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神経科学の最前線
From Brain to Mind
2011年12月5日(月)
13:00~17:00
December 5, 2011

関西文化学術研究都市 (けいはんな学研都市)のご紹介



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高等研レクチャー 2011 ▶▶

神経科学の 最前線

— 脳からこころへ —

日本学術振興会外国人著名研究者招へい事業
JSPS Award for Eminent Scientists



IIAS Lecture 2011 on
“Frontiers in Neuroscience :
From Brain to Mind”

13:00~13:10

開会挨拶 Welcome Remarks

尾池 和夫 (財団法人国際高等研究所)
Kazuo Oike (IIAS)

13:10~17:00

レクチャー Lecture

① **Linda Buck**
Olfactory Mechanisms in Mammals

② **David Anderson**
The neural circuitry of emotion
in flies and mice

③ **Jean-Pierre Changeux**
Allosteric receptors:
from molecular biology
to conscious processing

④ **松沢 哲郎 (Tetsuro Matsuzawa)**
What is uniquely human?
An answer
from the study of chimpanzees

日時: 2011年 **12月5日** (月)
13:00 ~ 17:00
Date: December 5, 2011

会場: **東京大学安田講堂** (本郷キャンパス)
Venue: Yasuda Auditorium,
The University of Tokyo (Hongo Campus)

主催: 財団法人国際高等研究所
Organizer: International Institute for Advanced Studies

後援: 文部科学省 / 日本学術振興会
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協賛: 公益社団法人関西経済連合会
Supported by: Kansai Economic Federation

IIAS 財団法人
国際高等研究所
International Institute for Advanced Studies



Olfactory Mechanisms in Mammals

Linda Buck

Fred Hutchinson Cancer Research Center

フレッドハッチンソンがん研究所基礎科学部
正メンバー

Howard Hughes Medical Institute 研究員

Affiliation:

Full Member, Division of Basic Sciences, Fred
Hutchinson Cancer Research Center
Investigator, Howard Hughes Medical Institute

主な受賞歴:

ガードナー国際賞 (2003年)

ノーベル医学生理学賞 (2004年)

Selected Honors and Awards:

Gairdner Foundation International Award
(2003)

The Nobel Prize in Physiology or Medicine
(2004)

<http://labs.fhcrc.org/buck/index.html>

The sense of smell allows mammals to perceive a multitude of environmental chemicals as having a distinct odor. It also mediates the detection of pheromones and predator odors that elicit innate responses. How does the olfactory system detect so many different chemicals and how does the nervous system translate those chemicals into diverse perceptions and behaviors? Using a combination of molecular, cellular, and genetic approaches, we have identified families of receptors that initially detect odorants and pheromones in peripheral sense organs, asked how those receptors encode the identities of different chemicals, and investigated how the signals they generate are routed and organized in the nervous system to yield distinct perceptions and instinctive responses.



The neural circuitry of emotion in flies and mice

David Anderson

California Institute of Technology

カリフォルニア工科大学生物学部教授

Howard Hughes Medical Institute 研究員

Affiliation:

Professor, Division of Biology, California Insti-
tute of Technology

Investigator, Howard Hughes Medical Institute

主な受賞歴:

米国国立科学財団若手研究者賞 (1986年)

チャールズ・ジャドソン・ヘリック賞 (比較神
経学) (1990年)

アルデン・スペンサー賞 (神経生物学) (1999
年)

Selected Honors and Awards:

National Science Foundation Presidential
Young Investigator Award (1986)

Charles Judson Herrick Award in Compara-
tive Neurology (1990)

Alden Spencer Award in neurobiology, Co-
lumbia University (1999)

<http://davidandersonlab.caltech.edu/>

Research interests in my laboratory focuses on understanding how emotional behavior is encoded in the brain, at the level of specific neuronal circuits, and the specific neuronal subtypes that comprise them. We want to understand the structure and dynamic properties of these circuits and how they give rise to the outward behavioral expressions of emotions such as fear, anxiety or anger. This information will provide a framework for understanding how and where in the brain emotions are influenced by genetic variation and environmental influence (“nature” and “nurture”), and the mechanism of action of drugs used to treat psychiatric disorders such as depression. We are using both mice and the vinegar fly *Drosophila melanogaster* as model systems. A central focus of the laboratory is on the neural circuits underlying aggression and fear. We are using molecular genetic tools, as well as functional imaging and electrophysiology, to establish cause-and-effect relationships between the activity of specific neuronal circuits and behavior. We hope that this research will lead to new insights into the organization of emotion circuits, and their dysregulation in psychiatric disorders.

Allosteric receptors: from molecular biology to conscious processing

Jean-Pierre Changeux

Collège de France

The presentation begins with the development of the concept of allosteric proteins and its application to pharmacological receptors. It continues with the identification of the nicotinic acetylcholine receptor, the discovery of its molecular organisation, the structure of the acetylcholine binding site and of the ion channel, and the demonstration of its allosteric transitions. The article then traces the origins of the concept of allosteric modulator and its consequences in pharmacology. The knowledge acquired with the nicotinic receptor is further exploited to reach higher levels of brain organization and the contribution of nicotinic receptors to the action of nicotine on reward and cognition is explored. Theoretical models of cognitive functions and in particular conscious processing are then proposed that link the molecular to the cognitive level.

コレージュ・ド・フランス名誉教授

Affiliation:

Professor Emeritus, Collège de France

主な受賞歴:

ガードナー国際賞 (1978年)

ウルフ賞医学部門 (1982年)

スウェーデン王立科学アカデミー

カール・グスタフ・ベルンハード・メダル (1991年)

Selected Honors and Awards:

Gairdner Foundation International Award
(1978)

Wolf Foundation Prize in Medicine (1982)

Carl-Gustav-Bernhard medal of the Swedish
academy of science (1991)

http://www.college-de-france.fr/default/EN/all/historique/jeanpierre_changeux.htm



What is uniquely human? An answer from the study of chimpanzees

松沢 哲郎 (Tetsuro Matsuzawa)

Kyoto University

I have been studying chimpanzees both in the wild and in the laboratory. My talk aims to compare cognitive development in humans and chimpanzees to illuminate the evolutionary origins of human cognition. The upright posture and the bipedal locomotion might be important in human evolution. However, it is the stable supine posture made us human in terms of cognitive development. The human mother-infant relationship is characterized by the physical separation of mother and infant, and the stable supine posture of infants, that enables vocal exchange, face-to-face communication, manual gestures, and object manipulation. Moreover, our study clearly demonstrated that chimpanzees have ultra-short-term working memory capabilities. Taken together, my talk presents a plausible evolutionary scenario for the human characteristics of cognition.

京都大学霊長類研究所教授

Affiliation:

Professor, Primate Research Institute, Kyoto
University

主な受賞歴:

秩父宮記念学術賞 (1991年)

ジェーン・グドール賞 (2001年)

紫綬褒章 (2004年)

Selected Honors and Awards:

Prince Chichibu Memorial Science Award
(1991)

Jane Goodall Award (2001)

The Medal with Purple Ribbon (2004)

<http://www.pri.kyoto-u.ac.jp/ai/>



座長 **Sigrun Korsching** ケルン大学 / University of Cologne

辻 篤子 (Atsuko Tsuji) 朝日新聞論説委員 / The Asahi Shimbun Company