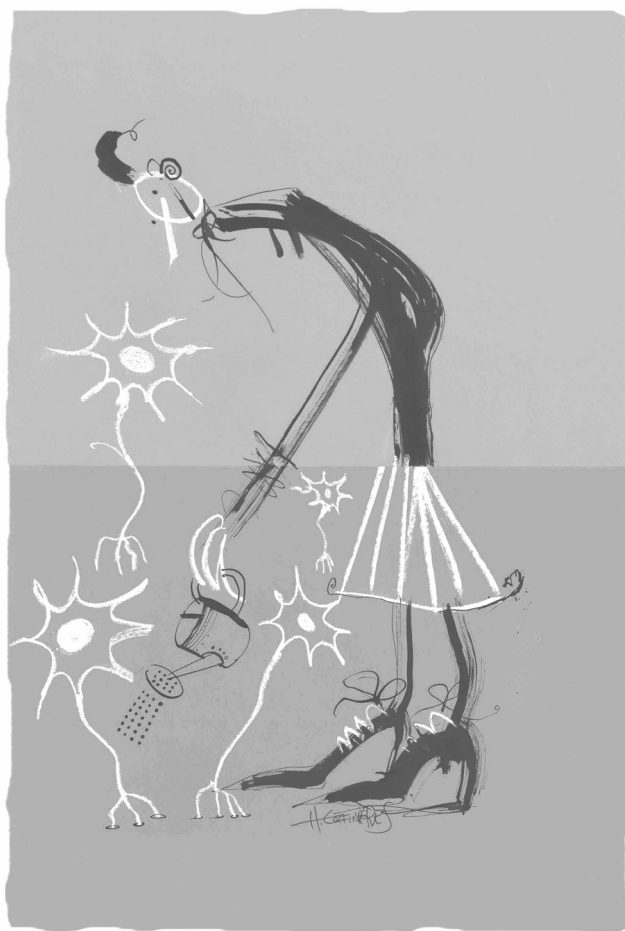


Neuronal Plasticity Prize

Fondation IPSEN Symposium

Amsterdam - July 4, 2010

12:30 pm - 02:00 pm



7th FORUM OF EUROPEAN NEUROSCIENCE (FENS)



LAUREATES

1990

Albert Aguayo (Montreal), *Anders Bjorklund* (Lund),
Fred Gage (La Jolla): neuronal grafting.

1991

Ursula Bellugi (La Jolla), *Wolf Singer* (Frankfurt),
Torsten Wiesel (New York): plasticity in the visual system.

1992

Philippe Ascher (Paris), *Kjell Fuxe* (Stockholm),
Terje Lomo (Oslo): interactions at the receptors level.

1993

Per Andersen (Oslo), *Masao Ito* (Wako Saitama),
Constantino Sotelo (Paris): neuronal plasticity at the synaptic
level in the hippocampus and the cerebellum.

1994

Mariano Barbacid (Princeton), *Yves-Alain Barde*
(Planegg-Martinsried), *Hans Thoenen* (Planegg-Martinsried):
neurotrophic factors.

1995

Jacques Melher (Paris), *Brenda Milner* (Montreal),
Mortimer Mishkin (Bethesda): cognitive processes in humans
and primates.

1996

Friedrich Bonhoeffer (Tübingen), *Corey Goodman* (Berkeley),
Marc Tessier-Lavigne (San Francisco): axonal guidance.

1997

Antonio Damasio (Iowa City), *Richard Frackowiak* (London),
Michael Merzenich (San Francisco): brain maps and their plasticity.

1998

Heinrich Betz (Frankfurt), *Gerald Fischbach* (Boston),
Uel McMahan (Stanford): formation of synapses at
the molecular level.

1999

Masakazu Konishi (Pasadena), *Peter Marler* (Davis),
Fernando Nottebohm (Millbrook): animal models.

2000

Tomas Hökfelt (Stockholm), *Lars Olson* (Stockholm),
Lars Terenius (Stockholm): neuromodulation
in neuronal plasticity.

2001

Albert Galaburda (Boston), *John Morton* (London),
Elizabeth Spelke (Cambridge, USA): psychological
development in children.

2002

Arturo Alvarez-Buylla (San Francisco), *Ronald McKay*
(Bethesda), *Samuel Weiss* (Calgary): stem cells in the central
nervous system.

2003

François Clarac (Marseille), *Sten Grillner* (Stockholm),
Serge Rossignol (Montreal): motor control.

2004

James Gusella (Boston), *Jean-Louis Mandel* (Strasbourg),
Huda Zoghbi (Houston): triplet diseases and neuronal
plasticity.

2005

Ann Graybiel (Cambridge, USA), *Trevor Robbins*
(Cambridge, UK), *Wolfram Schultz* (Cambridge, UK):
motivation and associative learning.

2006

Eckart Gundelfinger (Magdeburg), *Mary Kennedy* (Pasadena),
Morgan Sheng (Cambridge, USA): synapse protein complexes
in neuronal plasticity.

2007

Nikos K. Logothetis (Tübingen), *Giacomo Rizzolatti* (Parma),
Keiji Tanaka (Wako): neurophysiology of cognition.

2008

Jean-Pierre Changeux (Paris), *Peter W. Kalivas* (Charleston),
Eric J. Nestler (Dallas): molecular targets of drugs abuse.

2009

Alim-Louis Benabid (Grenoble), *Apostolos Georgopoulos*
(Minneapolis), *Miguel Nicolelis* (Durham): brain-machine
interaction.

2010

Thomas Insel (Bethesda), *Bruce McEwen* (New York) and
Donald Pfaff (New York): neuroendocrine control of behavior.



*The Fondation IPSEN Neuronal Plasticity prize is awarded
to researchers in recognition of outstanding contributions in
the field of neuronal plasticity: development, synaptogenesis,
ageing, regeneration, grafts, growth factors, etc. The prize
may be shared by several researchers involved in the same
research field.*

JURY

Wolf Singer (Frankfurt)
President

Albert Aguayo (Montréal)

Joël Bockaert (Montpellier)

Alexis Brice (Paris)

Stanislas Dehaene (Orsay)

Stephen Dunnett (Cardiff)

Kjell Fuxe (Stockholm)

Marc Jeannerod (Lyon)

Christine Petit (Paris)

and a Fondation IPSEN
representative



Thomas R. Insel

National Institute of Mental Health,
Bethesda, USA

Thomas R. Insel, M.D., is Director of the National Institute of Mental Health (NIMH). His tenure at NIMH has been distinguished by groundbreaking findings in the areas of practical clinical trials, autism research, and the role of genetics in mental illnesses. Prior to his appointment as NIMH Director in the Fall 2002, Dr. Insel was Professor of Psychiatry at Emory University. From 1994 to 1999, he was Director of the Yerkes Regional Primate Research Center in Atlanta. While at Emory, Dr. Insel continued the line of research he had initiated at NIMH studying the neurobiology of complex social behaviors. He has published over 250 scientific articles and books and has served on numerous academic, scientific, and professional committees and boards. He is a member of the Institute of Medicine and is a recipient of several awards including the Outstanding Service Award from the U.S. Public Health Service.

NEUROPEPTIDES AND SOCIAL BEHAVIOR

Neuropeptides are ancient hormones evolved to multitask as endocrine regulators in peripheral organs and neuromodulators in the brain. The neurohypophyseal neuropeptides, oxytocin and vasopressin, tell an extraordinary story of coordinated regulation of reproductive processes (copulation, parturition, lactation) outside of the brain and behavioral, cognitive effects (social memory, maternal care, attachment) mediated through select neural circuits and receptor subtypes. This talk will review findings from rodents with intense social attachments and from children with profound deficits in social behavior. Molecular, cellular, systems, and behavioral data support a conserved role for oxytocin and vasopressin (along with their CNS receptors) in mediating affiliation and attachment.



Bruce S. McEwen

The Rockefeller University,
New York, USA

Bruce S. McEwen, Ph.D., is the Alfred E. Mirsky Professor and Head of the Harold and Margaret Milliken Hatch Laboratory of Neuroendocrinology at The Rockefeller University. He is a member of the US National Academy of Sciences and the Institute of Medicine.. He served as President of the Society for Neuroscience in 1997-98. As a neuroscientist and neuroendocrinologist, McEwen studies environmentally-regulated, variable gene expression in brain mediated by circulating steroid hormones and endogenous neurotransmitters in relation to brain sexual differentiation and the actions of sex, stress and thyroid hormones on the adult brain. His laboratory discovered adrenal steroid receptors in the hippocampus in 1968. His laboratory combines molecular, anatomical, pharmacological, physiological and behavioral methodologies and relates their findings to human clinical information. His current research focuses on stress effects on amygdala and prefrontal cortex as well as hippocampus, and his laboratory also investigates sex hormone effects and sex differences in these brain regions

STRESS, SEX, COGNITION AND EMOTION: ROLE OF NEURONAL REMODELING AND RESILIENCE

The adult brain is much more resilient and adaptable than previously believed, and adaptive structural plasticity involves growth and shrinkage of dendritic trees, turnover of synapses and limited amounts of neurogenesis in the forebrain, especially the dentate gyrus of the hippocampal formation. Stress and sex hormones help to mediate such plasticity, which has been extensively investigated in hippocampus and to a lesser extent in prefrontal cortex and amygdala, all brain regions that are involved in cognitive and emotional functions. Stress and sex hormones exert their effects on brain structural remodeling through both classical genomic and non-genomic mechanisms and they do so synergistically with neurotransmitters and other intra- and extracellular mediators. This will be illustrated for estrogen actions on synapse formation and turnover in the adult hippocampus and for stress-induced remodeling of dendrites and synapses in the adult hippocampus, amygdala and prefrontal cortex. The influence of early developmental events such as early life stress and brain sexual differentiation will be noted along with the interactions between sex hormones and the effects of stress on the brain. Translational studies on the human brain will be noted. A loss of this type of adaptive plasticity, i. e., a loss of resilience, may be a key aspect of mood, anxiety and cognitive disorders. Supported by NIH Grants NS07080, MH41256, MH58911, P01 AG16765.



Donald Pfaff

The Rockefeller University,
New York, USA

Donald W. Pfaff, Ph.D., is the head of the Laboratory of Neurobiology and Behavior at The Rockefeller University. He uses neuroanatomical, neurochemical and neurophysiological methods to study the cellular mechanisms by which the brain controls behavior. After discovering steroid hormone receptors in hypothalamic neurons, Dr. Pfaff used them (a) to help unravel the neural circuit for lordosis behavior, the first complete set of mechanisms for a mammalian behavior; and (b) to elucidate estrogen-facilitated gene expression in neurons related to lordosis behavior. Now, his lab considers sexual arousal as one manifestation of generalized CNS arousal, a powerful function of clinical importance. Dr. Pfaff is a member of the US National Academy of Sciences and a fellow of the American Academy of Arts and Sciences.

GENERALIZED CNS AROUSAL, SEXUAL AROUSAL AND THEIR RELATIONS TO BEHAVIOR

Discovering sex hormone receptors in brain yielded one of three scientific starting points from which we could unravel the first neural circuit for a complete vertebrate behavior (summarized, "Drive", MIT Press, 1999), a sex behavior. Since nuclear hormone receptors turned out to be ligand-activated transcription factors, we could construct rules for certain gene/behavior relations (e. g. Ogawa, Annals NYAS, 2004), and we now study histone modifications involved in hormone-activated transcriptional events (Hunter, 2009; Weil, 2009). Having proposed that the most powerful and essential force in the CNS is Generalized Arousal (Harvard Univ. Press, 2006) and having gathered evidence for its existence and its properties, we want to see how it affects specific behaviors. Using breeding of High and Low Arousal lines of mice (Weil et al, 2010) and biophysical recording techniques (Zhou, 2007; Lee, 2008, 2009; Dupre et al, in press) we see that generalized arousal impacts sexual arousal, and we have evidence of 4 physical chains of events by which this happens.

Created in 1983 under the auspices of Fondation de France, the Fondation IPSEN tracks progress in biomedical research with the continuing aim of highlighting fundamental advances. Staying away from passing trends, the ambition of Fondation IPSEN is to identify emerging knowledge and new paradigms and to foster the most promising interconnections between domains that have not previously been communicating. By paying attention to the cross-roads of knowledge, Fondation IPSEN seeks to facilitate the process of interdisciplinary fertilization and draw out its meaning.

In the past decades, we have witnessed an impressive series of discoveries in all domains of biomedical research and clinical medicine. In addition to this significant growth in knowledge, new interactions are emerging between science and society, some of which are related to our very ideas about being human, while others deal with the impacts the biomedical revolution we are witnessing might have on our future.

To play a part in highlighting what is at stake, to promote the interactions needed between specialists in different fields of research, and to disseminate the most recent discoveries, Fondation IPSEN facilitates interdisciplinary groups of clinical practitioners and academics involved in basic research to meet at regular series of meetings. The Fondation chose to favour excellence, continuity and an open-minded atmosphere. Because it was necessary to concentrate its efforts, the topics selected reflect some of the most important challenges for the current evolution of the world as well as of knowledge: the aging of populations; the spectacular development of neuroscience and its contribution to the understanding of cognitive mechanisms; the interactions between the great biological systems, such as the nervous and endocrine systems; and the medical challenges posed by the biomedical revolution, particularly in the science of cancer.

Over the last quarter of century, Fondation IPSEN has organized over 250 meetings and produced several hundreds publications; over 250 scientists and biomedical researchers have been awarded prizes and research grants. This report outlines the outcome of Fondation IPSEN activity, which in the final analysis is composed of multiple encounters with the living and expanding heart of research. We are indebted for such a gratifying expansion to the hundreds of partners who have joined us in this intellectual adventure.



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