATION (Name, address, and congressional district)	
Code: <u>011</u> Description: School of Medicine		The University of Chicago 5801 South Ellis Avenue Chicago, Illinois 60637 First Congressional District	
15. OFFICIAL IN BUSINESS OFFICE TO BE NOTIFIED IF AN AWARD IS MADE (Name, title, address and telephone number)		12. ENTITY IDENTIFICATION NUMBER	
Donald S. Sigal, Director, Office of Sponsored Programs 5801 South Ellis Avenue Chicago, Illinois 60637 312-962-8604		1362177139A1	
16. OFFICIAL SIGNING FOR APPLICANT ORGANIZATION (Name, title, address and telephone number)		14. TYPE OF ORGANIZATION (See instructions)	
1) Donald S. Sigal, Director, Office of Sponsored Programs (312) 962-8604		<input checked="" type="checkbox"/> Private Nonprofit <input type="checkbox"/> Public (Specify Federal, State, Local)	
17. PRINCIPAL INVESTIGATOR PROGRAM DIRECTOR ASSURANCE: I agree to accept responsibility for the scientific conduct of the project and to provide the required progress reports if a grant is awarded as a result of this application.		16. OFFICIAL SIGNING FOR APPLICANT ORGANIZATION (Name, title, address and telephone number)	
		1) Donald S. Sigal, Director, Office of Sponsored Programs (312) 962-8604	
18. CERTIFICATION AND ACCEPTANCE: I certify that the statements herein are true and complete to the best of my knowledge, and I accept the obligation to comply with Public Health Service terms and conditions if a grant is awarded as a result of this application. I willfully make certification as a criminal offense, U.S. Code, Title 18, Section 1001.		SIGNATURE OF PERSON NAMED IN 3a (In ink, "Pa." signature not acceptable)	
		<i>Eugene Goldwasser</i>	
		DATE	
		8 April 1983	
		SIGNATURE OF PERSON NAMED IN 16 (In ink, "Pa." signature not acceptable)	
		DATE	

FHS-318  
Rev. 3/78

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DEFENDANT'S  
DEPOSITION  
EXHIBIT  
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10-13-99

EXHIBIT  
Goldwasser 21  
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DEPARTMENT OF HEALTH AND HUMAN SERVICES PUBLIC HEALTH SERVICE	LEAVE BLANK
<b>ABSTRACT OF RESEARCH PLAN</b>	PROJECT NUMBER

NAME AND ADDRESS OF APPLICANT ORGANIZATION (Same as Item 11, page 1)

The University of Chicago, 5801 S. Ellis Avenue, Chicago, Illinois 60637

TITLE OF APPLICATION (Same as Item 1, page 1)

Erythropoietin: Purification, Properties, Biogenesis

Name, Title and Department of all professional personnel engaged on project, beginning with Principal Investigator/Program Director

Eugene Goldwasser, SS # 494-14-6535, Department of Biochemistry  
Fung-Fang Wang, SS # 135-52-9600, Department of Biochemistry

**ABSTRACT OF RESEARCH PLAN:** Concisely describe the application's specific aims, methodology and long-term objectives, making reference to the scientific disciplines involved and the health-relatedness of the project. The abstract should be self-contained so that it can serve as a succinct and accurate description of the application when separated from it. **DO NOT EXCEED THE SPACE PROVIDED.**

We propose to continue study of the glycoprotein hormone, erythropoietin. Purification methods will be improved with the use of affinity, chromatography based on the newly developed monoclonal, antibody. We plan to prepare different hybridomas as a means of finding antibodies directed against different domains. We will continue the study of erythropoietin primary structure, both of the protein and carbohydrate portions. The chemical and biological properties of fragments of erythropoietin found in sera and urine will be determined. We will continue to search for a system in which to study the biogenesis of erythropoietin and its regulation. An improved radioimmunoassay, based on the use of the monoclonal antibody, will also be developed.

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LABORATORY ANIMALS INVOLVED. Identify by common names. If none, state "none"

Yes, mice, rats, rabbits.

PHS-398  
Rev. 5/80

PAGE 2

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PRINCIPAL INVESTIGATOR/PROGRAM DIRECTOR: Eugene Goldwasser

**TABLE OF CONTENTS**

*Number pages consecutively at the bottom throughout the application. Do not use suffixes such as 5a, 5b. Type the name of the Principal Investigator/Program Director at the top of each printed page and each continuation page.*

	<u>PAGE NUMBERS</u>
SECTION 1.	
Face Page, Abstract, Table of Contents.....	7-3
Detailed Budget for First 12 Month Budget Period .....	4
Budget Estimates for All Years of Support.....	5-6
Biographical Sketch-Principal Investigator/Program Director (Not to exceed two pages).....	7-8
Other Biographical Sketches (Not to exceed two pages for each).....	9
Other Support.....	10
Resources and Environment .....	11

SECTION 2.

Introduction (Excess pages; revised and supplemental applications) .....	---
Research Plan	
A. Specific Aims (Not to exceed one page) .....	12
B. Significance (Not to exceed three pages).....	12
C. Progress Report/Preliminary Studies (Not to exceed eight pages) .....	12-14
D. Methods .....	15-17
E. Human Subjects, Derived Materials or Data .....	18
F. Laboratory Animals .....	---
G. Consultants.....	---
H. Consortium Arrangements or Formalized Collaborative Agreements .....	---
I. Literature Cited .....	19
Checklist .....	19

SECTION 3. Appendix (Six sets) (No page numbering necessary for Appendix)

Number of publications: \_\_\_\_\_ Number of manuscripts: \_\_\_\_\_  
 Other items (list): \_\_\_\_\_

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Application Receipt Record, form PHS 3830  
 Form HHS 596 if Item 4, page 1, is checked

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PRINCIPAL INVESTIGATOR/PROGRAM DIRECTOR: Eugene Goldwasser

DETAILED BUDGET FOR FIRST 12 MONTH BUDGET PERIOD DIRECT COSTS ONLY				FROM 4/1/83	THROUGH 6/30/83	DOLLAR AMOUNT REQUESTED (omit cents)		
PERSONNEL (Applicant organization only) (See instructions)			TIME/EFFORT		SALARY	FRINGE BENEFITS	TOTALS	
NAME	TITLE OF POSITION	%	Hours per Week					
Eugene Goldwasser	Principal Investigator	15			-0-	-0-	-0-	
Anthony Kittler	Instrument Design		2.5		\$450	\$82	\$532	
Fung-Fang Wang	Research Assoc.	100			0	0	0	
SUBTOTALS					\$450	\$82	\$532	
CONSULTANT COSTS (See instructions)							0	
EQUIPMENT (Itemize)							0	
SUPPLIES (Itemize by category) HPLC columns and hardware, \$3000; spectral grade reagents, \$400; isotopes (14C, 3H, 125I,), \$1500; culture media, \$700; fetal calf serum, \$800; disposable sterile culture ware, \$1400; antibodies and protein A, \$500; high purity gas for G-C, \$300.							\$8,600	
TRAVEL		DOMESTIC					0	
		FOREIGN					0	
PATIENT CARE COSTS		INPATIENT					0	
		OUTPATIENT					0	
ALTERATIONS AND RENOVATIONS (Itemize by category)							0	
CONTRACTUAL OR THIRD PARTY COSTS (See instructions)							0	
OTHER EXPENSES (Itemize by category) Maintenance contracts, \$1500							\$1,500	
TOTAL DIRECT COSTS (Also enter on page 7, Item 8)							\$10,632	

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PMS-378  
Rev. 5/80

PAGE 4

PRINCIPAL INVESTIGATOR: PROGRAM DIRECTOR: Eugene Goldwasser

BUDGET ESTIMATES FOR ALL YEARS OF SUPPORT REQUESTED  
DIRECT COSTS ONLY

BUDGET CATEGORY TOTALS	1st BUDGET PERIOD (from page 4)	ADDITIONAL YEARS SUPPORT REQUESTED			
		2nd	3rd	4th	5th
PERSONNEL (Salary and fringe benefits, Applicant organization only)	* \$ 532	\$ 2,341	\$ 2,575		
CONSULTANT COSTS					
EQUIPMENT					
SUPPLIES	8,600	9,460	10,406		
TRAVEL	DOMESTIC				
	FOREIGN				
PATIENT CARE COSTS	INPATIENT				
	OUTPATIENT				
ALTERATIONS AND RENOVATIONS					
CONTRACTUAL OR THIRD PARTY COSTS					
OTHER EXPENSES	1,500	1,650	1,815		
TOTAL DIRECT COSTS	\$10,632	\$ 13,451	\$14,796		

TOTAL FOR ENTIRE PROPOSED PROJECT PERIOD (Also enter on page 1, Item 7) → \$ 38,879

JUSTIFICATION (Use continuation pages if necessary): Briefly describe the specific functions of the personnel and consultants. For all years, justify any costs for which the need may not be obvious, such as equipment, foreign travel, alterations and renovations, and contractual or third party costs. For future years, justify any significant increases in any category. In addition, for COMPETING CONTINUATION applications, justify any significant increases over current level of support. If a recurring annual increase in personnel costs is anticipated, give percentage.

Justification:

The 2.5 hours of an instrument designer's time are included in this project because the machine shop is involved in a) repair and maintenance of equipment not covered by maintenance contracts and b) construction of laboratory items not available from commercial sources, such as microelectrophoresis apparatus, which have become vital to the research in progress.

This request for supplemental funds is justifiable by the greatly increased cost of contemporary research. Our work on the structural properties of erythropoietin and the biological and clinical aspects of its activity would be materially impeded by not being able to use state-of-the-art methods such as HPLC, affinity chromatography and gas chromatography. Our experience over the past two years makes it quite clear that even with great care in regulating expenditures, the amount available to us is inadequate. We have managed to make good progress because funds were made available that were, otherwise, in a restricted category, but it would be preferable to have the flexibility inherent in no restrictions.

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PHS-399  
Rev. 5/80

PAGE 5

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Name of PI/PC/Program Coordinator or Candidate (Last, first initial) Goldwasser, Eugene	Social Security Number #94-14-6535
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\* The wages for the instrument designer are calculated for the 3 months, 1 April 1983 to 30 June 1983 in the 1st year. After that the full year is used. Cost are increased by 10% per year. No change in percent effort of P.I. is involved.

I have included a modest amount (\$1500) for maintenance contracts which is intended to supplement that already committed to keeping sophisticated instruments in operation. The most critical maintenance contracts are for the gamma counters, the liquid scintillation counter and the high-speed centrifuges. These are items of equipment in constant use and downtime would impede our work. These contracts (also paid for by another grant) include preventive maintenance which does help keep the operation going. Because of the excessive expense we do not have maintenance contracts on the gas chromatograph or the HPLC; this is a calculated risk.

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PHS-295  
Rev. 5/60

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PRINCIPAL INVESTIGATOR/PROGRAM DIRECTOR: Eugene Goldwasser

## BIOGRAPHICAL SKETCH

Give the following information for key professional personnel listed on page 2, beginning with the Principal Investigator/Program Director. Photocopy this page for each person.

NAME	TITLE	BIRTHDATE (Mo., Day, Yr.)	
Eugene Goldwasser	Professor of Biochemistry	10-14-22	
EDUCATION (Begin with baccalaureate training and include postdoctoral)			
INSTITUTION AND LOCATION	DEGREE	YEAR CONFERRED	FIELD OF STUDY
The University of Chicago, Chicago, IL	S.B.	1943	Biochemistry
The University of Chicago, Chicago, IL	Ph.D.	1950	Biochemistry

RESEARCH AND/OR PROFESSIONAL EXPERIENCE: Concluding with present position, list in chronological order previous employment, experience, and honors. Include present membership on any Federal Government Public Advisory Committee. List, in chronological order, the titles and complete references to recent representative publications, especially those most pertinent to this application. Do not exceed 2 pages.

Positions:

Research Associate: Department of Biochemistry, University of Chicago 1952 - 1961  
 Associate Professor of Biochemistry: University of Chicago 1962 - 1963  
 Professor of Biochemistry, University of Chicago 1963 - present  
 Chairman, Committee on Developmental Biology, University of Chicago 1976 - present

Honors

Guggenheim Fellowship Oxford University, U.K. 1966 - 1967

Publications: (Selected from 109 papers since 1947):

Meints, R., and Goldwasser, E. The persistence of Hemopoietic stem cells in vitro J. Cell Biol. 56: 429 (1973).  
 Chang, C.S., and Goldwasser, E. On the mechanism of erythropoietin-induced differentiation XIII. A cytoplasmic protein mediating induced nuclear RNA synthesis. Dev. Biol. 34: 246 (1973).  
 Chang, S.C.-S., Sikkema, D., and Goldwasser, E. Evidence for an erythropoietin receptor protein on rat bone marrow cells. Biochem. Biophys. Res. Commun. 57: 399 (1974).  
 Goldwasser, E., Kung, C.K.-H., and Eliason, J.F. On the mechanism of erythropoietin-induced differentiation XIV, the role of sialic acid in erythropoietin action. J. Biol. Chem. 249: 4202 (1974).  
 Goldwasser, E., Eliason, J.F., and Sikkema, D. An assay for erythropoietin in vitro at the milliunit level. Endocrinology 97: 315 (1975).  
 Goldwasser, E. Erythropoietin and the differentiation of red blood cells. Fed. Proc. 34: 2285 (1975).  
 Bedard, D.L., and Goldwasser, E. On the mechanism of erythropoietin-induced differentiation. XV. Induced transcription restricted by cytosine arabinoside. Exp. Cell Res. 102: 376 (1976).  
 Van Zant, G., and Goldwasser, E. The effects of erythropoietin in vitro on spleen colony-forming cells. J. Cell Physiol. 90: 241 (1977).  
 Miyake, T., Kung, C.K.-H., and Goldwasser, E. Purification of human erythropoietin. J. Biol. Chem. 252: 5558 (1977).  
 Van Zant, G., and Goldwasser, E. The simultaneous effects of erythropoietin and colony stimulating factor on bone marrow cells. Science 198: 733 (1977).  
 Sherwood, J.B., and Goldwasser, E. Extraction of erythropoietin from normal kidneys. Endocrinology 103: 866 (1978).

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PHS-371  
 Rev. 10-79

PAGE 7

A 196324  
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AM-ITC 00927015



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Publications (con't)

Goldwasser, E., and Inana, G. Molecular aspects of the initiation of erythropoiesis in hemopoietic cell differentiation. Eds. D.W. Golde, M.J. Cline, D. Metcalf, and C.F. Fox, pp. 15-28, Academic Press, 1978.

Van Zant, G., and Goldwasser, E. Suppression of erythroid differentiation by colony-stimulating factor. Exp. Hematol. Today, eds. S.J. Baum & G.D. Ledney, pp63-71, Springer-Verlag, New York Inc.

Van Zant, G., and Goldwasser, E. Competition between erythropoietin and colony-stimulating factor for target cells in mouse marrow. Blood 53: 946 (1978).

Eliason, J.F., Van Zant, G., and Goldwasser, E. The relationship of hemoglobin synthesis to erythroid colony and burst formation. Blood 53: 935 (1979).

Sherwood, J.B., and Goldwasser, E. Radioimmunoassay for erythropoietin. Blood 54:885 (1979).

Eliason, J.F., and Goldwasser, E. Evidence for cellular cooperativity in hemoglobin synthesis by erythroid bursts. Exp. Hematol. 8: 419 (1980).

Terasawa, T., Ogawa, M., Porter, P.N., Golde, D.W. and Goldwasser, E. Effect of burst-promoting activity (BPA) and erythropoietin on hemoglobin biosynthesis in culture. Blood 56, 1105 (1980).

Koeffler, H.P. and Goldwasser, E. Erythropoietin radioimmunoassay in evaluating patients with polycythemia. Ann. Int. Med. 94: 44 (1981).

Weiss, TL and Goldwasser E. The biological properties of endotoxin-free human erythropoietin. Biochem J 98, 17 (1981)

Goldwasser E. Erythropoietin and red cell differentiation. in Control of Cellular Division and Development: p 487 Eds D Cunningham, E Goldwasser, D Watson and CF Fox. 1981

Goldwasser E and Sherwood JB Radioimmunoassay of erythropoietin. Brit J Haematol 98, 359 (1981)

Tong BD and Goldwasser E. The formation of erythrocyte membrane proteins during erythropoietin-induced differentiation. J Biol Chem 256, 12666(1981)

Nijhof W, Wierenga P and Goldwasser E. The regeneration of stem cells after a bone marrow depression induced by thiamphenicol. Exp Hematol 10, 36-43 (1982)

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PRINCIPAL INVESTIGATOR/PROGRAM DIRECTOR: Eugene Goldwasser

**OTHER SUPPORT**

**(USE CONTINUATION PAGES IF NECESSARY)**

For each of the professionals named on page 2, list, in three separate groups: (1) active support; (2) applications pending review and/or funding; (3) applications planned or being prepared for submission. Include all Federal, non-Federal, and institutional grant and contract support. If none, state "NONE." For each item give the source of support, identifying number, project title, name of principal investigator/program director, time or percent of effort on the project by professional named, annual direct costs, and entire period of support. (If part of a larger project, provide the titles of both the parent grant and the subproject and give the annual direct costs for each.) Briefly describe the contents of each item listed. If any of these overlap, duplicate, or are being replaced or supplemented by the present application, justify and delineate the nature and extent of the scientific and budgetary overlaps or boundaries.

PRINCIPAL INVESTIGATOR/PROGRAM DIRECTOR:

**(1) ACTIVE SUPPORT:**

1. NIH: Grant HL 21676-05 Erythropoietin, Purification, Properties, Biogenesis, P.I. Eugene Goldwasser (15%), annual direct costs 07/01/81-06/30/82, \$153,751, period of support 07/01/77 to 06/30/85. Dr. F. F. Wang does not have any independent research support. She devotes 100% of her time to HL 21676.

NIH: Grant CA 18375 Hemopoietic Stem Cells and Induced Differentiation, P.I. Eugene Goldwasser (20%), annual direct costs 07/01/81 to 06/30/82 \$75,154, period of support 07/01/78 to 06/30/83. This project is devoted to the cell biology of erythropoietin and the relationships between erythropoietin-responsive cells and pluripotent stem cells.

NIH: Grant HL 16005, Comprehensive Center for Sickle Cell Research, project period 04/01/74 to 03/31/83, P.I. J. E. Bowman: Subproject; studies of erythropoiesis in vitro, P.I. Eugene Goldwasser (10%) & M. Gross, annual direct cost 05/01/82 to 04/31/83, \$89,724 (approximately one-half of this amount is for Dr. Gross' lab). This project is devoted to study of transcription induced by erythropoietin, to the regulation of heme synthesis and to the specific expression of mouse globin genes.

2. Application pending: NIH HL 21676-06, Erythropoietin, Purification, Properties, Biogenesis, annual direct cost 07/01/82 to 06/30/83, \$164,023, period of support, 07/01/77 to 06/30/85.

3. Application planned: Program project on Sickle Cell Biology

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PHS-398  
Rev. 5/80

PAGE 10

A 196326  
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PRINCIPAL INVESTIGATOR/PROGRAM DIRECTOR: Eugene Goldwasser

RESOURCES AND ENVIRONMENT

FACILITIES: Mark the facilities to be used and briefly indicate their capacities, pertinent capabilities, relative proximity and extent of availability to the project. Use "other" to describe facilities or other performance sites listed in Item 9, page 1, and at sites for field studies. Using continuation pages if necessary, include a description of the nature of any collaboration with other organizations and provide further information in the RESEARCH PLAN.

Laboratory: Approx. 1500 sq. ft: fully operating, including culture labs, and needed equipment

Clinical: When needed, the clinical Research Center can be made available. It can be used for any further clinical testing.

Animal: Carlson Animal Research Facility is used to house all lab animals and to maintain them in a healthy state for experimental purposes.

Computer:

Office: There are separate offices for the P.I. and the secretary.

Other ( ): \_\_\_\_\_

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MAJOR EQUIPMENT: List the most important equipment items already available for this project, noting the location, and pertinent capabilities of each.

HPLC, Gas chromatograph, culture hoods, incubators, centrifuges, monitors, counters and spectrophotometers are all within the lab.

ADDITIONAL INFORMATION: Provide any other information describing the environment for the project. Identify support services such as consultants, secretarial, machine shop, and electronics shop, and the extent to which they will be available to the project.

Secretarial service within the lab; the machine shop is an important adjunct as noted in the budget justification.

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PRINCIPAL INVESTIGATOR/PROGRAM DIRECTOR: Eugene Goldwasser

**BIOGRAPHICAL SKETCH**

Give the following information for key professional personnel listed on page 2, beginning with the Principal Investigator/Program Director. Photocopy this page for each person.

NAME		TITLE	BIRTHDATE (Mo., Day, Yr.)
Fung-Fang, Wang		Research Associate	05/05/48
EDUCATION (Begin with baccalaureate training and include postdoctoral)			
INSTITUTION AND LOCATION	DEGREE	YEAR CONFERRED	FIELD OF STUDY
National Taiwan (Univ.)	B.S.	1970	Agricultural Chem.
Rutgers University		1971-73	Biochemistry
Indiana University	Ph.D.	1973-77	Biochemistry

RESEARCH AND/OR PROFESSIONAL EXPERIENCE: Concluding with present position, list in chronological order previous employment, experience, and honors. Include present membership on any Federal Government Public Advisory Committee. List, in chronological order, the titles and complete references to recent representative publications, especially those most pertinent to this application. Do not exceed 2 pages.

**Professional Experience:**

- Univ. of Chicago (1981-Present), Research Associate
  1. Structural and Functional Studies of Colony stimulating factor
  2. Structural studies of erythropoietin
- Univ. of Chicago (1979-1980), Post Doctoral Trainee
  - Purification of human urinary colony stimulating factor
- City of Hope Medical Center (1977-1978), Junior Research Scientist
  1. Interaction of detergents with fibronectin
  2. Protein sequence studies of fibronectin
- University of Chicago (1979-1980): Post doctoral trainee, purification of human urinary colony stimulating factor
- City Hope National Medical Center (1977-78): Junior Research Scientist.

**Publications:**

1. Pietrusako, R and Chen FF. (1976) Biochem Pharmacol 25, 2721.
2. Wang FFC, and Hirs CHW, (1977) J Biol Chem 252, 8358, Influence of the Hetero-saccharides in porcine pancreatic ribonuclease on the conformation and stability of the protein.
3. Wang FFC, and Hirs CHW, (1979) J Biol Chem 254, 1090. A comparison by 220 MHz NMR of Histidine H<sup>+</sup> ion titration in porcine ribonuclease and an extensively deglycosylated derivative.
4. Wang FFC and Goldwasser E. Purification of Human urinary CSF (in preparation).
5. Wang FFC and Goldwasser E. Irrelevance of the carbohydrate moiety of human urinary CSF for activity. In preparation.

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PRINCIPAL INVESTIGATOR/PROGRAM DIRECTOR: Eugene Goldwasser

**BIOGRAPHICAL SKETCH**

Give the following information for key professional personnel listed on page 2, beginning with the Principal Investigator/Program Director. Photocopy this page for each person.

NAME	TITLE	BIRTHDATE (Mo., Day, Yr.)	
Fung-Fang, Wang	Research Associate	05/05/48	
EDUCATION (Begin with baccalaureate training and include postdoctoral)			
INSTITUTION AND LOCATION	DEGREE	YEAR CONFERRED	FIELD OF STUDY
National Taiwan (Univ.)	B.S.	1970	Agricultural Chem.
Rutgers University		1971-73	Biochemistry
Indiana University	Ph.D.	1973-77	Biochemistry

RESEARCH AND/OR PROFESSIONAL EXPERIENCE: Concluding with present position, list in chronological order previous employment, experience, and honors. Include present membership on any Federal Government Public Advisory Committees. List, in chronological order, the titles and complete references to recent representative publications, especially those most pertinent to this application. Do not exceed 2 pages.

**Professional Experience:**

- Univ. of Chicago (1981-Present), Research Associate
  1. Structural and Functional Studies of Colony stimulating factor
  2. Structural studies of erythropoietin
- Univ. of Chicago (1979-1980), Post Doctoral Trainee
  - Purification of human urinary colony stimulating factor
- City of Hope Medical Center (1977-1978), Junior Research Scientist
  1. Interaction of detergents with fibronectin
  2. Protein sequence studies of fibronectin
- University of Chicago (1979-1980): Post doctoral trainee, purification of human urinary colony stimulating factor
- City Hope National Medical Center (1977-78): Junior Research Scientist.

**Publications:**

1. Pietrusako, R and Chen FF. (1976) Biochem Pharmacol 25, 2721.
2. Wang FFC, and Hirs CHW, (1977) J Biol Chem 252, 8358, Influence of the Hetero-saccharides in porcine pancreatic ribonuclease on the conformation and stability of the protein.
3. Wang FFC, and Hirs CHW, (1979) J Biol Chem 254, 1090. A comparison by 220 MHz NMR of Histidine H<sup>+</sup> ion titration in porcine ribonuclease and an extensively deglycosylated derivative.
4. Wang FFC and Goldwasser E. Purification of Human urinary CSF (in preparation).
5. Wang FFC and Goldwasser E. Irrelevance of the carbohydrate moiety of human urinary CSF for activity. In preparation.

0-3688

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FHS-288  
Rev. 5/80

PAGE 9

A 196329  
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