

Further Characterisation of a Light-stimulated, cGMP-dependent Mg-ATPase in Photoreceptor Disk Membranes

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A few years ago we have reported that disk membranes of vertebrate photoreceptor rod outer segments (ROS) contain a specific Mg-ATPase system (1,2). This enzyme is transiently activated in the dark when ROS membranes are incubated with Mg^{2+} ions and ATP, and it enables the photoreceptor to respond to flash-illumination by means of a rapid structural response not seen without previous ATPase activity. Both the enabling process and the subsequent light response can be readily monitored as large light scattering increments called " A_D " and " A_L ".

A detailed study of the light scattering signals " A_D " and " A_L " has revealed a number of properties of the Mg-ATPase, which will be discussed in the poster. The three most important findings are listed below:

- 1.) Very freshly prepared intact frog ROS yield a light response " A_L " without previous addition of extraneous ATP, suggesting that the underlying process also occurs in vivo.
- 2.) Following flash-illumination the enzyme becomes transiently activated again, with a half-time of 1200 ms at 20°C.
- 3.) The light-stimulated resumption of ATPase activity is regulated by levels of cGMP in the physiological range, i.e. between 10 and 100 μ M.

It is suggested that the disk membrane Mg-ATPase may be an important part of the photoreceptor machinery, its precise role in the process of visual transduction, however, remains to be determined.

(1) R. Uhl, T. Borys, E.W. Abrahamson, *Biophys. J.* 21, 136a, 1978

(2) R. Uhl, T. Borys, E.W. Abrahamson, *FEBS Let.* 107, 317, 1979