

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 00016-01 LBG						
PERIOD COVERED July 1, 1975 through June 30, 1976								
TITLE OF PROJECT (80 characters or less) Acetylcholine Receptor-Mediated Regulation of Adenylate Cyclase in Hybrid Cells								
NAMES, LABORATORY AND INSTITUTE AFFILIATIONS, AND TITLES OF PRINCIPAL INVESTIGATORS AND ALL OTHER PROFESSIONAL PERSONNEL ENGAGED ON THE PROJECT <table border="0" data-bbox="165 574 1321 680"> <tr> <td>PI: Marshall Nirenberg</td> <td>Chief, Lab. of Biochem. Genetics</td> <td>LBG NHLI</td> </tr> <tr> <td>Neil M. Nathanson</td> <td>Guest Worker</td> <td>LBG NHLI</td> </tr> </table>			PI: Marshall Nirenberg	Chief, Lab. of Biochem. Genetics	LBG NHLI	Neil M. Nathanson	Guest Worker	LBG NHLI
PI: Marshall Nirenberg	Chief, Lab. of Biochem. Genetics	LBG NHLI						
Neil M. Nathanson	Guest Worker	LBG NHLI						
COOPERATING UNITS (if any) Muscular Dystrophy Association								
LAB/BRANCH Laboratory of Biochemical Genetics								
SECTION Section on Molecular Biology								
INSTITUTE AND LOCATION NHLI, NIH, Bethesda, Maryland 20014								
TOTAL MANYEARS: 1.05	PROFESSIONAL: 1.05	OTHER:						
SUMMARY OF WORK (200 words or less - underline keywords) <p>The activity of <u>adenylate cyclase</u> in neuroblastoma x glioma hybrid NG108-15 cells is regulated by the interaction of acetylcholine and its analogues with the <u>muscarinic acetylcholine</u> receptors of the cells. Addition of the acetylcholine analogue carbamylcholine inhibits adenylate cyclase activity. However, growth of cells with carbachol results in a prolonged increase in adenylate cyclase activity. Adenylate cyclase activity increases slowly and after 18-24 hours is 1.5-3 times higher than control values. Intracellular cAMP is also 1.5-3-fold higher in carbachol-grown cells than in controls. These changes are maintained for at least three days in the presence of carbachol, but the activity returns to control values if carbachol is removed.</p>								

Project Description:

Objectives: The objective of this project is to study muscarinic acetylcholine-receptor mediated regulation of adenylate cyclase activity, in an attempt to understand how neurotransmitter-receptor interactions modulate synaptic transmission.

Major Findings: The activity of adenylate cyclase in neuroblastoma x glioma hybrid NG108-15 cells is regulated by the interaction of acetylcholine and its analogues with the muscarinic acetylcholine receptors of the cells. Addition of the acetylcholine analogue carbamylcholine inhibits adenylate cyclase activity. However, growth of cells with carbachol results in a prolonged increase in adenylate cyclase activity. Adenylate cyclase activity increases slowly and after 18-24 hours is 1.5-3 times higher than control values. Intracellular cAMP is also 1.5-3-fold higher in carbachol-grown cells than in controls. These changes are maintained for at least three days in the presence of carbachol, but the activity returns to control values if carbachol is removed.

Significance to Biomedical Research: The results obtained suggest that neurotransmitter-receptor interactions can exert long-lived effects on macromolecules required for synaptic transmission.

Proposed Course: Work on this project will be incorporated into other projects in the coming year.