

Sensory Systems Basics and Principles I

Lecture: Photoreceptors and Phototransduction, Retinal Pigment Epithelium & Visual Cycle

1. What are the main differences between rhabdomic and ciliary photoreceptors ?
Give examples of species that have either rhabdomic and ciliary photoreceptors.
2. The photopigment. Which statement(s) are correct:
 - the photopigment consists of the apo-protein (opsin) and the chromophore 11-cis-retinal
 - 11-cis-Retinal is covalently bound to the opsin moiety through a Schiff's Base bond
 - the photopigment belongs to the family of G-protein coupled receptors
 - photopigments have absorption maxima that range between UV and red light
3. List the principle types of opsins in the primate retina
4. Rhodopsin: Which statements are wrong:
 - Rhodopsin localizes to the discs of the outer segment of rods
 - The functional unit of rhodopsin is a Hetero-Tetramer
 - Rhodopsin represents the most abundant protein of a rod photoreceptor
 - the Rhodopsin molecule is a membrane protein with 7 transmembrane helices
5. Explain the term dark current
6. Describe the basic principle of photoisomerization
7. List the main steps and components in vertebrate phototransduction
8. Calcium plays an important role as a feedback regulator of the phototransduction.
What are the targets of this feedback regulation ?
9. Describe the differences in the phototransduction process between rhabdomic and ciliary photoreceptors .
10. How is 11-cis-retinal recycled in the vertebrate retina ?