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13. ABSTRACT (Maximum 200 words)

One Hundred and eight scientist attended the 1989 GOrdon Conference on Neural Plasticity. Formal presentations and poster presentations provided a unique mixture of topics in this rapidly growing field. New research avenues will be a key result of this meeting.

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Air Force Office of Scientific Research
AFOSR-89-0322

Final Progress Report
1989 Gordon Research Conference on Neural Plasticity

Principal Investigator: Alexander M. Cruickshank, Ph.D.
Conference Chairperson/Co-P.I.: Carla J. Shatz, Ph.D.

The seventh Gordon Conference on Neural Plasticity was held on July 17-21, 1989 at Brewster Academy in Wolfeboro, New Hampshire. Attached is a final list of the sessions and the speakers at the conference. Also attached is a list of all attendees.

One hundred and eight persons attended the meeting- a significant increase over the numbers in previous years and an indication that the subject of Neural Plasticity is one of great current interest and rapid advancement. Among the participants were about 10 foreign scientists from France, England, the Netherlands, Israel and Canada. About one-third of the attendees were postdoctoral or senior predoctoral fellows, most of whom participated actively in the meeting by presenting posters. This group of students contributed an air of vitality and enthusiasm to the meeting. Their presence, as well as that of about half of the foreign travellers and all of the speakers, was facilitated by the award of grant funds that were used to defray travel expenses and/or registration fees.

There were many comments reflecting upon the unique mixture of subjects covered by the meeting and the wide diversity of interests represented. Many participants attended in order to broaden their own knowledge of the rapidly moving subject of neural plasticity: Molecular biologists benefitted from sessions on systems-level neuroscience, and vice versa. The opportunities for education and for cross-fertilization were great.

Formal presenations were not only of high quality, but also were almost entirely based on new material. Because session leaders adhered strictly to time requirements, and because most sessions involved only three speakers, there was ample time for lively discussions. As a result, many important and controversial issues were clarified. For example, the question of whether the changes produced by long term potentiation in the hippocampus are presynaptic or postsynaptic was thoroughly dealt with in several presentations and summations in several sessions. The keynote address, given by Dr. C.F. Stevens, was an extremely lucid and informative chalk talk without slides on the properties of NMDA-gated channels. Finally, almost 50 posters were presented, in two sessions that were packed with attendees and that lasted long into the night.

Comments indicated that many of the participants found the meeting to be of the highest quality, and to represent a unique and desirable mixture of disciplines that would otherwize not be found in combination. It is anticipated that another conference on this topic will take place in 1991- a Chairman and Program Committee were appointed at this meeting.

We are extremely grateful for your support, which was essential for the success of the meeting and especially for the participation of the many younger scientists.

1989 GORDON CONFERENCE ON NEURAL PLASTICITY-FINAL PROGRAM

Chair: Carla Shatz, Stanford University; Vice-chair: Richard Zigmond, Case Western Reserve University

1. Monday A.M. Oncogenes and Neural Plasticity

Session Leader: Linda Dokas (Medical College of Ohio)

Src oncogene expression in the nervous system- Joan Brugge, SUNY Stony Brook.

Role of immediate-early genes in neuronal plasticity- Donna Cohen, Roche Institute of Molecular Biology.

Nerve growth factor and neurotransmitter regulation of the c-Fos proto-oncogene- Michael Greenberg, Harvard Medical School.

2. Monday P.M. How the Cerebral Cortex Learns to Represent Sensory Information

Session Leader: Steve Lisberger, UC San Francisco

Learning spatial representation in the parietal cortex- Richard Anderson, MIT.

Changes in neuronal responses in visual cortex in association with learning- John Maunsell, Univ. Rochester.

Cortical learning rules derived from the physiology of long-term potentiation- Richard Granger, UC Irvine.

3. Tuesday A.M. Genetic Models of Neuronal Development

Session Leader: Judith Eisen (Univ. Oregon)

A genetic approach to the study of neuronal development in a simple vertebrate- Judith Eisen, Univ. Oregon.

Genetic control of neuronal differentiation in C. elegans- Martie Chalfie, Columbia University.

Molecular genetics of neuronal development in drosophila- Corey Goodman, UC Berkeley.

4. Tuesday P.M. Characterization and Regulation of Neuronal Nicotinic Receptors

Session Leader: Richard Zigmond (Harvard Univ.)

Characterization of neuronal nicotinic receptors using snake venom neurotoxins- Ralph Loring, Harvard Medical School.

Developmental regulation and modulation of neuronal nicotinic receptors- Lorna Role, Columbia Medical School.

Regulation of neuronal nicotinic receptors by cell-cell interactions and second messengers- Darwin Berg, UC San Diego.

5. Wednesday A.M. NMDA- Mediated Mechanisms of Synaptic Plasticity

Session Leader: Mary Kennedy (California Institute of Technology)

Presynaptic modifications during LTP in the hippocampus- Tim Bliss, Mill Hill, London.

Role of NMDA receptors in development of frog optic tectum- Liz Debski, Yale University.

NMDA receptors and plasticity in cat visual cortex- Nigel Daw, Washington University Sch. of Medicine.

6. Wednesday P.M. Keynote Lecture and Poster Session

Speaker: *Charles F. Stevens (Yale Univ. School of Medicine)- Three ways that ion channels participate in neural plasticity.*

Poster Session to follow immediately.

7. Thursday A.M. Cellular and Molecular Models of Learning

Session Leader: Tom Carew (Yale University)

Factors involved in the induction of long term potentiation- Roger Nicoll, University of California, San Francisco.

Protein Kinases and the induction, maintenance and expression of LTP- Dan Madison, Yale University.

Mechanisms of short and long term memory in Hermissenda- Terry Crow, Univ. of Texas, Houston.

Neural and molecular models of short and long term sensitization in Aplysia- John Bryne, University of Texas, Houston.

8. Thursday P.M. Hormonal Control of Neuronal Development and Plasticity

Session Leader: Jim Truman (Washington University)

Androgen effects on development and morphology of mammalian motomeruons- Marc Breedlove, UC Berkeley.

Hormone induced synaptic reorganization in the vertebrate CNS- Arthur Arnold, UCLA

Interaction of steriod and local cues during synaptic reorganization an invertebrate nervous system- Jim Truman, Washington University.

9. Friday A.M. What Can Neural Grafts Reveal about Neural Plasticity?

Session Leader: Dennis Landis (Case Western School of Medicine)

Functional innervation of target neuronal populations by hippocampal grafts- Fred Gage (UC San Diego).

Interaction of embryonic and adult neurons in cerebellar grafts- Constantino Sotello, INSERM, Paris, France.

POSTER SESSION: 1989 GORDON CONFERENCE
ON NEURAL PLASTICITY

POSTERS I: Monday and Tuesday

Formal presentation time: Monday afternoon

PLASTIC CHANGES OCCUR IN A LATE COMPONENT OF THE PRIMATE VESTIBULO-OCULAR REFLEX. D.B. Belknap, H. Bronte-Stewart and S.G. Lisberger, Dept. of Physiology, UCSF, San Francisco, CA 94143.

PLASTICITY OF SYNAPTIC STRUCTURE IN VISUAL CORTEX. D. McCarthy, L.A. Coleman, K. Martin and M. Friedlander, Neurobiology Research Center, University of Alabama at Birmingham.

MODEL OF OCULAR DOMINANCE COLUMNS AND PATTERN FORMATION: ANALOGY TO FERROMAGNETIC DOMAINS. Huntington Potter, Ph.D., Department of Neurobiology, Harvard Medical School, 220 Longwood Avenue, Boston, MA 02115.

OCULAR DOMINANCE PLASTICITY IN KITTEN VISUAL CORTEX: A LITHIUM REGULATED MECHANISM. T. Ohashi and T. Kasamatsu, Smith-Kettlewell Eye Research Institute, San Francisco, CA 94115.

MODELS FOR THE DEVELOPMENT OF OCULAR DOMINANCE AND ORIENTATION IN VISUAL CORTEX. Kenneth D. Miller, Dept. of Physiology, UCSF, San Francisco, CA 94143, and Dept. of Neurobiology, Stanford University, Stanford, CA 94305.

TRANSIENT EXPRESSION OF A SUBPLATE-SPECIFIC ANTIGEN IN CAT VISUAL CORTEX. Janice R. Naegele, Colin Barnstable and Petra Wahle, Dept. of Ophthalmology and Visual Sciences, Yale University School of Medicine, New Haven, CT 06510.

ABLATION OF SUBPLATE NEURONS ALTERS THE DEVELOPMENT OF GENICULOCORTICAL AXONS. A. Ghosh, A. Antonini, S.K. McConnell and C.J. Shatz, Dept. of Neurobiology, Stanford University, Stanford, CA [illegible]05.

ONTOGENETIC DISTRIBUTION OF ZINC IN THE CAT [illegible]JAL CORTEX. Richard H. Dyck and Max S. Cynader. Dept. of Ophthalmology, University of British Columbia, Vancouver, British Columbia, Canada, V5Z3N9.

NEURAL PLASTICITY IN DEVELOPING OLFACTORY SYSTEM OF THE HONEYBEE. Masson, C., Gascuel, J. Laboratoire de Neurobiologie Comparee des Invertebres. INRA-CNRS (URA 1190) 91440 Bures Sur Yvette, France.

ANATOMICAL AND PHYSIOLOGICAL DEVELOPMENT OF TAIL SENSORY NEURONS IN *APLYSIA*. Mark Stopfer and Emilie A. Marcus, Departments of Biology and Psychology, Yale University, New Haven, CT 06520.

THE ROLE OF CELL LINEAGE IN THE REGULATION OF TRANSMITTER EXPRESSION IN IDENTIFIED NEURONS IN THE MOTH, *MANDUCA SEXTA*. J.L. Witten and J.W. Truman, Dept. of Zoology, University of Washington, Seattle, WA 98195.

NEURONAL GROWTH RESPONSE GENES EXPRESSED IN CANARY SONG CONTROL REGION HVC: CLONING OF EGR-1/NGFI-A HOMOLOGUES. C. Mello, M. Heucas and D.F. Clayton, Lab. of Animal Behavior, The Rockefeller University, New York, NY 10021.

STUDIES ON THE RAT BRAIN CREATINE KINASE GENE PROMOTER. G. Hobson, B. Parameswaran, M. Mitchell, C.D. Wilson, G. Molloy, and P. Benfield, University of Delaware and Du Pont Company.

FATE OF TARGET-DEPRIVED MOTOR NEURONS DURING POSTNATAL DEVELOPMENT. Lee Crews, Department of Physiology, Emory University.

NICOTINIC AGONISTS CAUSE RETRACTION OF NEURITES IN CULTURED RAT RETINAL GANGLION CELLS. T.P.O. Cheng and Stuart A. Lipton, Dept. of Neurology, Children's Hospital and Program in Neuroscience, Harvard Medical School, Boston, MA 02115.

AGMATINE ACTS AS AN ANTAGONIST OF NICOTINIC RECEPTORS. Yu Xie and Ralph Loring, Dept. of Pharmacology, Northeastern University, Boston, MA 02115.

PROTEIN KINASE C MEDIATES BOTH SHORT- AND LONG-TERM LEARNING-PRODUCED EXCITABILITY CHANGES IN *HERMISSENDA* TYPE B PHOTORECEPTORS. Schuman, Erin M. and J. Farley. Program in Neural Science, Indiana University, Bloomington, IN 47405.

DIRECT EVIDENCE THAT NOREPINEPHRINE INCREASES THE PHOSPHORYLATION OF SYNAPSIN I AND PROTEIN III IN DENTATE SLICES OF YOUNG BUT NOT AGED F344 RATS. K. Parfitt, B.J. Hoffer, M.D. Browning, Dept. of Pharmacology, U. of Colorado HSC, Denver, CO 80262.

AUTOPHOSPHORYLATION OF TYPE II CAMKINASE IN HIPPOCAMPAL NEUROS. S.S. Molloy and M.B. Kennedy, Cal Tech, Pasadena, CA.

PERSISTENT KINASE MODULATION IN REGENERATING OPTIC AXONS. Denis C. Larrivee, Dept. of Physiology, Cornell University Medical College, New York, NY 10021.

PROTEIN KINASE C ONTOGENY IN CAT VISUAL CORTEX. W.-G. Jia and M.S. Cynader, Dept. of Ophthalmology, University of British Columbia, 2550 Willow Street, Vancouver, B.C., Canada, V5Z 3N9.

MODIFICATION OF NEURONAL SECOND MESSENGER PHYSIOLOGY: EXPRESSION OF THE CALCIUM CALMODULIN PROTEIN KINASE II GENE AND THE YEAST ADENYLATE CYCLASE GENE IN NEURONS FROM HSV-1 VECTORS. Alfred I. Geller, Division of Cell Growth and Regulation, Dana Farber Cancer Institute, Boston, MA 02115.

POSTER SESSION: 1989 GORDON CONFERENCE
ON NEURAL PLASTICITY

POSTERS II: Wednesday and Thursday

Formal presentation time: Wednesday evening

NMDA RECEPTORS AND PLASTICITY IN CORTICAL LAYERS II AND III. Kevin Fox, Hiromichi Sato and Nigel Daw. Washington University Medical School, St. Louis, MO 63110.

NMDA-RECEPTOR MEDIATED ACTIVITY AND LONG TERM POTENTIATION IN RAT NEOCORTEX. Lynn T. Bindman, Dept. Physiology, University College London, Gower Street, London , England.,

NMDA RECEPTORS MEDIATE SYNAPTIC TRANSMISSION BETWEEN ZEBRA FINCH SONG CONTROL NUCLEI. R. Mooney, Division of Biology, 216-76, California Institute of Technology, Pasadena, CA 91125.

NMDA RECEPTOR ACTIVATION DECREASES PHOSPHORYLATION OF THE MICROTUBULE-ASSOCIATED PROTEIN MAP2. Shelley Halpain and Paul Greengard, Lab. of Molecular and Cellular Neuroscience, The Rockefeller University, New York.

LONG TERM POTENTIATION AND ACTIVITY DEPENDENT RETINOTOPIC SHARPENING IN THE REGENERATING RETINOTECTAL PROJECTION OF GOLDFISH: COMMON SENSITIVE PERIOD AND SENSITIVITY TO NMDA BLOCKERS. John T. Schmidt, Dept. Biol. Sci., SUNY-Albany, 1400 Wash. Ave., Albany, NY 12222.

MUSCARINIC AND OPIOID RECEPTOR PLASTICITY: SUBTYPE-SELECTIVE REGULATORY ROLE OF CHRONIC MEMBRANE DEPOLARIZATION AND GLUTAMATE EXCITATION. Rabi Simantov, Department of Genetics, Weizmann Institute of Science, Rehovot 76100, Israel.

LONG-TERM POTENTIATION (LTP) EVALUATED AT SYNAPTIC CONNECTIONS BETWEEN SINGLE CA3-CA1 NEURONAL PAIRS IN HIPPOCAMPAL SLICE. M. Friedlander, R. Sayer and S. Redman, Neurobiology Research Center, University of Alabama at Birmingham and the Australian National University.

ARACHIDONIC ACID CAUSES A LONG-LASTING ACTIVITY-DEPENDENT ENHANCENMENT OF SYNAPTIC TRANSMISSION IN THE HIPPOCAMPAL SLICE. J.H. Williams and T.V.P. Bliss. Division of Neurophysiology and Neuropharmacology, National Institute for Medical Research, Mill Hill, London, NW7 1AA, UK.

STEROID REGULATION OF HIPPOCAMPAL NERVE CELL GROWTH. Roberta E. Brinton and Beverly R. Johnson, School of Pharmacy and Department of Biology, University of Southern California, 1985 Zonal Avenue, Los Angeles, CA 90033.

GONADAL STEROIDS REGULATE DENDRITIC SPINE DENSITY IN HIPPOCAMPAL PYRAMIDAL CELLS IN ADULTHOOD. Catherine S. Wooley, Elizabeth Gould, Maya Frankfurt and Bruce S. McEwen, Laboratory of Neuroendocrinology, The Rockefeller University, New York, NY 110021.

SHORT TERM GLUCOCORTICOID MANIPULATIONS ALTER HIPPOCAMPAL NEURONAL MORPHOLOGY IN THE ADULT RAT. Elizabeth Gould, Catherine S. Wooley, Maya Frankfurt and Bruce S. McEwen, Laboratory of Neuroendocrinology, Rockefeller University, 1230 York Avenue, New York, NY 10021.

GLUCOCORTICOID RECEPTOR OCCUPATION/ACTIVATION WITH VARYING LEVELS OF ENDOGENOUS STEROID: HEIGHTENED SENSITIVITY OF THE HIPPOCAMPUS RELATIVE TO OTHER TISSUES. Robert L. Spencer, Andrew H. Miller and Bruce S McEwen. Rockefeller University, 1230 York Ave., New York, NY 10021.

COMPARISON OF A GLUCOCORTICOID- AND STRESS-INDUCED RAT HIPPOCAMPAL PROTEIN WITH GLYCEROL PHOSPHATE DEHYDROGENASE (GPDH). L.K. Schlatter, S. Ting, L.A. Meserve and L.A. Dokas, Departments of Biochemistry and Neurology, Medical College of Ohio, Toledo, OH and Department of Biology, Bowling Green State University, Bowling Green, OH.

EFFECT OF CORTISOL ON PLASTICITY IN THE CAT VISUAL CORTEX. N.W. Daw, H. Sato and K.D. Fox, Washington University Medical School, St. Louis, MO 63110.

ANDROGEN CONTROL OF TYROSINE HYDROXYLASE IN PERIPHERAL SYMPATHETIC GANGLIA. M.E. Goldstein, A.W. Tank and R.W. Hamill, Neurology and Pharmacology Departments, Monroe Community Hospital/University of Rochester School of Medicine and Dentistry, Rochester, NY 14603.

CHRONIC STRESS INCREASES BOTH TYROSINE HYDROXYLASE ACTIVITY AND EVOKED NOREPINEPHRINE RELEASE IN LOCUS COERULEUS NEURONS. Laura K. Nisenbaum, Michael J. Zigmond, and Elizabeth D. Abercrombie, Department of Behavioral Neuroscience and Center for Neuroscience, University of Pittsburgh, Pittsburgh, PA 15260.

COMPENSATION BY NIGROSTRIATAL DOPAMINE NEURONS AFTER PARTIAL INJURY AND STRESS. K.A. Keefe, E.M. Stricker, M.J. Zigmond and E.D. Abercrombie, Dept. of Behavioral Neuroscience, University of Pittsburgh, Pittsburgh, PA 15260.

ADAPTATION OF CATECHOLAMINERGIC SYSTEMS TO PARTIAL INJURY. Elizabeth D. Abercrombie, Kristen A. Keefe, and Michael J. Zigmond. Department of Behavioral Neuroscience, University of Pittsburgh, Pittsburgh, PA 15260.

NIGROSTRIATAL BUNDLE LESIONS IN NEONATAL RATS INCREASES STRIATAL SEROTONIN: FUNCTIONAL IMPLICATIONS. Denise Jackson, Michal K. Stachowiak, John P. Bruno, Elizabeth D. Abercrombie, and Michael J. Zigmond, Dept. of Behavioral Neuroscience and Center for Neuroscience, University of Pittsburgh, Pittsburgh, PA.

GABAergic AND DOPAMINERGIC FEEDBACK CONTRIBUTES TO FUNCTIONAL DIFFERENCES BETWEEN TYPE I AND TYPE II STRIATAL NEURONS. E.S. Nisenbaum, A.A. Grace, and T.W. Berger. Departments of Behavioral Neuroscience and Psychiatry, University of Pittsburgh, Pittsburgh, PA 15260.

ANDROGEN CONTROL OF TYROSINE HYDROOXYLASE IN PERIPHERAL SYMPATHETIC GANGLIA. M.E. Goldstein, A.W. Tank and R.W. Hamill. Neurology and Pharmacology Departments, Monroe Community Hospital/University of Rochester School of Medicine and Dentistry, Rochester, NY 14603.

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Brewster Academy, Wolfeboro, New Hampshire
July 16-21, 1989

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