

INVITED LECTURES

June 1 Monday

8:30-9:00 Opening Remarks T. Yoshizawa

Chairpersons : J. Lugtenburg and T. Kouyama

9:00-9:30 STRUCTURE OF BACTERIORHODOPSIN BASED ON ELECTRON CRYSTALLOGRAPHY AT 3.0 Å RESOLUTION K. Mitsuoka, T. Hirai, K. Murata, A. Miyazawa, A. Kidera, Y. Kimura and Y. Fujiyoshi (Japan)

9:30-10:00 BACTERIORHODOPSIN, A PHOTOACTIVATED RETINAL PROTEIN IN PURPLE MEMBRANES OF *H. SALINARUM* L. P. Rosenbusch, E. M. Landau, E. Pebay-Peyroula and H. Belrahli (Switzerland)

10:00-10:30 STRUCTURAL DETERMINANTS OF PROTON TRANSPORT IN BACTERIORHODOPSIN L. K. Lanyi and Richter H.-T. (USA)

10:30-11:00 Coffee Break

11:00-11:30 STRUCTURAL BASIS OF PROTON TRANSPORT BY BACTERIORHODOPSIN S. Subramaniam and R. Henderson (USA/UK)

11:30-12:00 THERMODYNAMIC STUDY AND THE ROLE OF WATER IN THE PHOTOCYCLE OF BACTERIORHODOPSIN G. Váró (Hungary)

12:00-12:30 LIGHT-INDUCED CONFORMATIONAL CHANGES AND WATER MOLECULES IN BACTERIORHODOPSIN ARE KEY ELEMENTS OF THE PROTON TRANSPORT MECHANISM N. A. Dencher, G. Büldt, J. Fitter, T. Hauß, M. H. J. Koch, R. Lechner, M. Lösche, D. Oesterhelt, G. Papadopoulos, G. Rapp, H. -J. Saß, and S. A. W. Verclas (Germany)

12:30-14:00 Lunch Break

Chairperson : E. Eguchi

14:00-15:00 Poster Preview

15:00-17:00 Poster Session

Chairpersons : M. Ito and N. G. Abdulaev

17:00-17:30 A FORCE CONSTANT MODEL OF PURPLE MEMBRANE FROM NEUTRON SCATTERING RESULTS G. Zaccai (France)

17:30-18:00 SOLID STATE NMR STUDIES OF ENERGY TRANSDUCTION IN BACTERIORHODOPSIN J. Herzfeld, J. G. Hu, B. Q. Sun, A. T. Petkova, M. Bizounok, M. Hatanaka, J. Lansing, M. E. Hatcher, J. Raap, J. Lugtenburg and R. G. Griffin (USA)

18:00-18:30 CONFORMATION AND BACKBONE DYNAMICS OF BACTERIORHODOPSIN AS STUDIED BY ¹³C NMR H. Saitó, S. Tuzi, S. Yamaguchi, M. Tanio, Y. Kawase, A. Naito, J. K. Lanyi and R. Needleman (Japan)

18:30-20:00 Dinner Break

20:00-20:30 THE ROLE OF RETINAL IN THE ACTIVATION OF THE SIGNAL TRANSDUCTION PROCESS IN RODS AND CONES R. K. Crouch, V. J. Kefalov and M. C. Cornwall (USA)

20:30-21:00 BATHORHODOPSIN, STRUCTURE AND FORMATION J. Lugtenburg (The Netherlands)

21:00-21:30

EFFECTIVE LIGHT-INDUCED HYDROXYLAMINE REACTIONS OCCUR WITH
C₁₃=C₁₄ NON-ISOMERIZABLE BACTERIORHODOPSIN PIGMENTS I.
Rousso, E. Khachatryan, Y. Gat, A. Aharoni, A. Lewis, M. Ottolenghi and M. Sheves
(Israel)

June 2 Tuesday

Chairpersons : L. Keszthelyi and N. Kamo

- 8:30-9:00 PROBING THE PRIMARY LIGHT-INDUCED EVENTS IN BACTERIORHODOPSIN WITH C13=C14 LOCKED PIGMENTS T. Ye, N. Friedman, S. Ruhman, M. Sheves and M. Ottolenghi (Israel)
- 9:00-9:30 FTOA METHOD FOR THE ANALYSIS OF EXCITED STATE DYNAMICS OF RETINAL PROTEINS AND PYP T. Kakitani, T. Yamato, A. Ozawa, Y. Hatano, R. Akiyama, Y. Imamoto, Y. Shichida (Japan), P. J. E. Verdegem and J. Lugtenburg (The Netherlands)
- 9:30-10:00 THE PRIMARY STEP IN BACTERIORHODOPSIN-PHOTOSYNTHESIS: BOND STRETCH RATHER THAN ANGLE TWIST OF ITS RETINAL EXCITED STATE STRUCTURE L. Song and M. A. El-Sayed (USA)
- 10:00-10:30 VIBRATIONAL SPECTRA OF INTERMEDIATES IN THE RHODOPSIN PHOTOREACTION: PICOSECOND TIME-RESOLVED CARS SPECTROSCOPY G. H. Atkinson, L. Ujj, F. Jäger, Y. Zhou, J. Lou and K. Nakanishi (USA)

10:30-11:00 Coffee Break

11:00-11:30 QUANTUM / CLASSICAL MECHANICAL MODELLING OF THE EARLY EVENTS IN BACTERIORHODOPSIN'S PUMP CYCLE K. Schulten, M. Ben-Nun, F. Molnar, H. Lu, J. Phillips, and T. J. Martinez (USA)

11:30-12:00 SIMILARITY AND DIFFERENCE IN THE PHOTOREACTIONS OF PHOTOACTIVE YELLOW PROTEIN AND RETINAL PROTEINS Y. Imamoto, K. Mihara, Y. Shirahige, O. Hisatomi, M. Kataoka, F. Tokunaga, N. Bojkova and K. Yoshihara (Japan)

12:00-12:30 REGULATION OF THE SCHIFF BASE PK IN GECKO P521 CONE-TYPE VISUAL PIGMENT BY CHLORIDE BINDING C. Yuan, O. Kuwata, S. Misra, J. Liang, S. Balashov and T. G. Ebrey (USA)

12:30-14:00 Lunch Break

Chairperson : J. Usukura

14:00-15:00 Poster Preview

15:00-17:00 Poster Session

16:00-17:00 Round-Table Discussion (Chairperson : J. Hertzfeld)

Chairpersons : M. Sheves and K. Yoshihara

17:00-17:30 POLARIZED FTIR SPECTROSCOPY OF BACTERIORHODOPSIN H. Kandori (Japan)

17:30-18:00 OPTOACOUSTIC SPECTROSCOPY IN RETINAL PROTEINS W. Gärtner and S. E. Braslavsky (Germany)

18:00-18:30 FLASH-INDUCED VOLTAGE CHANGES IN HALORHODOPSIN FROM *N. pharaonis* AND IN E204Q BACTERIORHODOPSIN MUTANT A. D. Kaulen, I. V. Kalaidzidis and A. N. Radionov (Russia)

18:30-20:00 Dinner Break

20:00-20:30 CAN TIME-RESOLVED FTIR SPECTROSCOPY DISCRIMINATE BETWEEN THE POSTULATED DIFFERENT M STATES OF BACTERIORHODOPSIN? C. Rödig, O. Weidlich and E. Siebert (Germany)

- 20:30-21:00 THE STRUCTURES OF THE PHOTOINTERMEDIATES OF BACTERIORHODOPSIN AND THE IMPLICATION FOR THE PROTON PUMP MECHANISM M. Kataoka, H. Kamikubo, T. Oka, F. Tokunaga (Japan), R. Needleman and J. K. Lanyi (USA)
- 21:00-21:30 BACTERIORHODOPSIN PROTONTRANSFER MECHANISM ELUCIDATED BY TIME-RESOLVED FTIR DIFFERENCE SPECTROSCOPY K. Gerwert (Germany)

June 3 Wednesday

Chairpersons : K. Tsujimoto and R. Bogomolni

8:30-9:00 CHLORIDE TRANSPORT IN BACTERIORHODOPSIN AND HALORHODOPSIN
D. Oesterhelt (Germany)

9:00-9:30 VOLTAGE DEPENDENCE OF BACTERIORHODOPSIN AND HALORHODOPSIN
EXPRESSED IN OOCYTES FROM XENOPUS LAEVIS E. Bamberg (Germany)

9:30-10:00 INTERPRETATION OF THE SPATIAL CHARGE DISPLACEMENTS IN
BACTERIORHODOPSIN IN TERMS OF STRUCTURAL CHANGES DURING THE
PHOTOCYCLE A. Dér and P. Ormos (Hungary)

10:00-10:30 Lunch Break

10:30-11:00 LOCATION OF FUNCTIONAL WATER MOLECULES IN BACTERIORHODOPSIN
AND RHODOPSIN A. Maeda (USA)

11:00-11:30 SENSORY RHODOPSIN II FORM *NATRONOBACTERIUM PHARAONIS* M.
Engelhard, B. Lüttenberg, I. Chizhov, G. Schmies, A. Becker and E. Bamberg
(Germany)

11:30-13:00 Lunch Break

13:00-21:00 Excursion

June 4 Thursday

Chairpersons : Y. Hashimoto, A. Tonosaki, F. Hayashi, and M. W. Bitensky

- 8:30-9:00 ACTIVATION OF ARCHAEAL SENSORY RHODOPSINS AND SIGNAL RELAY TO THEIR TRANSDUCER PROTEINS I. Spudich, E. Spudich, J. Sasaki, K.-H. Jung, B. Perazzona, X.-N. Zhang and J. Zhu (USA)
- 9:00-9:30 EXAMINING RHODOPSIN FOLDING AND ASSEMBLY THROUGH EXPRESSION OF POLYPEPTIDE FRAGMENTS K. D. Ridge, N. G. Abdulaev, J. H. Fujiwara, T. Ngo and S. S. J. Lee (USA)
- 9:30-9:50 DIVERSITY OF PROTEINS PARTICIPATING IN PHOTOTRANSDUCTION CASCADE OF LOWER VERTEBRATES O. Hisatomi, S. Matsuda, T. Satoh, Y. Taniguchi, Y. Imanishi, H. Honkawa, S. Kotaka, Y. Kobayashi and F. Tokunaga (Japan)
- 9:50-10:20 SIGNALLING STATES OF BOVINE RHODOPSIN - THERMODYNAMIC STUDIES M. Heck, G. Tellgmann and K. P. Hofmann (Germany)
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10:20-10:50 Coffee Break

- 10:50-11:20 DIVERSITY OF G-PROTEIN MEDIATED PHOTOTRANSDUCTION CASCADE: A NOVEL G_O-MEDIATED CASCADE FOUND IN SCALLOP VISUAL CELLS A. Terakita (Japan)
- 11:20-11:40 X-RAY CRYSTAL STRUCTURE OF ARRESTIN, A STOP SIGNAL IN THE RETINAL TRANSDUCIN CASCADE L. Granzin, U. Wilden, H.-W. Choe, J. Labahn, B. Krafft and G. Büldt (Germany)
- 11:40-12:00 FUNCTIONAL SITE OF S-MODULIN REVEALED BY S-MODULIN PARTIAL POLYPEPTIDES S. Kawamura and K. Nanda (Japan)
- 12:00-12:30 A NEW MODEL FOR THE LIGHT REGULATION OF ROD PHOTORECEPTOR SENSITIVITY M. W. Bitensky (USA)
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12:30-14:00 Lunch Break

- 14:00-14:30 SECOND MESSENGER SIGNALS IN THE PHOTOTRANSDUCTION CASCADE OF RETINAL RODS M. Gray-Keller, W. Denk and P. B. Detwiler (USA)
- 14:30-15:00 RETINAL DEGENERATION IN DROSOPHILA K. Ozaki, K. Katanosaka, A. K. Satoh, S. Kawamura and F. Tokunaga (Japan)
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Chairperson : T. Oishi

15:00-16:00 Poster Preview

16:00-18:00 Poster Session

18:00-21:00 Congress Dinner

June 5 Friday

Chairpersons : Y. Tsukahara and K. P. Hofmann

8:30-9:00 TRACKING THE VISUAL PROCESS OF THE SPHEROIDAL ALGA *VOLVOX CARTERI* P. Hegeman, E. Ebnet and F. -J. Braun (Germany)

9:00-9:30 EVOLUTION OF RHODOPSIN-BASED VISION: FROM A GENE DUPLICATION TO HUMAN RHODOPSIN K. Foster and J. Saranak (USA)

9:30-10:00 RETINAL PROTEIN IN CEREBRAL GANGLION IN ASCIDIAN IS A PHOTORECEPTOR TO TRIGGER BIOLOGICAL CLOCK OF SEXUAL REPRODUCTION M. Tsuda and M. Ohkuma (Japan)

10:00-10:30 A MYOSIN III FROM *LIMULUS* EYES IS A CLOCK-REGULATED PHOSPHOPROTEIN B. -A. Battelle, J. R. Sellers, R. M. Greenberg and W. C. Smith (USA)

10:30-11:00 Coffee Break

11:00-11:30 MOLECULAR BASIS FOR THE PHOTORECEPTION IN THE BRAIN T. Okano, T. Yoshikawa, Y. Wada, Y. Takanaka, T. Kasahara, T. Oishi, A. Adachi, S. Ebihara, K. Hirunagi and Y. Fukada (Japan)

11:30-12:00 PHOTOTRANSDUCTION IN DEPOLARIZING PHOTORECEPTORS OF THE VERTEBRATE PARIETAL EYE K. -W. Yau, W. -H. Xiong, J. T. Finn and E. C. Solessio (USA)

12:00-12:30 Closing Remarks A. Maeda