

ONE-PAGE BIOGRAPHICAL SKETCH FOR PERMANENT NIH INTRAMURAL SCIENTIST

NAME Marshall Nirenberg		TITLE Chief, Lab. of Biochemical Genetics		BIRTHDATE & PLACE 4-10-27 New York		CITIZENSHIP USA	
Institute/Division/Laboratory NHLBI/Lab. of Biochemical Genetics			OFFICE (Bldg./Room No.) 36/1C-27		LABORATORY (Bldg./Room No.) 4C-20		
EDUCATION and TRAINING:							
Years	Institution	Degree		Discipline			
1952-57	Univ. of Mich. Ann Arbor	Ph.D.		Biochemistry			
1950-52	Univ. of Florida	M.S.		Biology			
1945-48	Univ. of Florida	B.S.		Biology and Chemistry			
CHRONOLOGY OF EMPLOYMENT (Limited to space provided)							
1966 - Now	Chief, Laboratory of Biochemical Genetics, NHLBI						
1962-66	Chief, Section on Biochemical Genetics, NHLBI						
1960-62	Research Biochemist, Section of Metabolic Enzymes, NIAMD						
1957-60	Postdoctoral Fellow with Dewitt Stetten, Jr. (2 yrs.), Gordon Tomkins(3rd year)						
RESEARCH INTERESTS AND ACCOMPLISHMENTS (Limited to space provided)							
<u>Interest.</u> Regulation of gene expression. Neurobiology, Genetics, <u>Drosophila</u> , Neuroblastoma.							
<u>Accomplishments.</u> Deciphered the genetic code. Showed that RNA is a template for protein synthesis. Established clonal lines of neuroblastoma and somatic hybrid cells that form synapses <u>in vitro</u> as model systems for neurobiology. Discovered 10 novel homeobox genes and 2 novel Pou-domain genes.							
IMPORTANT AND RECENT PUBLICATIONS (Limited to 5) Total Number of Publications: <u>159</u>							
1. Hara, Y., Rovescalli, A., Kim, Y., and Nirenberg, M.: Structure and Evolution of Four POU-Domain Genes Expressed in Mouse Brain. <u>Proc. Natl. Acad. Sci., USA 89: 3280-3284 (1992).</u>							
2. Nazarali, A., Kim, Y., and Nirenberg, M.: <u>Hox 1.11 and Hox-4.9 Homeobox Genes. Proc. Natl. Acad. Sci., USA 89: 2883-2887 (1992).</u>							
3. Kim, Y. and Nirenberg, M.: <u>Drosophila NK-homeobox Genes. Proc. Natl. Acad. Sci. 77: 7716-7720 (1989).</u>							
4. Nirenberg, M. W. and Leder, P.: RNA codewords and protein synthesis. I. The effect of trinucleotides upon the binding of sRNA to ribosomes. <u>Science, 145:1399-1407 (1964).</u>							
5. Nirenberg, M.W. and Matthaei, J.H.: The dependence of cell-free protein synthesis in <u>E. coli</u> upon naturally occurring or synthetic polyribonucleotides. <u>Proc. Natl. Acad. Sci. USA, 47: 1588-1602.</u>							
AWARDS, HONORS, EDITORSHIPS, AND COMMITTEES (Examples limited to space provided)							
Nobel Prize in Medicine or Physiology (1968). Shared with H.G. Khorana and R.W.Holley.							
Member National Academy of Science.							
Member National Academy of Medicine.							
Editorial Advisory Board - Molecular Neurobiology.							
Editorial Advisory Board - Cellular and Molecular Neurobiology							
Editorial Board - Molecular Neurobiology							
DATE FORM COMPLETED: August <u>17</u> 1993				SIGNATURE <i>Marshall Nirenberg / AP</i>			

Dr. Marshall Nirenberg (1992-1993)

CRITICAL ELEMENT #1: Maintains and manages a creative environment in the Laboratory of Biochemical Genetics.

Encouragement of Seminars and Journal Clubs. Laboratory seminars are held Monday, Tuesday, and Wednesday. The most recent interesting papers that have been published are presented at the Monday noon seminar. The Tuesday 4:00 PM seminar is for Dr. Nirenberg's group. This is a highly informal seminar with no scheduled speakers. Each person discusses the experimental results that he or she obtained during the previous week, technical problems encountered, methods, and so forth. Ideas also are discussed. The Wednesday noon seminar series focuses on the research of the investigators in the laboratory. Each person gives a one hour talk on the research that he or she has done over the past 4-6 months, answers questions, and considers critical comments.

Consultations with Section Chiefs and Professional Staff to Review Their Research Progress and Encourage Collaborations where Advisable. Usually, Dr. Nirenberg discusses results of the current or last experiment with each postdoctoral fellow each day and also discusses plans for the next experiment or set of experiments. However, the frequency of discussion often is tailored to the needs of the postdoctoral fellow and the experimental difficulties that are encountered. Large projects usually are designed as collaborative projects; i.e., different postdoctoral fellows work on separate but related parts of the same problem. In addition, ² projects are being studied in collaboration with investigators in other laboratories at the NIH. Additional discussions also are held with the other permanent, independent investigators in the laboratory on the results of their research and their plans for future research.

Effective Performance of Support Staff. The performance of support staff is monitored closely and suggestions are made as needed. Problems are discussed with Dr. Nirenberg and are monitored until they are solved. Dr. Nirenberg's technicians (~~1 full-time, 2 half-time technicians~~) are effective and productive. A medical problem has impaired the effectiveness of Dr. Daniel's technician, but



this problem should be resolved soon.

Compliance With E.E.O. And Affirmative Action Guidelines And Objectives. Dr.

Nirenberg complies fully with E.E.O. and affirmative action objectives. ^{As} ~~discussed above~~, ^{year} the diener in the lab, Derek Tang, from Viet Nam, ^{was} ~~has~~ been taught many technical procedures used in molecular biology, and now is doing research for ^{most} ~~more than half~~ of each day, which should enable him to obtain a promotion. Afro-Americans in the laboratory also have been taught many technical procedures.

Effective and Efficient Management of Financial Resources. Dr. Nirenberg makes

sure that all members of the laboratory conserve resources in a responsible manner. Years ago, to save money some policies were instituted in this laboratory which are still being followed; ^{it's} ~~now~~ because of the expense no one in this laboratory uses NIH sterile glassware or ~~the services of~~ the NIH media room. The NIH Art Department is used very infrequently; figures are drawn on the computer by members of the laboratory. ~~Computers are used extensively in this laboratory.~~ however, Mental Health and NINDS computer facilities are used rather than the NIH facilities because ^{they are full} ~~it is much cheaper and the facilities are excellent~~. All orders are approved by Dr. Nirenberg or Dr. Peterkofsky prior to placement. Computer printouts of expenditures are examined each month by Dr. Nirenberg and appropriate actions are taken ^{when} ~~when~~ needed.

CRITICAL ELEMENT 2: PURSUES AND DIRECTS A VIGOROUS RESEARCH PROGRAM.

Publications. Three manuscripts were written that were supposed to be in press by now but have been delayed a few months because several months ago Dr. Nirenberg thought it was more important for him to focus intensively on some research concerning the pattern of expression of the NK-2 homeobox gene during the development of Drosophila embryos. This analysis led to predictions, which have a high probability of being correct, of the rules for assembling part of the central nervous system of Drosophila and explains how positional information that determines the structure of the nervous system is encoded in DNA and retrieved. These ideas will change the direction of Dr. Nirenberg's research for the next 3 or 4 years. Each prediction can be tested experimentally using the NK-2 as the experimental system. These ideas represent a major advance in Dr. Nirenberg's understanding of how the nervous system is assembled. With a slight modification the hypothesis also applies to the assembly of part of the mammalian CNS.

Presentations at Scientific Meetings. Dr. Nirenberg was a coauthor of 7 abstracts that were presented as posters or talks at the following meetings: Society for Cell Biology, Society for Neuroscience meeting, Neurobiology of Drosophila meeting at Cold Spring Harbor, Biophysical Society meeting, Eastern Analytical Symposium, and the Third Forum on Peptides and Proteins, Biarritz, France. Dr. Nirenberg also presented a symposium talk at the International Meeting on the Biochemistry of Cell Membranes, sponsored by the International Union of Biochemistry and Molecular Biology in Bari, Italy.

Peer Recognition. Was invited to select the speakers and cochairperson for a symposium on Drosophila Neurobiology and to be the Chairman of the symposium at the International Congress of Biochemistry in New Delhi in 1994. Was invited to be a plenary speaker at the European Pharmacology Society Meeting in Berlin in 1994. Was a member of the Organizing Committee and an invited lecturer for the Elba International Neuroscience Meeting in Marina di Campo, Isola d'Elba, Italy for 1993. Was invited to be a symposium speaker at a meeting "DNA: The Double Helix, Forty Years: Perspective and Prospective" sponsored by the New York Academy of Science. Invited lecturer at the Department of Biochemistry, College of Medicine, University of Illinois at Chicago, Illinois and Georgetown University. Many other invitations to give talks were not accepted. Member of the Editorial Advisory Board, Molecular Neurobiology. Member of the Editorial Advisory Board of Cellular and Molecular Neurobiology. Member of the Editorial Board, Journal of Neurogenetics. Adjunct Professor, Department of Biochemistry, George Washington Medical School, Washington, D.C. Member of an American College of Neurology Committee to choose the recipient of a major award for research.

Influence on Research Projects. Essentially all of the research objectives of Dr. Nirenberg's group, past and present, originated from Dr. Nirenberg. The ideas for 2 of the 3 collaborative projects that Dr. Nirenberg currently is working on were originated by Dr. Nirenberg. The idea for the third collaborative project in collaboration with a former postdoctoral fellow of Dr. Nirenberg's was equally obvious to Dr. Nirenberg and the other investigator.

nothing has been done on the manuscripts for the last few months for Nirenberg 123-11-35

Dr. Marshall Nirenberg (1992-1993)

CRITICAL ELEMENT #2: PURSUES AND DIRECTS A VIGOROUS RESEARCH PROGRAM.

~~Publications. A large portion has to be included here. ~~These papers are manuscripts submitted and supposed to be in press. Approx. 10 abstracts were presented.~~~~

Presentations at Scientific Meetings. Dr. Nirenberg was a coauthor of 7 posters or talks that were presented at the following meetings: Society for Cell Biology, Society for Neuroscience meeting, Neurobiology of Drosophila meeting at Cold Spring Harbor, Biophysical Society meeting, Eastern Analytical Symposium, and the

Third Forum on Peptides and Proteins, Biarritz, France. Dr. Nirenberg also was invited to present a symposium talk at the International Meeting on the Biochemistry of Cell Membranes, sponsored by the International Union of Biochemistry and Molecular Biology in Bari, Italy. He was also invited to be a lecturer at a meeting in Switzerland.

Peer Recognition. Was invited to select the speakers for a symposium on Drosophila Neurobiology and to be the Chairman of the symposium at the International Congress of Biochemistry in New Delhi in 1994. Was invited to be a plenary speaker at the European Pharmacology Society Meeting in Berlin in 1994. Was a member of the Organizing Committee and an invited lecturer for the Elba International Neuroscience Meeting in Marina di Campo, Isola d'Elba, Italy for 1993. Was invited to be a symposium speaker at a meeting "DNA: The Double Helix, Forty Years: Perspective and Prospective" sponsored by the New York Academy of Science. Invited lecturer at the Department of Biochemistry, College of Medicine, University of Illinois at Chicago, Illinois and Georgetown University. Many other invitations to give talks were not accepted.

Member of the Editorial Advisory Board, Molecular Neurobiology.
Member of the Editorial Advisory Board of Cellular and Molecular Neurobiology.
Member of the Editorial Board, Journal of Neurogenetics.
Adjunct Professor, Department of Biochemistry, George Washington Medical School, Washington, D.C.

Member of an American College of Neurology Committee to choose the recipient of a prestigious award for research.

Influence on Research Projects. Essentially all of the research objectives of Dr. Nirenberg's group, past and present, originated from Dr. Nirenberg. The ideas for 2 of the 3 collaborative projects that Dr. Nirenberg (is) currently *working on* ~~involved with~~ ^{was} originated ^{by} Dr. Nirenberg. The idea for the third collaborative project ~~was~~ ^{in collaboration with} ~~was~~ ^{the former postdoctoral fellow of Nirenberg's} equally obvious to Dr. Nirenberg and the other investigator.

CRITICAL ELEMENT 3: MAINTAINS AN ACTIVE ROLE IN THE PROFESSION
AS INDICATED BY:

Reviews Manuscripts for Scientific Journals. Dr. Nirenberg is a member of the Editorial Boards of 3 scientific journals and reviews manuscripts for these journals. He also serves as an ad hoc reviewer of many manuscripts for other scientific journals.

Active Participation in Scientific Societies.

Dr. Nirenberg is an active member of the following societies:

National Academy of Sciences, U.S.A.

National Academy of Medicine, U.S.A.

American Academy of Arts and Sciences

American Society of Biological Biological Chemistry and Molecular Biology

American Chemical Society

American Neurochemistry Society

Biophysical Society

American Association for the Advancement of Science

Society for Neuroscience

The Society for Developmental Biology

American Society for Neurology

Neurological Association

European Academy of Arts and Sciences

Pontifical Academy of Sciences, the Vatican

Federation of American Scientists

International Society for Neuroimmunomodulation

Dr. Nirenberg is a Sponsor of The Federation of American Scientists and a member of the Advisory Board of the The International Society for Neuroimmunomodulation.

During the past year, Dr. Nirenberg signed about 10 letters from different scientific societies or organizations ~~dedicated to worthy causes~~

that contain statements or principles that he agrees with.

Shirley
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Dr. Marshall Nirenberg (1992-1993)

NONCRITICAL ELEMENT #4: SERVES ON COMMITTEES WITHIN NIH AND ELSEWHERE AS REQUESTED.

As discussed on ~~the~~ previous page, Dr. Nirenberg is a member of the Editorial Advisory Boards of 3 scientific journals, ~~he is~~ a member of the Advisory Board of the International Society for Neuroimmunomodulation, and was a member of a committee to select the recipients of a major award presented by the American Neurological Association. He is a member of the Advisory Board of the Beckman Institute of the University of Illinois at Urbana-Champaign, IL. He also was a member of the doctoral committee of Mrs. Wha Kwon and directed the research of Mrs. Kwon, who received a Ph.D. degree several months ago from the Department of Biology, University of MD.

CRITICAL ELEMENT #5:

SUPPORTS THE NIH EQUAL EMPLOYMENT OPPORTUNITY PROGRAMS BY ACTIONS THAT INSURE EQUAL TREATMENT OF EMPLOYEES.

Dr. Nirenberg always has supported the National Institutes of Health and Public Health Service Equal Employment Opportunity programs and has a long, well established record of treating all employees equally and of recruiting, developing, and advancing minorities, women, and persons with disabilities. About half of the investigators in the Laboratory of Biochemical Genetics are women and some individuals are members of minorities. Only one individual with a disability applied to ^{for} ~~me~~ for a postdoctoral position. The individual ~~who~~ ^{was} crippled by polio in childhood ~~was~~ ^{is} a woman and a member of a minority group was accepted ~~as~~ ^{as} a postdoctoral fellow. As discussed on an earlier page, a young man with little or no background in science, a member of a minority group, ^{my} was recruited to maintain liquid nitrogen freezers and other laboratory equipment and to take care of the laboratory stock room, was taught many technical procedures during the past year that are required for recombinant DNA research and now spends most of the day doing research. Other individuals who are members of minorities also were taught various technical procedures during the past year.

Dr. Korn came to the Laboratory of Biochemical Genetics and gave a talk which was attended by all members of the laboratory on issues related to sexual harassment and EEO programs ~~to educate people so that they will obtain ? or sexually harassing behavior.~~ ^{The talk evoked a vigorous discussion} Ethical questions that were brought up by members of the ~~laboratory also were discussed.~~ ^{for sexual harassment and other issues}