PHOTOMOVEMENTS IN MICROORGANISMS

F . Lenci, N. Angelini, G. Checcucci, F. Ghetti, D. Gioffre, A. Sgarbossa
Istituto Biofisica, Consiglio Nazionale Ricerche (C.N.R.), Via S. Lorenzo, Pisa, Italy

Photic stimuli are perceived and transduced by freely motile microorganisms to escape harmful illumination conditions and gather in favorable ones. This goal can be achieved by means of actively oriented movement with respect to the light source and/or through a series of biased random directional changes elicited by sharp temporal and/or spatial gradients. The light signal is perceived by specialized photosensors, which undergo molecular reactions able to transform the information associated with the photon into a biophysical/biochemical signal that the cell can elaborate to finally alter its motile behavior. In this lecture special attention will be devoted to the photobehavioural responses and to the molecular basis of the photosensing/phototransducing mechanisms in ciliates like *Stentor coeruleus*, *Blepharisma japonicum* and *Fabrea salina*. Photoreceptor pigments of *Stentor coeruleus* and *Blepharisma japonicum*, stentorin and blepharismin respectively, have been shown, by action spectroscopy, to be based on hypericin-type chromophores. In these ciliates, a proton release or an electron transfer from the chromophore could play a role in the primary events which trigger the photosensory transduction chain. In the case of *Fabrea salina*, at the moment, it seems plausible to suggest that two different pigments, one using a hypericin-type chromophore and the other one using a retinal-type chromophore, mediate the photomotile responses of this microorganism.