

PROGRAM

August 25, Saturday

16.00-19.00 Registration

19.30- Get-together party

August 26, Sunday

8.00-9.00 Registration

9.00-9.10 Opening of the symposium

9.10-10.20 Oral presentations
Chairman: **K. Elekes**

Ernst Florey Memory Lecture

Exploring ensemble representations of olfactory stimuli: making scents of intertwined spatial and temporal codes. J.G. Hildebrand (*ARL, Division of Neurobiology, University of Arizona, Tucson, USA*)

Conserved brain design across invertebrate phyla. R. Loesel (*II Department of Developmental Biology and Morphology of Animals, Institute of Biology, RWTH Aachen, Aachen, Germany*)

10.20-10.50 Break

10.50-12.10 Oral presentations
Chairman: **H.-J. Pflüger**

News on synaptic circuits in mushroom bodies of the insect brain. F.-W. Schürmann, I. Frambach (*Institut für Zoologie, Anthropologie und Entwicklungsbiologie, Universität Göttingen, Göttingen, Germany*)

Neurotransmitters and their receptors in the *Drosophila* circadian clock. D.R. Nässel¹, Y. Hamasaka¹, D. Rieger², H.A.D. Johard¹, A. Kolodziejczyk¹, M.-L. Parmentier³, Y. Grau³, C. Helfrich-Förster² (*¹Department of Zoology, Stockholm University, Stockholm, Sweden, ²Institute of Zoology, University of Regensburg, Regensburg, Germany, ³Institut de Génomique Fonctionnelle, Universités Montpellier, Montpellier, France*)

The *Drosophila* circadian system: entrainment by light and temperature. K. Tomioka, Y. Miyasako, Y. Umezaki. (*Graduate School of Natural Science and Technology, Okayama University, Okayama, Japan*)

Behavioral plasticity and visual pattern discrimination learning of *Drosophila* in the flight simulator. R. Wolf (*Department of Genetics and Neurobiology, Biozentrum, University of Wuerzburg, Wuerzburg, Germany*)

12.10-14.00 Lunch

14.00-15.30 Oral presentations
Chairman: **F. -W. Schürmann**

Plenary lecture

Synaptic organisation in the insect brain: Evidence from neural circuits in *Drosophila*. I.A. Meinertzhagen (*Life Sciences Centre, Dalhousie University, Halifax, Canada*)

Identified *Drosophila* ion transport peptide isoforms are differentially expressed in neurons throughout metamorphosis. H. Dirksen, L. Kahsai, C. Albus, J. Söderberg, D.R. Nässel (*Department of Zoology, Stockholm University, Stockholm, Sweden*)

Nitric oxide and cGMP signaling in the developing antennal lobe of the sphinx moth *Manduca sexta*. W. Huetteroth, S. Utz, M. Vömel, P. Winterhagen, J. Schachtner (*Department of Biology, Animal Physiology, Philipps-Universität Marburg, Marburg, Germany*)

Neuropeptides in the developing insect antennal lobe: localization, characterization, and putative functions. J. Schachtner W. Huetteroth (*Department of Biology, Animal Physiology, Philipps-Universität Marburg, Marburg, Germany*)

16.00-17.30 Poster presentations (Nos. 1-35)

17.30-19.00 Oral presentations
Chairman: **D. R. Nässel**

Plenary lecture

Genitalic autogrooming in the male cricket, *Gryllus bimaculatus* DeGeer. M. Sakai¹, M. Kumashiro¹, M. Iwano^{2,3} (*Department of Biology, Faculty of Science, Okayama University, Okayama, ²Center for Bioinformation, University of Tokyo, ³BIRD, JST, Saitama, Japan*)

Bilateral symmetry in crayfish behavioural reactions. Z. Shuranova (*Institute of Higher Nervous Activity and Neurophysiology, RAS, Moscow, Russia*)

Development and modulation of a sensory-motor pathway in locusts. H.-J. Pflüger, S. Ott, D. Münch (*Faculty of Biologie, Chemistry, Pharmacy; Institute of Biology, Neurobiologie, Free University of Berlin, Berlin, Germany*)

Augustus 27, Monday

9.00-12.00 Oral presentations
Chairman: **M. Sakakibara**

Plenary lecture

Altered gene activity correlated with long-term memory formation of conditioned taste aversion in *Lymnaea*. E. Ito (*Laboratory of Functional Biology, Kagawa School of Pharmaceutical Sciences, Tokushima Bunri University, Sanuki, Japan*)

Constant and dynamic memories in simple nervous systems. P.M. Balaban (*Institute of Higher Nervous Activity and Neurophysiology, RAS, Moscow, Russia*)

Immunohistological study on distribution of learning related peptide in CNS of conditioned *Lymnaea*. Y. Nomura¹, T. Horikoshi², M. Sakakibara² (¹*Graduate School of High-Technology for Human Welfare, Tokai University, Numazu, Japan* ²*School of High-Technology for Human Welfare, Tokai University, Numazu, Japan*)

10.30-10.45 Break

10.30-12.00 Oral presentations
Chairman: **E. Ito**

Cellular and molecular mechanisms of memory function and dysfunction in a defined neuronal network. G. Kemenes. (*Sussex Centre for Neuroscience, School of Life Sciences, University of Sussex, Falmer, Brighton, U.K.*)

PKA, CREB and single-trial associative learning in *Lymnaea*. M. Michel¹, I. Kemenes¹, M. Daniels¹, U. Müller², G. Kemenes¹ (¹*Sussex Centre for Neuroscience, School of Life Sciences, University of Sussex, Falmer, Brighton, U.K.* ²*University of Saarland, Saarbrücken, Germany*)

Non-synaptic plasticity and associative learning in *Lymnaea*. I. Kemenes, V.A. Straub, E.S. Nikitin, K. Staras, M. O'Shea, G. Kemenes, P.R. Benjamin (*Sussex Centre for Neuroscience, School of Life Sciences, University of Sussex, Falmer, Brighton, U.K.*)

Time-course of memory formation in one-trial reward conditioning. V. Marra, I. Kemenes, J. Ireland, M. O'Shea, P.R. Benjamin (*Sussex Centre for Neuroscience, School of Life Sciences, University of Sussex, Falmer, Brighton, U.K.*)

12.30 EXCURSION (*Visiting: the world's largest porcelain manufacture in Herend; Castle of Szigliget at Lake Balaton; Esterházy Wine Cellar*) (*Lunch on the board*)

August 28, Tuesday

9.00-11.05 Oral presentations
Chairman: **Ian Meinertzhagen**

Adult-to-embryo chemical signaling in regulation of larval development of trochophore animals: cellular and molecular mechanisms. E. Voronezhskaya¹, K.I. Glebov², N.Y. Khabarova³, E.G. Ponimaskin², L.P. Nezhlin¹ (¹*Institute of Developmental Biology, RAS, Moscow, Russia*, ²*Department of neuro- and Sensory Physiology, University of Göttingen, Göttingen, Germany*, ³*Tula State Pedagogical University, Tula, Russia*)

Investigation of MAP/ERK-kinase cascade activation in *Helix* during forming of food aversion reflex at different stages of postnatal ontogenesis. L.N. Grinkevich (*Laboratory of Regulation of Function of Brain Neurons, Pavlov Institute of Physiology, RAS, St. Petersburg, Russia*)

Larval neurogenesis in two polychaete annelids based on immunolabeling, confocal microscopy, and 3D reconstruction software. N. Brinkmann, A. Wanninger (*Department of Cell Biology and Comparative Zoology, Institute of Biology, University of Copenhagen, Copenhagen, Denmark*)

Comparative lophotrozoan neurogenesis and larval neuroanatomy: recent advances from previously neglected taxa. A. Wanninger (*Department of Cell Biology and Comparative Zoology, Institute of Biology, University of Copenhagen, Copenhagen, Denmark*)

The problem of glia cells existence in the nervous system of parasitic and free-living flatworms (ultrastructural and immunocytochemical investigation). N.M. Biserova (*Department of Invertebrate Zoology, Biological Faculty, Lomonosov State University, Moscow, Russia*)

Histochemical demonstration of extracellular matrix components in the snail central nervous system. Z. Serfözö, K. Elekes (*Department of Experimental Zoology, Balaton Limnological Research Institute, HAS, Tihany, Hungary*).

11.05-11.25 Break

11.25-12.55 Oral presentation
Chairman: **R. J. Walker**

Ultrastructural organization of the statocyst hair cells of *Lymnaea*. K. Elekes, N.L. Kononenko, G. Balog, T. Kiss (*Department of Experimental Zoology, Balaton Limnological Research Institute, HAS, Tihany, Hungary*)

Neurogenic gastrointestinal movements caused by the enteric nervous system and its extrinsic regulation in *Lymnaea*. T. Okamoto¹, K. Elekes², M. Kurokawa³ (¹*Department of Biological Sciences, Tokyo Metropolitan University, Tokyo Japan*, ²*Department of Experimental Zoology, Balaton Limnological Research Institute, HAS, Tihany, Hungary*)

Neuropeptides and their functions in *Hydra*. T. Takahashi¹, E. Hayakawa², O. Koizumi³, T. Fujisawa² (*Suntory Institute for Bioorganic Research, Osaka, ²National Institute of Genetics, Mishima, ³Fukuoka Women's University, Fukuoka, Japan*)

Native flatworm neuropeptides NPF, GYIRF, and FMRF, and their functions in regenerating planarian *Girardia tigrina*. N. Kreshchenko (*Institute of Cell Biophysics, RAS, Pushchino, Moscow region, Russia*)

12.55-14.45 Lunch

14.45-16.30 Oral presentations
Chairman: **G. Kemenes**

Monoaminergic modulation of network oscillations and synaptic connectivity in *Lymnaea*. A. Szűcs, Á. Vehovszky (*Department of Experimental Zoology, Balaton Limnological Research Institute HAS, Tihany, Hungary*)

Behavioral and neuronal impairment by rotenone as a new dopaminergic neurotoxin in model invertebrates Á. Vehovszky¹, H. Szabó¹, C J. Elliott², L. Hernádi¹ (*¹Department of Experimental Zoology, Balaton Limnological Research Institute, HAS, Tihany, Hungary, ²Department of Biology, University of York, York, U.K.*)

The neuronal background of feeding modulation in snails with special attention to the monoaminergic system. L. Hernádi, L. Hiripi, J. Györi, Á. Vehovszky (*Department of Experimental Zoology, Balaton Limnological Research Institute, HAS, Tihany, Hungary*)

Protein phosphorylation in the heart and foot of *Helix pomatia* during active state. L. Hiripi, Zs. Pirger, T. Kiss, K. Elekes (*Department of Experimental Zoology, Balaton Limnological Research Institute, HAS, Tihany, Hungary*)

The presence and distribution of pituitary adenylate cyclase activating polypeptide (PACAP) and its receptor (PAC1-R) in the snail. Zs. Pirger¹, T. Kiss¹, J. Németh², L. Hernádi¹, D. Reglödi³ (*¹Department of Zoology, Balaton Limnological Research Institute, HAS, Tihany, ²Department of Pharmacology and Pharmacotherapy, University of Debrecen, ³Department of Anatomy, University of Pécs, Hungary*)

16.30-18.00 Poster presentations (Nos.1-35)

August 29, Wednesday

9.30-11.00 Oral presentations
Chairman: **P. M. Balaban**

János Salánki Memory Lecture

Persistent Na-channels: origin and function T. Kiss (*Department of Experimental Zoology, Balaton Limnological Research Institute, Tihany, Hungary*)

A role for the calcium-activated potassium channel, SLO-1, in the action of the anthelmintic, emodepside. K. Guest¹, K. Bull¹, V. Amliwala¹, N.A. O'Connor¹, A. Hopper¹, L. Harder², M. Holden-Dye¹, R.J.Walker¹ (¹*School of Biological Sciences, University of Southampton, Southampton, UK*, ²*Bayer Health Care AG, Leverkusen, Germany*)

How messengers regulate the modulation of potential changes from spontaneously generated action potential into bursts of potential in central snail neuron? M. C. Tsai (*Department of Pharmacology, College of Medicine, National Taiwan University, Taipei, Taiwan*)

11.00-11.30 Break

11.30-13.30

Where do we go? (Discussion on the future of invertebrate neurobiology)

Introductory remarks: H.-J. Pflüger; Commentaries: P.M. Balaban, E. Ito, J.G. Hildebrand)

General Meeting of ISIN

Closing remarks

19.00 Farewell dinner

POSTER SECTIONS

POSTERS, Nos. 1-35, August 26-29 (Sunday-Wednesday, continuous display)

1. **Caspase-like activity is essential for long-term synaptic plasticity in the terrestrial snail *Helix*.** N.I. Bravarenko, V.N. Ierusalimsky, M.V. Onufriev, M. Yu. Stepanichev, N.V. Gulyaeva, P.M. Balaban (*Institute of Higher Nervous Activity and Neurophysiology, RAS, Moscow, Russia*)
2. **Moult control in an isopod crustacean: role of ecdysteroids and crustacean cardioactive peptide.** H. Dirksen¹, T. Nussbaum², C. Johnen² (¹*Dept. Zoology, Stockholm University, Stockholm, Sweden*, ²*Institute of Molecular Biomedicine, University of Bonn, Germany*)
3. **Monoamines regulating the embryonic development of the pond snail *Lymnaea stagnalis*.** A. Filla, L. Hiripi, K. Elekes (*Department of Experimental Zoology, Balaton Limnological Research Institute, HAS, Tihany, Hungary*)
4. **Relationship between developmental synaptic modulation and conditioning-induced synaptic change in *Lymnaea*.** T. Karasawa¹, N. Satoh², T. Horikoshi², M. Sakakibara² (¹*Graduate School of High-Technology for Human Welfare, Tokai University, Numazu, Japan* ²*School of High Technology for Human Welfare, Tokai University, Numazu, Japan*)
5. **βeta-amyloid peptide influences learning in terrestrial snail.** T. A. Korshunova, N. I. Bravarenko, P. M. Balaban (*Institute of Higher Nervous Activity and Neurophysiology, RAS, Moscow, Russia*)
6. **Distribution and localisation of different sodium channel subtypes in snail.** Zs. Pirger, G. Juhász-Vedres, T. Kiss (*Department of Experimental Zoology, Balaton Limnological Research Institute, HAS, Tihany, Hungary*)
7. **The genomic structure and the variants of nitric oxide synthase gene in the terrestrial slug *Limax valentianus*.** R. Matsuo, E. Ito (*Laboratory of Functional Biology, Kagawa School of Pharmaceutical Sciences, Tokushima Bunri University, Sanuki, Japan*)
8. **The gene expression of serotonin transporter related to the conditioned taste aversion learning in the CNS of *Lymnaea stagnalis*.** H. Sadamoto, Z. Serfözö, E. Ito (*Laboratory of Functional Biology, Kagawa School of Pharmaceutical Sciences, Tokushima Bunri University, Sanuki, Japan*)
9. **Functions of a GnRH receptor heterodimer of the ascidian *Ciona intestinalis*.** T. Sakai¹, M. Aoyama¹, T. Kusakabe², M. Tsuda², H. Satake¹ (¹*Suntory Institute for Bioorganic Research, Osaka, Japan*; ²*Graduate School of Life Science, University of Hyogo, Hyogo, Japan*)
10. **Distribution of neuromodulators in the olfactory center of the ant *Aphaenogaster smythiesi japonica*.** M. Sakura¹, T. Hiraguchi¹, K. Ohkawara², H. Aonuma¹ (¹*Research Institute for Electronic Science, Hokkaido University, Sapporo, Japan*, ²*Graduate School of Natural Science and Technology, Kanazawa University, Kanazawa, Japan*)

11. **Neuropeptides and their receptors of the protochordate, *Ciona intestinalis*: the evolutionary origin of vertebrate neuropeptides.** H. Satake¹, M. Aoyama¹, T. Kawada¹, T. Sekiguchi¹, T. Sakai¹, M. Fujie², N. Satoh³ (¹*Suntory Institute for Bioorganic Research, Osaka, Japan;* ²*CREST, JST, Tokyo, Japan;* ³*Department of Zoology, Graduate School of Science, Kyoto University, Kyoto, Japan*)

12. **Neurophysiological analysis of visuo-vestibular conditioning in *Lymnaea stagnalis*** H. Suzuki¹, T. Horikoshi², M. Sakakibara² (¹*Graduate School of Bioscience, Tokai University Unified Graduate School, Numazu, Japan,* ²*School of High-Technology for Human Welfare, Tokai University, Numazu, Japan*)

13. **Immunocytochemical study of cercariae from different taxonomic groups.** O.O. Tolstakov¹, N.B. Terenina¹, M.K.S. Gustafsson², E.A. Serbina³, N.D. Kreshchenko⁴, L.M. Maklakova¹, V.A. Jashin⁴ (¹*Center of Parasitology, A.N. Severtsov Institute of Ecology and Evolution, RAS, Moscow,* ²*Department of Biology, Abo Akademi University, Abo, Finland,* ³*Institute of Animal Systematics and Ecology, RAS, Novosibirsk,* ⁴*Institute of Cell Biophysics, RAS, Pushino, Moscow region, Russia*)

14. **Patterned dynamics of neuroactive factors released from the buccal network of *Lymnaea*** I.A. Chistopolsky, D.D. Vorontsov, D.A. Sakharov (*Institute of Developmental Biology, Russian Academy of Sciences, Moscow, Russia*)

15. **Distribution of FMRFamide-like and serotonergic neurons in the central nervous system of the pygmy squid *Idiosepius notoides*.** T. Wollesen¹, R. Loesel², A. Wanninger¹ (¹*Department of Cell Biology and Comparative Zoology, Institute of Biology, University of Copenhagen, Copenhagen, Denmark,* ²*Unit of Developmental Biology and Morphology of Animals, RWTH Aachen, Aachen, Germany*)

16. **Distribution and physiological significance of the novel gene preproHelSFamide-expressing neurons in the nervous system of the snail *Helix* sp. nervous system.** D. Boguslavsky¹, A. Belyavsky², P.M. Balaban¹, I.S. Zakharov^{1,3} (¹*Institute of Higher Nervous Activity and Neurophysiology, RAS, Moscow, Russia,* ²*Engelhardt Institute of Molecular Biology RAS, Moscow, Russia.* ³*Koltzov Institute of Developmental Biology RAS, Moscow, Russia*)

17. **PACAP isoforms and Pac1 receptors are expressed in the regenerating ventral nerve cord ganglia of the earthworm *Eisenia fetida*.** Á. Boros¹, E. Pollák¹, D. Reglődi², E. Várhalmi¹, I. Somogyi¹, G. Kiszler¹, A. Lubics², J. Németh³, L. Molnár¹ (¹*Departments of General Zoology,* ²*Anatomy, University of Pécs, Pécs, Hungary,* ³*Department of Pharmacology, University of Szeged, Szeged, Hungary*)

18. **Functional neuroanatomy of the 5HT-ergic system in the developing and adult buccal complex of gastropods (*Helix* and *Lymnaea*).** G. Balog, K. Elekes (*Department of Experimental Zoology, Balaton Limnological Research Institute, HAS, Tihany, Hungary*)

19. **The involvement of transient larval FMRFamidergic neurons in neuronal development and osmoregulation in freshwater snails *Helisoma trivolvis* and *Lymnaea stagnalis*.** A.K. Chaban¹, E. E. Voronezhskaya² (¹*Laboratory of Embryology, Moscow State University, Moscow, Russia,* ²*Institute of Developmental Biology, RAS, Moscow, Russia*)

20. **Involvement of nitric oxide and volume transmission in coordination between feeding motor rhythms in *Lymnaea stagnalis*.** T.L. Dyakonova, V.E. Dyakonova (*Institute of Developmental Biology, RAS, Moscow, Russia*)
21. **Previous motor experience enhances courtship behavior in male cricket *Gryllus bimaculatus*** V.E. Dyakonova¹, A.L. Krushinsky² (¹*Institute of Developmental Biology, RAS,* ²*Biological Faculty of Moscow State University, Moscow, Russia*)
22. **Food-aversive conditioning increases persistent Na-current in withdrawal interneurons.** T. Kiss¹, Zs. Pirger¹, G. Kemenes², (¹*Department of Experimental Zoology, Balaton Limnological Research Institute, Tihany, Hungary,* ²*Sussex Centre for Neuroscience, School of Life Sciences, University of Sussex, Falmer, Brighton, U.K.*)
23. **Monoaminergic modulation of the vegetative arousal in *Helix pomatia*.** Á. Vehovszky L. Hiripi H. Szabó, J. Győri, L. Hernádi (*Department of Experimental Zoology, Balaton Limnological Research Institute, Tihany, Hungary*)
24. **Morphological evidence for the presence of endocannabinoid CB1 receptors in the CNS of terrestrial snails.** V. Ierusalimsky, P.M. Balaban (*Institute of Higher Nervous Activity and Neurophysiology, RAS, Moscow, Russia*)
25. **Endocannabinoids depress excitatory synaptic transmission in terrestrial snail *Helix lucorum* in an activity-dependent manner.** M.S. Lemak, A.Yu. Malyshev, P.M. Balaban (*Institute of Higher Nervous Activity and Neurophysiology, RAS, Moscow, Russia*)
26. **Endogenous cannabinoids modulate calcium influx in presynaptic terminals of primary sensory neurons in CNS of *H. lucorum*.** S.V. Salozhin, P.M. Balaban (*Institute of Higher Nervous Activity and Neurophysiology, RAS, Moscow, Russia*)
27. **GABAergic neurotransmission of the procerebrum neurons in odor information processing of the terrestrial slug *Limax valentianus*.** S. Kobayashi (*Laboratory of Functional Biology, Kagawa School of Pharmaceutical Science, Tokushima Bunri University, Sanuki, Japan*)
28. **Calcium signals associated with high-amplitude epsps in command neurons of *Helix lucorum*: role in the integrative properties of the neuron.** A.Y. Malyshev, P.M. Balaban (*Institute of Higher Nervous Activity and Neurophysiology, RAS, Moscow, Russia*)
29. **Cloning, localization, expression of two purinergic receptors in the CNS of *Aplysia californica*.** J. Győri³, T.J. Ha^{1,2}, A.B. Kohn¹, and L.L. Moroz^{1,2} (*Whitney Laboratory for Marine Biosciences*¹, *Department of Neuroscience*², *University of Florida, USA, Balaton Limnological Institute*³, *Tihany, Hungary*)
30. **The dance in the honeybee: how do they dance to transfer the food information effectively?** R. Okada¹, H. Ikeno², E. Ito¹: (¹*Laboratory of Functional Biology, Kagawa School of Pharmaceutical Sciences, Tokushima Bunri University, Sanuki, Japan,* ²*School of Human Science and Environment, University of Hyogo, Himeji, Hyogo, Japan*)

- 31. Activities and functions of peripheral neurons in the enteric nervous system of *Aplysia*.** M. Kurokawa, S. Ito, T. Okamoto (*Department of Biological Sciences, Tokyo Metropolitan University, Tokyo, Japan*)
- 32. Nerve stimulation of snail heart evokes releasing of proteins into circulation.** S.V. Shabelnikov, O. Bystrova, V.A. Ivanov, B.A. Margulis, M. Martynova (*Institute of Cytology, RAS, Saint-Petersburg, Russia*)
- 33. Coordination between locomotor and respiratory rhythms in *Planorbarius corneus*.** V.V. Tsyganov (*Institute for Developmental Biology, RAS, Moscow, Russia*)
- 34. Higher-order control of feeding network in *Lymnaea*: introducing an asymmetry into symmetrical system of projecting neurons.** M.A. Alania^{1,2}, D.D. Vorontsov¹, D.A. Sakharov¹ (¹*Institute for Developmental Biology, RAS, Moscow, Russia*, ²*Tbilisi State University, Tbilisi, Georgia*)
- 35. The functional organisation of sensory neuropiles is insect thoracic ganglia.** H. J. Pflüger, N. L. Kononenko, J. Rybak (*Freie Universitaet Berlin, Institute of Biology, Neurobiology, Koenigin-Luise-Strasse 28-30, D-14195 Berlin, Germany*)