

## Thursday, September 14, 2000

14.00 – Registration

19.30 – Welcome reception

## Friday, September 15, 2000

9.00 – 9.30 Opening remarks – Lajos Keszthelyi (Hungary)

9.30 – 10.45 Lectures on Photocycle (1<sup>st</sup> part)

**Chairperson: W. Stoeckenius (A. Dér)**

9.30 – **D. Farrens** (USA): Light induced structural changes in rhodopsin, studied by SDFL

9.55 – **E.L. Terpugov** (Russia): IR-emission of bacteriorhodopsin excited by visible light

10.20 – **M. Sheves** (Israel): Light-induced conformational alterations in bacteriorhodopsin

10.45 – 11.15 **Coffee break**

11.15 – 12.55 Lectures on Photocycle (2<sup>nd</sup> part)

**Chairperson: E. Bamberg (L. Kelemen)**

11.15 – **L.S. Brown** (USA): Timing of proton uptake in bacteriorhodopsin: dissecting the chain of events after reprotonation of the Schiff base

11.40 – **J. Heberle** (Germany): Ion translocation across bacteriorhodopsin and halorhodopsin: the advantage of time resolved ATR/FTIR spectroscopy

12.05 – **F. Siebert** (Germany): Static and time-resolved dstep-scan FTIR investigations of the photoreaction of halorhodopsin from *Natronobacterium pharaonis*: consequences for models of the anion translocation mechanism

12.30 – **G. Váró** (Hungary): Chloride and proton transporting photocycle of the *pharaonis* halorhodopsin

13.00 – 15.00 **Lunch break**

15.00 – 17.05 **Lectures on Protonation**

**Chairperson: D. Oesterhelt (C. Gergely)**

15.00 – **M. Gutman** (Israel): Mapping of the EC face of the purple membrane

15.25 – **J. Herzfeld** (USA): NMR probes of sub-Angstrom changes in the active site of bacteriorhodopsin: evidence for "electrostatic steering" mechanism of energy transduction

15.50 – **K. Gerwert** (Germany): Proton transfer via protonated water molecules in bacteriorhodopsin

16.15 – **A. Maeda** (Japan): H-bond changes of internal water molecules in the formation and photoreaction of the L and M intermediates of bacteriorhodopsin

16.40 – **S. Balashov** (USA): pH dependence of photocycle reactions and their coupling with proton transport in bacteriorhodopsin

17.05 – 18.30 **Poster session**

18.30 – 19.30 **Dinner**

19.30 – 21.20 **H-bond symposium**

**Chairperson: C. Sándorffy (K. Ludmann)**

19.30 – **C. Sándorffy** (Canada): Introduction

19.40 – **M. Szafran** (Poland): Influence of small water clusters on the proton position in H-bridge

20.05 – **Z. Latajka** (Poland): H-bond and proton transfer in acid-base complex

20.30 – **M. Bellissent-Funel** (France): Role of hydrogen bond networks in proteins

20.55 – **G. Zundel** (Germany): The proton channel in bacteriorhodopsin

## Saturday, 16 September, 2000

9.00 – 11.05 Lectures on BR structure (1<sup>st</sup> part)

Chairperson: K.P. Hofmann (R. Tóth-Boconádi)

9.00 – T. Kouyama (Japan): Distribution of lipids in the hexagonal crystal of bacteriorhodopsin

9.25 – J. Lanyi (USA): Structural understanding of the transport mechanism in bacteriorhodopsin

9.50 – A. Royant (France): Helix deformation is coupled to vectorial proton transport in the photocycle of bacteriorhodopsin

10.15 – R. Neutze (Sweden): Evolving structural rearrangements in the bacteriorhodopsin's photocycle

10.40 – H. Kandori (Japan): Protein structural changes upon photoisomerization in bacteriorhodopsin

11.05 – 11.35 Coffee break

11.35 – 13.15 Lectures on BR structure (2<sup>nd</sup> part)

Chairperson: J. Lugtenburg (L. Kelemen)

11.35 – R. Henderson (U.K.): Molecular mechanism for vectorial proton translocation by bacteriorhodopsin

12.00 – H. Luecke (USA): Atomic resolution structure of bacteriorhodopsin photocycle intermediates: The role of discrete water molecules in the function of this light-driven ion pump

12.25 – G. Büldt (Germany): Essential structural alterations for proton translocation in the M state of wild-type bacteriorhodopsin

12.50 – **J. Vonck** (Germany): Structure of the N intermediate from the bacteriorhodopsin mutant F219L determined by electron crystallography

13.15 – 15.00 **Lunch**

15.00 – **Poster session**

18.30 – **Brown bag dinner**

## Sunday, 17 September, 2000

9.00 – 10.40 Lectures on Signal transduction (1<sup>st</sup> part)

Chairperson: T. Yoshizava (L. Zimányi)

9.00 – O. Hisatomi (Japan): A mechanism to characterize the vertebrate photoreceptors

9.25 – M. Engelhard (Germany): The interaction of pharaonis sensory rhodopsin II with its transducer

9.50 – O. Kisselev (USA): Signal relay in rhodopsin-transducin complex

10.15 – Y. Shichida (Japan): G protein activation and coupling specificity of rhodopsin studied by loop-replaced mutants of rhodopsin

10.40 – 11.10 Coffee break

11.10 – 12.00 Lectures on Signal transduction (2<sup>nd</sup> part)

Chairperson: R. Henderson (Á. Kulcsár)

11.10 – K.P. Hofmann (Germany): Signaling state of rhodopsin: mechanism and physiological role of the retinal

11.35 – K. Nakanishi (USA): Movement of retinal along the visual transduction path

12.00 – 14.00 Lunch

14.00 – Excursion: visit of National Historical Memorial Park in Ópusztaszer

18.00 – Dinner at Ópusztaszer

## **Monday, 18 September, 2000**

9.00 – 10.40 **Lectures on Miscellanies (1<sup>st</sup> part)**

**Chairperson: J.K. Lanyi (G. Groma)**

9.00 – **P. Ormos** (Hungary): Optoelectronic devices based on the nonlinear optical properties of bacteriorhodopsin

9.25 – **M. Kataoka** (Japan): Structure and photoreaction of photoactive yellow protein (PYP)

9.50 – **Y. Fukada** (Japan): Phototransduction of brain photoreceptor pinopsin

10.15 – **E. Bamberg** (Germany): Bacteriorhodopsin voltage dependence shows optoelectric behavior

10.40 – 11.10 **Coffee break**

11.10 – 12.50 **Lectures on Miscellanies (2<sup>nd</sup> part) and Modeling**

**Chairperson: K. Nakanishi (L. Oroszi)**

11.10 – **M. Braiman** (USA): Role of a highly conserved arginine in the bacteriorhodopsin protein family from time-resolved FTIR spectroscopy

11.35 – **E. Wolff** (Germany): Electric structure of the purple membrane

12.00 – **K. Schulten** (USA): Purple membrane: the next generation model for functional studies of bacteriorhodopsin

12.25 – **T. Kakitani** (Japan): Molecular dynamics of photoisomerization of bacteriorhodopsin and photoactive yellow protein (PYP)

12.50 – 15.00 **Lunch break**

15.00 – 19.00 **Poster session**

19.00 – **Goulash party**

## Tuesday, 19 September, 2000

9.00 – 11.05 Lectures on Retinal protein structure (1<sup>st</sup> part)

Chairperson: P. Ormos (P. Galajda)

9.00 – T. Watts (U.K.): Retinal structures at atomic resolution in membrane embedded rhodopsin and bacteriorhodopsin from direct solid state NMR approaches

9.25 – D. Oesterhelt (Germany): Structure of Halorhodopsin at 1.8 Å resolution

9.50 – G.F.X. Schertler (U.K.): Structure of bovine rhodopsin at 5.5 Å resolution

10.15 – V. Buss (Germany): Some considerations regarding the absolute conformation of the retinal chromophore in rhodopsin

10.40 – Joseph Zaccai (France): A force constant model for bacteriorhodopsin from neutron scattering studies of purple membrane dynamics

11.05 – 11.35 Coffee break

11.35 – 12.50 Lectures on Retinal protein structure (2<sup>nd</sup> part)

Chairperson: N. Abdulaev (L. Fábrián)

11.35 – O. Ernst (Germany): Studies on the rhodopsin/G-protein interface

12.00 – H.J. Steinhoff (Germany): X- and W-band EPR studies of the structure and conformational changes of site-directed spin labeled retinal proteins

12.25 – K.D. Ridge (USA): G-protein coupled receptor/bacteriorhodopsin chimera: Grafting the amino-terminal and extracellular loop segments of CCR5 onto the transmembrane helices of bacteriorhodopsin

12.50 – 13.20 Closing remarks – J.K. Lanyi (USA)

13.20 – Lunch, departure