

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 00017-01 LBG						
PERIOD COVERED July 1, 1975 through June 30, 1976								
TITLE OF PROJECT (80 characters or less) Acetylcholine Receptors in the Developing Nervous System								
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: Marshall Nirenberg</td> <td style="width: 33%;">Chief, LBG</td> <td style="width: 33%;">LBG NHLI</td> </tr> <tr> <td> Hiroyuki Sugiyama</td> <td>Research Associate</td> <td>LBG NHLI</td> </tr> </table>			PI: Marshall Nirenberg	Chief, LBG	LBG NHLI	Hiroyuki Sugiyama	Research Associate	LBG NHLI
PI: Marshall Nirenberg	Chief, LBG	LBG NHLI						
Hiroyuki Sugiyama	Research Associate	LBG NHLI						
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: 1.6	PROFESSIONAL: 1.3	OTHER: .3						
SUMMARY OF WORK (200 words or less - underline keywords) <p>The goal of this project is to define the properties of <u>muscarinic and nicotinic acetylcholine receptors</u> of chick embryo retina before and after <u>synaptogenesis</u> in the retina. Thus far we have elucidated (1) the specificity and affinities of muscarinic and nicotinic acetylcholine receptors for cholinergic agonists and antagonists, (2) the number of receptors were defined as a function of developmental age of the retina, and (3) the location of nicotinic receptors within the retina was determined.</p>								

Project Description:

Objectives: The objectives are to define the biochemical properties of acetylcholine receptors before and after synaptogenesis in the retina.

Major Findings: Neurons dissociated from chick embryo retina and maintained in vitro were found to reaggregate and form, in vitro, approximately 1×10^9 synapses per mg of protein. Three types of synapses and several subtypes were identified which closely resemble those of the intact retina.

Chick embryo retina was found to be a rich source of both muscarinic and nicotinic acetylcholine receptors. Both muscarinic and nicotinic acetylcholine receptors are synthesized before synapses appear in the retina; however, during development, nicotinic acetylcholine receptors become associated predominantly with neurites in the synaptic layers of the retina. The properties of muscarinic acetylcholine receptors were determined at different developmental ages and were compared with the properties of muscarinic inhibitory and excitatory receptors of neuroblastoma cells.

Significance to Biomedical Research: This study gives fundamental information and serves as a basis for further studies on the role of this receptor protein in synapse formation.

Proposed Course: More detailed studies of synaptogenesis and receptor properties are planned.

Publications:

1. Vogel, Zvi and Nirenberg, Marshall: Localization of acetylcholine receptors during synaptogenesis in retina. Proc. Natl. Acad. Sci. USA, In Press.
2. Vogel, Zvi, Daniels, Mathew P. and Nirenberg, Marshall: Synapse and acetylcholine receptor synthesis by neurons dissociated from retina. Proc. Natl. Acad. Sci., USA, In Press.
3. Gouras, P., Chader, G., Enrigues, N. and Gibbons, R.G.: Calcium-induced spikes in cultures pigment epithelium of chich retina. Invest. Ophthalmol. 15: 62-64, 1976.