

# **EMBO Workshop on Molecular Biology of Retinal Proteins**

Schloß Ringberg, Rottach-Egern,  
September 10-14, 1984



Sponsored by:

European Molecular Biology Organization  
Max-Planck-Society

Max-Planck-Institute for Biochemistry ·  
Martinsried / München · FRG

**Sunday evening:**

20.00 Welcome party  
 Welcome address on behalf of the Max Planck Society  
 by vice-president B. Hess

**Monday morning: (Overviews) Chairman: D. Oesterhelt**

8.30 - 8.45 Introduction B. Hess

8.45 - 9.15 Rhodopsin, Transducin, and the Cyclic GMP Phosphodiesterase L. Stryer

9.25 - 9.55 Bacteriorhodopsin W. Stoeckenius

10.05 - 10.35 Halorhodopsin -- An Overview J. Lanyi

10.45 - 11.00 Coffee break

11.00 - 11.30 Halobacterium halobium Motility J. Spudich

11.40 - 12.10 Structure of Retinal Proteins Y. Ovchinnikov

12.20 - 12.50 Molecular Genetics of Halobacteria W. Goebel

**Monday afternoon: Chairman: L. Stryer**

14.30 - 15.30 Poster viewing

15.30 - 16.00 Poster discussion, group I

16.00 - 16.30 Functions and Functional Domains of Visual Rhodopsin H. Kühn

16.40 - 17.10 Does Visual Rhodopsin Function Like an Hormone Receptor? M. Chabre

17.20 - 17.50 The Photoreceptor-membrane Retinal Oxidoreductase: No Regulatory Factor in the Rod Excitation Mechanism W. de Grip

18.00 - 18.30 The Isolated Blowfly Rhabdom: A Model System for Examining the Biochemical Basis of Phototransduction in Invertebrates R. Paulsen

18.40 - 18.55 Recent Bioorganic Studies with Rhodopsin and Bacteriorhodopsin. I. F. Derguini

20.30 - ? Special topics

**Tuesday morning: Chairman: W. Goebel**

8.30 - 9.00 Oligonucleotide-directed Mutation Construction in DNA Cloned in Filamentous Phage H. Fritz

9.10 - 9.40 Genetic Control of Bacterio-opsin in Halobacterium halobium M. Betlach

9.50 - 10.20 Genome Organization of Halobacterium halobium - A 70 KB Island of more (A+T) Rich DNA in the Chromosome F. Pfeiffer

10.30 - 11.00 Coffee break

11.00 - 11.30 Genes involved in Colour Vision J. Nathans

11.40 - 12.10 Isolation of an Halobacterial DNA Fragment Containing an Antigenic Determinant for Halo-opsin H. Vogelsang

**Tuesday afternoon: Chairman: V. Skulachev**

14.30 - 15.30 Poster viewing

15.30 - 16.00 Poster discussion, group II

16.00 - 16.30 Halobacterium halobium Photophosphorylation: Bioenergetic Characterization of Retinyl Protein Mutant Strains S. Helgerson

16.40 - 17.10 The ATP Synthesis System in Halobacteria Y. Mukohata

17.20 - 17.50 Quantum Yield of Photophosphorylation in Halobacterium halobium Reveals Photochromism and Synergism of Photoenergetic Retinal Proteins G. Wagner

18.00 - 18.30 The Photochemical Cycle of Bacteriorhodopsin as an Indicator of Membrane Potential. Estimations for the Kinetics of the Rise and the Decay of  $\Delta\psi$  in H. halobium cells and cell envelope vesicles Z. Dancshazy

18.40 - 18.50 Calculation of the Electric Potential and the Ion Concentration Distribution due to Charge Separation in a Closed Membrane Vesicle L. Zimányi

18.50 - 19.00 Photoelectric Response of Bacteriorhodopsin K. Fendler

20.30 - ? Special topics

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	<b>Wednesday morning:</b>	<b>Chairman:</b>	<b>R. Henderson</b>	16.00 - 16.30	Structural Analysis of Bacteriorhodopsin and M <sub>412</sub>	R. Henderson
8.30 - 9.00	Theoretical Investigations Towards the Molecular Mechanism of the Retinal Proteins in Halobacterium halobium		K. Schulten	16.40 - 17.10	Microvillar Structure and the Cyclic GMP Enzyme Cascade in Squid Photoreceptors	H. Saibil
9.10 - 9.40	Recent Bioorganic Studies with Rhodopsin and Bacteriorhodopsin. II.		V. Balogh-Nair	17.20 - 17.35	Two crystal forms of bacteriorhodopsin	T. Ceska
9.50 - 10.20	Preparation and MASS <sup>13</sup> C Solid State NMR Spectroscopy of <sup>13</sup> C Labeled Bacteriorhodopsins		J. Lugtenburg	17.40 - 17.55	Location of Retinal in Bacteriorhodopsin Determined by Neutron Diffraction	N. Dencher
10.30 - 11.00	Coffee break			18.00 - 18.15	Structural Basis of H <sup>+</sup> -Transfer in Bacteriorhodopsin	D. Kuschmitz
11.00 - 11.30	Specific Requirement of Cations for the Photo-cycle of Bacteriorhodopsin		K. Kohl	20.30 - ?	Special topics	
11.40 - 12.50	Factors that Determine the Protonation State of Ionizable Amino Acids		B. Honig		-----	
13.00	Bus departure (basket lunch will be taken along) Sight seeing tour				<b>Friday morning:</b>	<b>Chairman:</b> <b>T. Yoshizawa</b>
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	<b>Thursday morning</b>	<b>Chairman:</b>	<b>J. Lanyi</b>	9.10 - 9.25	Determination of Retinal Chromophore Structure in Bacteriorhodopsin and Halorhodopsin with Resonance Raman Spectroscopy	S. Smith
8.30 - 9.00	Chloride-binding Sites in Halorhodopsin		B. Schober	9.30 - 9.40	The Role Charges Play in the Function of Bacteriorhodopsin and Visual Pigments	M. Sheves
9.10 - 9.40	Properties and Regulation of the Halorhodopsin Photocycle		P. Hegemann	9.50 - 10.20	BR-K, -L and -M Infrared Difference Spectra of Bacteriorhodopsin Containing Fully Deuterated Tyrosines	F. Siebert
9.50 - 10.20	Is HR <sub>578</sub> the Chloride Pump?		R. Bogomolni	10.30 - 11.00	Coffee break	
10.30 - 11.00	Coffee break			11.00 - 11.30	Energy Conversion in the Bacteriorhodopsin Photocycle: pH Dependence	M. Renard
11.00 - 11.30	A Mechanism of Light-driven Cl <sup>-</sup> Pump by Halorhodopsin		T. Yoshizawa	11.40 - 12.10	Correlation of Optical, pH and Electric Effects in the Photocycle	V. Skulachev
11.40 - 12.10	Electrical Properties of Light-driven Ion Pumps		E. Bamberg	12.20 - 12.50	Inhibition of Bacteriorhodopsin by 4 $\mu$ H <sub>2</sub> : Implications for the Pumping Mechanism and for the control of Energy Metabolism	H. Westerhoff
12.20 - 12.35	A Model for the Ion Translocation in Halorhodopsin by trans-cis Isomerization of its Retinal Moiety		D. Oesterhelt		<b>Friday afternoon:</b>	
	<b>Thursday afternoon:</b>	<b>Chairman:</b>	<b>Y. Ovchinnikov</b>	13.00	Bus departure (basket lunch will be taken along) Sightseeing tour	
14.30 - 15.30	Poster viewing			20.00	Farewell dinner	
15.30 - 16.00	Poster discussion, group III				<b>Saturday morning:</b>	
					Departure after breakfast	