

Rhodopsin palmitylation and removal by hydroxylamine

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Sensory proteins are very important to cellular systems from bacteria to humans. G-protein coupled receptors are a common family of sensory proteins used to detect environmental changes in all studied terrestrial and marine organisms. Rhodopsin, the visual pigment of rod photoreceptors, is the prototypical G-protein coupled receptor; it is the only protein in this family with its crystal structure resolved. In humans, rhodopsins and rhodopsin like proteins, are implicated in diseases such as diabetes, AIDS, cancer, age related macular degeneration as well as many others. Common structural features in these g-protein coupled receptors are its seven transmembrane spanning regions as well as post-translational modifications. Each structural feature of rhodopsin is thought to provide its own unique attribute to the protein. Post-translational modifications on rhodopsin and most other G coupled protein receptors are glycosidation, phosphorylation and palmitylation. Palmitylation is the focus of this study. Hydroxylamine (NH₂OH) removes palmitate modifications from rhodopsin in an unknown fashion, here native palmitylation and removal by hydroxylamine are analyzed. Molar ratios (palmitylation per rhodopsin) are used to compare rhodopsins in different retinal locations and conditions. Observations of bovine rhodopsin from outer and inner retinal segments, and treatments with hydroxylamine are analyzed.

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