SMITHSONIAN SCIENCE INFORMATION EXCHANGE PROJECT NUMBER (Do NOT use this space) U.S. DEPARTMENT OF PROJECT NUMBER HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE
NOTICE OF ZO1 HL 00011-02 LBG INTRAMURAL RESEARCH PROJECT PERIOD COVERED July 1, 1975 through June 30, 1976. 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 F. G. DeMello Visiting Associate LBG NHLI LBG NHLI Marshall Nirenberg Chief, LBG COOPERATING UNITS (if any) None

LAB/BRANCH

Laboratory of Biochemical Genetics

SECTION

Section on Molecular Biology

INSTITUTE AND LOCATION

NHLI, NIH, Bethesda, Maryland 20014

TOTAL MANYEARS: 1.2

PROFESSIONAL:

OTHER:

SUMMARY OF WORK (200 words or less - underline keywords)

Some biochemical aspects of chick embryo retina differentiation were studied: 1) An alternate route for GABA synthesis was characterized in the retina; which depends upon the conversion of putrescine to GABA. 2) Glutamic acid decarboxylase specific activity in the retina, increased during the course of embryonic development, either when measured in ovo 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 synaptogenesis in the retina.

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 ornithing 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.

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

Publications:

1. DeMello, F. G., Bachrach, U. and Nirenberg, M.: Ornithine and glutamic acid decarboxylase activities in the developing retina. J. Neurochem. In Press.