第 27 回生理研国際シンポジウム

生理学研究所国際シンポジウム”Mechanisms of Cell Signaling in Early Development”（初期発生における細胞信号伝達機構）は，生理学研究所が主催，細胞内代謝研究部門宮崎俊一教授がオーガナイザーとなって，平成 12 年 11 月６日から８日にかけて岡崎コンファレンスセンターで開催された．生殖細胞（精子・卵子）の成熟，受精，胚発生開始を含む初期発生機序の解明は，生物学上重要な研究課題であるばかりでなく，医学・農学領域への応用の基礎になる有用な研究課題でもある．本シンポジウムは，初期発生における細胞信号伝達機構に焦点を絞り，特にヒトを含めた哺乳動物の受精のメカニズムを中心に，このテーマに関わる生物学・医学・農学の国内外の先端的研究者が最新のデータを持ち寄る機会を我が国で設け，情報交換と今後の研究方向・ストラテジーを討論することにより，さらなる相互研究協力関係を確立することを目的として開催された．生理学研究所，内藤記念科学振興財団，加藤記念難病研究助成基金から援助をいただいた．

本シンポジウムは比較的小さい国際シンポジウムであり，参加者は約 60 名で，海外から７名（米国４，英国２，フランス１），国内から 15 名の招待講演と，21 題のポスター発表があった．シンポジウムは”discussion meeting”と位置づけ，また若手研究者の参画を呼びかけ，活発な討論が行われて，非常に有意義なものとなった．会期中に，生理研の見学，岡崎城見物，懇親会などを折り込み，最新研究情報の交換ばかりでなく，パーソナルコミュニケーションも充分でき，所期の目的が充分達成された．

SEIRIKEN (NIPS) International Symposium
”Mechanisms of Cell Signaling in Early Development”

November 6-8, 2000; Okazaki Conference Center, Japan

November 6 (Monday)

Welcome greeting　Sasaki S (Director general, NIPS)

1) Miyazaki S (NIPS & Tokyo Women’s Medical Univ) Opening remarks and “Cell signaling in early development”
2) Morisawa M (Univ of Tokyo) Cell signalings for sperm activation and chemotaxis in the ascidians, Ciona intestinalis and C. savignyi.
3) Okabe M (Osaka Univ) Sperm/egg fusion and surface proteins in mouse
4) Ogura A (Natl Inst of Infectious Diseases) Construction of diploid zygotes by micromanipulation using male germ cells
5) Kuroda H (Toyama Univ) Fertilization signals in sea urchin eggs
6) Kyozuka K (Tohoku Univ) Signal transduction during fertilization in Ascidian
7) Deguchi R (Miyagi Univ of Education) Spatiotemporal patterns of $Ca^{2}+$ increases at fertilization in bivalve and mouse eggs”
8) Fissore RA (Univ of Massachusetts) Understanding how the sperm initiates life and death in mammalian oocytes
9) Swann K (Univ College London) A soluble sperm factor that generates $InsP_3$ and $Ca^{2}+$ oscillations in mammalian eggs

November 7 (Tuesday)

10) Stricker SA (Univ of New Mexico) Calcium and ER dynamics during oocyte maturation and fertilization in nemertean worms
11) Oda S (Tokyo Women’s Med Univ) Physiological characterization of mammalian sperm factor
12) Kline D (Kent State Univ) Localization of the endoplasmic reticulum and generation of Ca^{2+} waves in the mouse egg

13) Mohri T (NIPS) Ca^{2+}/Mn^{2+} influx and release during Ca^{2+} oscillations in mouse eggs
14) Carroll D (Florida Inst of Technol) Tyrosine kinase and PLC γ involvement in egg activation during fertilization
15) Iwao Y (Yamaguchi Univ) Molecular mechanisms of egg activation in amphibians

November 8 (Wednesday)

16) Sardet C. (CNRS / Univ P M Curie) Cortical and cytoplasmic reorganizations of the ascidian zygote
17) Hamaguchi Y. (Tokyo Inst of Technol) Cleavage stimulus in relationship with the mitotic apparatus in echinoderm eggs
18) Whitaker M. (Univ of Newcastle upon Tyne) Calcium signalling in early embryos
19) Mikoshiba K. (Inst of Med Sci, Univ of Tokyo) The role of IP_3 receptors in development
20) Kono T. (Tokyo Univ of Agriculture) Epigenetic modification during oocyte growth and embryo development
21) Okamoto H. (Natl Inst of Bioscience and Human-technol) FGF signaling and the neural induction in Xenopus early development
22) Takahashi K. (Meiji Pharmaceutical Univ) Differentiation of ion channels during development

Closing remarks Miyazaki S (NIPS)

Poster session (November 6 – 8)

P-1 Nomura M, Yoshida M & Morisawa M (Misaki Marine Biol Station, Univ of Tokyo)
Calcium/calmodulin and calmodulin-dependent protein kinase II regulates membrane hyperpolarization in the SAAF-induced motility activation-signaling cascade in sperm of the ascidian, *Ciona savignyi*.

P-2 Tsutsui H[1], Ishikawa M[1], Cosson J[2], Oka Y[1] & Morisawa M[1] ([1]Misaki Marine Biol Station, Univ of Tokyo; [2]Observatoire Oceanologique de Villefrance-sur-Mer, CNRS)
Two strategies for sperm chemotaxis in Ciona and siphonophores: A numerical simulation study

P-3 Kanematsu D, Kuroda R & Kuroda H (Toyama Univ)
A transient increase in $[Ca^{2+}]_i$ during fertilization of *C . elegans oocytes*

P-4 Stricker SA & Smythe TL (Univ of New Mexico)
Serotonin triggers an increase in cAMP during oocyte maturation in nemertean worms

P-5 Nakano T[1,2], Nakashima T[1], Kontani K[3], Kurosu H[3], Katada T[3], Hoshi M[4] & Chiba K[1] ([1]Ochanomizu Univ; [2]Tokyo Inst of Technol; [3]Univ of Tokyo; [4]Keio Univ)
G-protein β γ subunit-dependent phosphorylation of starfish oocyte

P-6 Iwasaki H[1,2], Chiba K[3], Uchiyama T[1], Yoshikawa F[4], Suzuki F[3], Ikeda M[5], Furuichi T[6] & Mikoshiba K[1,2] ([1]Univ of Tokyo; [2]Brain Science Inst, RIKEN; [3]Ochanomizu Univ; [4]Univ of California, San Francisco; [5]Tokyo Inst of Technol; [6]Dept of Mol Neurogenesis, Brain Science Inst, RIKEN)
Molecular characterization of starfish IP_3 receptor and its roles during oocyte maturation and fertilization

P-7 Kumano M[1,2], Albay D[1], Carroll D[3] & Foltz K[1] ([1]Univ of California, Santa Barbara; [2]Tokyo Inst of Technol; [3]Florida Inst of Technol)
The regulation of MAP kinase during fertilization of echinoderm eggs

P-8 Yoshida M (Misaki Marine Biol Station, Univ of Tokyo)
Role of calcium in the egg activation in the ascidian, Ciona savignyi

P-9 Yamamoto S[1], Kubota HY[2], Yoshimoto Y[3] & Iwao Y[1] ([1]Yamaguchi Univ; [2]Kyoto Univ; [3]Kansai Med Univ)
Injection of a sperm extract triggered egg activation in the newt, Cynops pyrrhogaster

P-10 Whitaker M (Univ of Newcastle upon Tyne)
cGMP and the fertilization calcium wave in sea urchin eggs

P-11 Shirakawa H[1], Mohri T[2] & Miyazaki S[1,2] ([1]Tokyo Women's Med Univ; [2]NIPS)

Numerical simulation for Mn^{2+} quenching of fura-2 during Ca^{2+} oscillations in mouse eggs

P-12 Shirakawa H[1] & Miyazaki S[1,2] ([1]Tokyo Women's Med Univ; [2]NIPS)
Dual-wavelength ratiometric fluorescence measurement of endoplasmic reticulum membrane potential using voltage-sensitive dyes

P-13 Parrington J[1], Jones M[2], Rice A[1], Rhee SG[3], Katan M[2] & Swann K[1] ([1]Univ College London, [2]CRC Centre for Cell and Mol Biol; [3]NIH)
Characteristics of the sperm factor and its assosciated PLC activity

P-14 Deguchi R[1], Shirakawa H[2], Oda S[2], Mohri T[3] & Miyazaki S[2,3] ([1]Miyagi Univ of Education; [2]Tokyo Women's Med Univ; [3]NIPS)
Spatiotemporal analysis of Ca^{2+} waves during Ca^{2+} oscillations in fertilized mouse eggs

P-15 Sato M[1], Yoshitomo M[1], Mohri T[1], Sakurai A[2] & Miyazaki S[1,3] ([1]NIPS; [2]Juntendo Univ; [3]Tokyo Women's Med Univ)
Ca^{2+} dynamics in mouse eggs after ICSI

P-16 Ogonuki O[1,2,3], Sankai T[2] , Yagami K[3], Shikano T[4], Oda S[4], Miyazaki S[4] & Ogura A[1] ([1]National Inst of Infectious Diseases; [2]Tsukuba Primate Center; [3]Univ of Tsukuba; [4]Tokyo Women's Med Univ)
Activity of a sperm-borne oocyte-activating factor in spermatozoa and spermatogenic cells from cynomolgus monkeys and its localization after oocyte activation

P-17 Kline D & Miller D (Kent State Univ)
Development of an in vtro culture system for ovarian follicles suitable for imaging

P-18 Kaji K[1], Oda S[2], Shikano T[1], Ohnuki T[3], Uematsu Y[3], Sakagami J[3], Tada N[3], Miyazaki S[2,4] & Kudo A[1] ([1]Tokyo Inst of Technol; [2]Tokyo Women's Med Univ; [3]Taisho Pharm CO LTD; [4]NIPS)
Cd9 on mouse egg microvilli participates in sperm-egg fusion

P-19 Haremaki T[1], Tanaka Y[2], Hongo I[1], Okamoto H[1] ([1]National Inst of Bioscience and Human-technol; [2]Univ of Tsukuba)
FGF dose-dependent expression of Xcad3 is mediated by elements in the 5'-flanking region and the first intron

P-20 Tanaka-Kunishima M & Takahashi K (Meiji Pharmaceutical Univ)
Ascidian reural oreEpidermal differentiation reflected in developmental profile of IRK channel gene promoter activity

P-21 Ono Y[1], Shimozawa N[2], Ito M[2], Kono T[1,2] ([1]Tokyo Univ of Agriculture; [2] Central Inst for Exp Anims)
Production of cloned mice by serial and single nuclear transfer

COE 国際シンポジウム（第 28 回生理研国際シンポジウム）

本シンポジウムは姿勢と歩行運動の高次制御機序を解明することを目的とし，森茂美（生体調節系，生体システム研究部門）を総括選任者，Wiesendanger 教授（フライブルグ大，スイス）および Stuart 教授（アリゾナ大，アメリカ）を国際諮問委員として開催した。会議にはアメリカ，カナダ，イギリス，フランス，スウェーデンなど１４カ国からそれぞれの国を代表する先導的な研究者が参加するとともに，我が国からも運動制御の研究分野における先導的研究者と次世代を担う若年研究者が参加し, それぞれ研究成果 を講演するとともに全体討論に積極的に参加した。 シンポジウムでは 1. Brainstem and Spinal Cord: Cellular / Systems Approaches, 2. Adaptive Brainstem and Spinal Mechanisms, 3. Rhythm Generation and Sensorimotor Brainstem Interactions, 4. Brainstem-Cerebellar Interactions, 5. Eye-Head-Neck Coordination, 6. Higher Nervous Mechanisms: Basal Ganglia, Sensorimotor Cortex, and Frontal Lobe, の６主題で最も基本的神経回路が内在する脊髄レベルから脳幹，小脳，基底核，大脳レベルまでの最新の研究成果を国内外の第一線研究者によって発表して頂きさらに討論した。また会議の早朝には Shik（イスラエル），Strick（アメリカ），Wiesendanger（スイス）教授による Keynote Lecture が行われた。これらの研究発表・討論から２０世紀に出された主要な研究成果 を総括するとともに, それらを２１世紀の研究者に広く理解して頂くことを目的として講演者が研究成果をミニレビューとしてまとめ，国際的な専門誌に出版することの必要性が論じられた。幸いにも研究成果を Progress in Brain Research Series に出版することについて Elsevier 出版社（オランダ）の同意を得ることができた。諸外国では動物実験の制約などから脳研究に対するシステムアプローチ的研究がやや停滞している。本会議に参加した数多くの外国人研究者がこの研究分野における日本人研究者の高いレベルでの研究成果を再認識したことは今後の国際間における研究交流を進める上で本シンポジウムの大きな成果であったと考えられる。

COE international symposium: The 28th SEIRIKEN International Symposium Higher Nervous Control of Posture and Locomotion: Parallel and Centralized Control Mechanisms

March 18-22, 2001, NIPS Conference Center

NIPS, Japan

March 19 Monday

Opening Remarks　Shigemi Mori (NIPS)

Welcoming Address　Kazuo Sasaki (Director-General, NIPS)

1) Mark Shik (Tel Aviv Univ.) How the mesencephalic “ Locomotor Region ” recruits hindbrain neurons
2) Douglas Stuart (Univ. Arizona), Historical perspective: Integration of posture and locomotion: significance of the contributions of Sherrington, Hess, and Bernstein
3) Sten Grillner (Karolinska Institute) The intrinsic function of a neuronal network: From ion channels to motor behavior
4) Francois Clarac (Univ. Marseilles) Comparative aspects of the development of posture and locomotion in mammals: The neonatal rat
5) Norio Kudo (Tsukuba Univ.) Developmental changes in the spatial pattern of rhythmic motor activity in the rat fetus
6) Hans Hultborn (Univ. Copenhagen) Resetting as a tool to analyze the locomotor network in the mammalian spinal cord
7) Takashi Yamaguchi (Yamagata Univ.) Neuronal organization of cat forelimb CPG
8) Larry Jordan (Univ. Manitoba) Examining the role of 5-HT in the control of spinal locomotor neurons: Release, receptor

distribution, and the effects of antagonists

9) Keir Pearson (Univ. Alberta) Functional role of feedback from muscle afferents in the generation of motor activity in walking cats
10) Kiyoji Matsuyama (Sapporo Med. Univ.) Locomotor role of the reticulospinal-spinal interneuronal system
11) Peter Kirkwood (Univ. College London) Respiratory inputs, non-respiratory inputs and plateau potentials in hindlimb motoneurons of female cats: Modulation by oestrogen and implications for functional heterogeneity in nucleus retroambiguus.
12) Saburo Kawaguchi (Kyoto Univ.) Functional recovery from spinal cord injury: Effects of a repair graft in the neonate
13) Marion Murray (MCP Hahnemam Univ.) Some functions develop and some do not after transplantation into spinal cord transection sites in neonatal rats
14) Alan Tessler (MCP Hahnemam Univ.) Some functions recover and some do not after intraspinal transplantation in adult rats
15) Serge Rossignol (Univ. Montreal) Determinants of locomotor recovery after spinal injury in the cat

March 20 Tuesday

16) Peter L. Strick (Univ. Pittsburgh) New concepts about basal ganglia and cerebellar "loops" with the cerebral cortex
17) Yoshio Nakamura (Tokyo Medical and Dental Univ.) Brainstem rhythm generation for ingestive movements
18) Kazuhisa Ezure (Tokyo Metropolitan Institute for Neuroscience) Central control of respiration by brainstem neural networks
19) Edgar Garcia-Rill (Univ. Arkansas) Arousal mechanisms related to posture and locomotion: I. Descending modulation
20) Robert Skinner (Univ. Arkansas) Arousal mechanisms related to posture and locomotion: II. Ascending modulation
21) Tadashi Isa (NIPS) Saccade initiation and vigilance: Regulation by the brainstem cholinergic system.
22) Ryuichi Shigemoto (NIPS) Cerebellar ataxia in patients with Hodgkin's disease: Role of a metabotropic glutamate receptor
23) Vlastislav Bracha (Iowa State Univ.) Cerebellar involvement in eyeblink conditioning in humans
24) Shigemi Mori (NIPS) Fastigial control of multiple body segments for the integration of posture and locomotion
25) James Bloedel (Iowa State Univ.) The task- and condition-dependent nature of the cerebellum's contribution to motor learning is reflected in the modulation of cerebellar neurons
26) Thomas Thach (Washington Univ.) Cerebellar control of simple vs. compound movements
27) Barry Peterson (Univ. Arkansas) Neural control of head movements
28) Kikuro Fukushima (Hokkaido Univ.) Role of the frontal eye fields in smooth gaze tracking
29) Yoshio Uchino (Tokyo Medical and Dental Univ.) The role of cross-striolar and commissural inhibition in the vestibulocollic reflex
30) Yoshikazu Shinoda (Tokyo Medical and Dental Univ.) The neural control of gaze: Organization from the superior colliculus to ocular and neck motoneurons
31) Alexej Glantyn (CNRS/College de France) Control of orienting movements: Role of multiple tectal projections to the lower brain stem
32) Shigeto Sasaki (Tokyo Metropolitan Institute for Neuroscience) Velocity and position guided orienting in the unrestrained cats

March 21 Wednesday

33) Mario Wiesendanger (Univ. Berne) Hands: The quest to understand dexterity
34) George Stelmach (Arizona State Univ.) Coordination among multiple body segments involved in trunk-assisted

prehension

35) Roger Lemon (Univ. College London) Pathways for corticospinal control of motoneurons in different primate species.
36) Eric Rouiller (Univ. Fribourg) Recovery of manual dexterity following lesion of the corticospinal system in the adult monkey
37) Jun Tanji (Tohoku Univ.) Regional specialization within the premotor cortex of the non-human primate
38) Jiping He (Arizona State Univ.) Cortical control of arm movement: Adaptation and learning by cortical neurons
39) Fraser Wilson (Univ. Arizona) Spatially-directed responses and neuronal activity in freely moving monkeys
40) Okihide Hikosaka (Juntendo Univ.) Neural control of voluntary saccades: Role of the basal ganglia
41) Atsushi Nambu (Tokyo Metropolitan Institute for Neuroscience) Cortico-basal ganglia loop and Parkinson's disease
42) Kaoru Takakusaki (Aasahikawa Medical College) Basal ganglia-brainstem systems that control postural muscle tone and locomotion in cats
43) Trevor Drew (Univ. Montreal) Cortical and brainstem contributions to the control of locomotion
44) Hiroshi Shibasaki (Kyoto Univ.) Neural control mechanisms for normal vs. disordered gait
45) Gert Holstege(Univ. Groningen) The emotional motor system
46) Paul Cordo (Oregon Health Sci.Univ.) Control of multijoint movement in a natural motor behavior
47) Victor Gurfinkel (Oregon Health Sci.Univ.) Coexistence of stability and mobility in a natural motor behavior
48) Jean Massion (Univ. Marseilles) Posture and movement: co-ordination and control

Concluding remarks Douglas Stuart (Univ. Arizona), What have we learned in Okazaki?

Closing remarks Shigemi Mori (NIPS)

Poster Presentations (March 20 Tuesday)

P-1 Tetsuro Yamamoto (Mie Univ.)
Mode of cerebellar activation of the motor cortical areas: Phylogenetic comparisons among mammals

P-2 Satoru Kondo (NIPS)
Inhibitory postsynaptic currents in the frontal cortex of the rat

P-3 Md. Kadrul Huda (Gifu Univ.)
Thalamocortical excitation of cat motor cortical neurons: Inhibitory modulation by dopamine

P-4 Alstermark Bror (NIPS)
C3-C4 propriospinal neurons mediate disynaptic pyramidal excitation to forelimb motoneurons in Macaca Fuscata

P-5 Yuka Inoue (NIPS)
Functions of the pedunculo-pontine tegmental nucleus: Reward-influenced modulation of a saccade task in the monkey

P-6 Yasushi Kobayashi (NIPS)
The performance of visually guided saccade tasks in monkeys: Contribution of pedunculo-pontine tegmental nucleus neurons

P-7 Tetsu Okumura (NIPS)
Microperfusion into the rat striatum: rotation movements and brain c-fos expression induced by carbachol

P-8 Izumi Sugihara (Tokyo Med. Dent. Univ.)
Cerebellar projection patterns of single climbing vs. mossy fibers

P-9 Katsumi Nakajima (NIPS)
Locomotor-driving signals to lumbosacral neurons: Role of CLR-activated reticulospinal cells

P-10 Hiroshi Nishimaru (Tsukuba Univ.)
Rhythmic, locomotor-like activity in the spinal cord of the neonatal mouse

P-11 Arpad Dobolyi (NIPS & NIH)
Acetylcholinesterase-positive neurons in the lumbar spinal cord of the developing and adult rat

P-12 Julita Czarkowska-Bauch (Nencki Institue)
BDNR and NT-4 immunoreactivity increase in spinal cord fibers following locomotor training in the adult rat

P-13 Malgorzata Skup (Nencki Institute)
Identification of spinal cells responding with an increased expression of Trk-B receptor protein to locomotor training in adult rats

P-14 Yasunobu Itoh (Akita Univ.)
Adult dorsal root regeneration into the adult spinal cord: Enhancement by neurotrophic factors

P-15 Riyi Shi (Purdue Univ.)
Polyethylene glycol repairs mammalian spinal cord axons after mechanical injury

P-16 Giito Izuta (Yamagata Univ.)
Postural control on stable and unstable support surfaces: Use of different self-paced movement strategies

P-17 Mihai Tarata (Bucharest Univ.)
A new technique for measuring muscle activity: The accelerometer MMG

P-18 Carol Boliek (Univ.Arizona)
Postural control and speech breathing in young children with neuromotor disorders

P-19 Naomi Wada (Yamaguchi Univ.,)
Trunk movement in the cat: Level vs. upslope treadmill walking

P-20 Atsumichi Tachibana (NIPS)
Longitudinal study of the acquisition of operant-trained upright posture and bipedal locomotion by M. Fuscata

P-21 Futoshi Mori (NIPS)
Cerebral glucose metabolism during the bipedal locomotion of the Japanese monkey, M. Fuscata: A PET study