Brain and Behavioral Dynamics

in Development and Following Injury to the Adult Nervous System

A broad range of studies in the neurosciences have recently shown striking examples of brain plasticity in a wide variety of species and under innumerable conditions. The plasticity that has been discovered following injury to the adult central nervous system may be on a biologic continuum with the continuing plasticity that is seen in brain development. What remains as key issues interacting with these dramatic phenomena are the biologic mechanisms underlying not only the sprouting, but also the cell dynamics that determine what existing structures should be reconnected. In addition, there is a clear need to correlate these structural changes with a behavioral reality. In this panel, Dr. Herbert Killackey will discuss some of the plastic changes that occur in the commissural systems innervating somato-sensory cortex development. Gerald Schneider will review the kinds of plasticity that can occur following central nervous system injury in the adult. Joshua Lederberg will describe possible biological mechanisms underlying the logic of cell-to-cell connection. Lastly, Norman Geschwind will comment on how well the evidence of brain plasticity correlates with the recovery of function at a behavioral level.

Herbert Killackey
Psychobiology, Irvine

Joshua Lederberg
Rockefeller University

Gerald Schneider
Brain and Behavioral Science
M.I.T.

Norman Geschwind
Neurology
Harvard Medical School

Proposed List of Seminar Issues Fall '79 R.U.

DEVELOPMENTAL NEUROBIOLOGY

Group 1. How specific is specific cell-to-cell recognition?

- Topic A. Specificity in Growth and Regeneration of the Retinotectal Pathway (anatomical description, Jacobson, Gaze, Cowan)
- Topic B. Specificity in Nerve-muscle Connections (Fambrough, Fishback)
- Topic C. Specificity in Tissue Culture (Bunge, Crain, Parnes)

Group 2. Mechanisms of Specificity: Search for molecules

- Topic A. Model Systems for Cell-aggregation (Moscona, Roth, Gottlieb)
- Topic B. Membrane-bound Protein Factors and Cell Adhesion (Gottlieb, brain; Barondes, slime mold)
- Topic C. Proteins in Neuromuscular Interaction (Denberg)
- Topic D. Biochemical Exploration of Synaptic Proteins (Morgan, Cotman)
- Topic E. Surface Glycoproteins in Nerve Growth (Pfenninger)

Group 3. Bridging the Gap to More Molar Aspects

- Topic A. Reactive Synaptogenesis in Mature Brain, Sprouting, Plasticity (Lynch, Cotman)

Proposed List of Seminar Issues Fall '79

COGNITIVE NEUROSCIENCE

BIOLOGIC ASPECTS OF HUMAN MEMORY

Group 1. Physiologic Mechanisms of Motor Memory

Topic A. Adaptation of Command Cells and Performance Changes
(Rosenbaum, Bell Labs.)

Topic B. Role of Proprioception in Praxis
(Kelso, Haskins Labs.)

Group 2. Auditory and Language Aspects of Memory

Topic A. Biologic Limits of Speech Perception
(Cutting, Wesleyan)

Topic B. Neural Coding of Language: Neurologic Confirmation of Psychologic Models
(Marcel, Cambridge)

Topic C. Brain Wave Clues to Language and Memory Mechanisms
(Kutas, La Jolla)

Group 3. Memory Mechanisms in Visual Coding

Topic A. Physical Basis of Mental Rotations: The Idea of Imagery
(Cooper, Cornell, Ithaca)

Topic B. Biochemical Basis of Visual Adaptation Changes: Possible Mechanism of Brain Plasticity
(Pettigrew, Cal.Tech.)

linguistic comp.