IN SEARCH FOR DIVERSITY OF BIO-PHOTOSENSOR MOLECULES ---- ACTION SPECTROSCOPY AT THE OKAZAKI LARGE SPECTROGRAPH

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The Okazaki Large Spectrograph (OLS) at the National Institute for Basic Biology (NIBB) is the world's largest polychromator dedicated mainly to biological action spectroscopy and has been actively used for 15 years by many scientists of various fields and various countries under the NIBB cooperative research projects to use the OLS (refs. 1-3).

Such action spectroscopy, combined with the immense bio-diversity in the algal groups, for example, provides scientists with a vast possibility to discover unknown bio-photosensor molecules and to understand the evolution of such molecules with respect to the phylogeny of these organisms (ref. 3). Some examples of such approach will also be presented for algal blue- (ref. 4), green-(ref. 5), and yellow- (ref. 6) light sensor systems.

References

- 1. Watanabe, M., Furuya, M., Miyoshi, Y., Inoue, Y., Iwahashi, I. and Matsumoto, K. (1982). Design and performance of the Okazaki Large Spectrograph for photobiological research. *Photochem. Photobiol.* 36, 491-498.
- 2. Watanabe, M. (1991). High-fluence rate monochromatic light sources, computerized analysis of cell movements, and microbeam irradiation of a moving cell current experimental methodology at the Okazaki Large Spectrograph. In "Biophysics of Photoreceptors and Photomovements of Microorganisms," (NATO Advanced Study Institute. September 2-14, 1990, Tirrenia, Italy), (Edited by G. Colombetti, F. Lenci, D.-P. Haeder, and P.-S. Song), pp. 327-337. Plenum Publishing Corp., New York
- 3. Watanabe, M. (1995). Action spectroscopy: Photomovement and photomorphogenesis spectra. In "CRC Handbook of Organic Photochemistry and Photobiology". (Edited by B. Horspool and P.-S. Song). pp. 1260-1272. CRC Press. Boca Raton.
- 4. Kawai, H., Kubota, M., Kondo, T. and Watanabe, M. (1991), Action spectra for phototaxis in zoospores of the brown alga *Pseudochorda gracilis*. *Protoplasma* 161, 17-22.
- 5. Takahashi, T., Yoshihara, K., Watanabe, M., Kubota, M., Johnson, R., Derguini, F. and Nakanishi, K. (1991). Photoisomerization of retinal at 13-ene is important for phototaxis of *Chlamydomonas reinhardtii*: simultaneous measurements of phototactic and photophobic responses. *Biochem. Biophys. Res. Commun.* 178, 1273-1279.
- 6. Erata, M., Kubota, M., Takahashi, T., Inouye, I. and Watanabe, M. (1995) Ultrastructure and phototactic action spectra of two genera of cryptophyte flagellate algae, *Cryptomonas* and *Choroomonas*. *Protoplasma*, in press.