

SMITHSONIAN SCIENCE INFORMATION EXCHANGE PROJECT NUMBER (Do NOT use this space)	U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE PUBLIC HEALTH SERVICE NOTICE OF INTRAMURAL RESEARCH PROJECT	PROJECT NUMBER Z01 HL 00011-02 LBG						
PERIOD COVERED July 1, 1976 through September 30, 1977								
TITLE OF PROJECT (80 characters or less) The Development of Chick Embryo Retina								
NAMES, LABORATORY AND INSTITUTE AFFILIATIONS, AND TITLES OF PRINCIPAL INVESTIGATORS AND ALL OTHER PROFESSIONAL PERSONNEL ENGAGED ON THE PROJECT <table border="0" style="width: 100%;"> <tr> <td style="width: 33%;">PI: F. G. De Mello</td> <td style="width: 33%;">Visiting Associate</td> <td style="width: 33%;">LBG NHLBI</td> </tr> <tr> <td>Marshall Nirenberg</td> <td>Chief, LBG</td> <td>LBG NHLBI</td> </tr> </table>			PI: F. G. De Mello	Visiting Associate	LBG NHLBI	Marshall Nirenberg	Chief, LBG	LBG NHLBI
PI: F. G. De Mello	Visiting Associate	LBG NHLBI						
Marshall Nirenberg	Chief, LBG	LBG NHLBI						
COOPERATING UNITS (if any)								
LAB/BRANCH Laboratory of Biochemical Genetics								
SE Section on Molecular Biology								
INSTITUTE AND LOCATION NHLBI, NIH, Bethesda, Maryland 20014								
TOTAL MANYEARS: 0.5	PROFESSIONAL: 0.5	OTHER:						
CHECK APPROPRIATE BOX(ES) <input type="checkbox"/> (a) HUMAN SUBJECTS <input type="checkbox"/> (b) HUMAN TISSUES <input checked="" type="checkbox"/> (c) NEITHER <input type="checkbox"/> (a1) MINORS <input type="checkbox"/> (a2) INTERVIEWS								
SUMMARY OF WORK (200 words or less - underline keywords) <p>Some biochemical aspects of <u>chick embryo retina</u> differentiation were studied: 1) An alternate route for <u>GABA</u> synthesis was characterized in the retina; which depends upon the <u>conversion of putrescine to GABA</u>. 2) <u>Glutamic acid decarboxylase</u> specific activity in the retina, increased during the course of embryonic development, either when measured <u>in ovo</u> or in aggregate cultures. 3) The presence of GABA in the culture medium prevented the development of glutamic acid decarboxylase activity in aggregate cultures. 4) The proposed course of this project is to attempt to correlate the biochemical changes observed, with <u>synaptogenesis</u> in the retina.</p>								

Project Description:

Objectives: The objective of the project is to study the biochemical step required for synaptogenesis in chick embryo retina.

Major Findings: Two pathways for γ -aminobutyric acid synthesis were found in chick embryo retina. The first pathway depends upon the conversion of putrescine to ornithine decarboxylase and the subsequent conversion of ornithine to γ -aminobutyric acid. The second route of synthesis is dependent upon the conversion of glutamic acid to γ -aminobutyric acid, catalyzed by glutamic acid decarboxylase. Elevation of cAMP levels in neuroblastoma cells was shown to induce ornithine decarboxylase activity. Thus, in the developing embryo, neurotransmitters which affect cAMP levels may regulate ornithine decarboxylase activity and thereby control the rate of GABA synthesis from ornithine.

GABA was found to regulate the specific activity of glutamic acid decarboxylase in cells dissociated from chick embryo retina and cultured in vitro.

Significance to Biomedical Research: These findings show that GABA can be synthesized by a novel pathway and provide new insight on the relationship and regulation of GABA synthesis.

Proposed Course: To determine the effect of retina neurotransmitters and other compounds on retina synaptogenesis.

Publications:

1. De Mello, F. G., Bachrach, U. and Nirenberg, M.: Ornithine and glutamic acid decarboxylase activities in the developing retina. J. Neurochem. 27: 847-851, 1976.