

3. HISTOGENESIS AND SPECIFIC MORPHOLOGICAL ASPECTS OF THE PHOTORECEPTORS



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Introduction. People rely on visual cues to navigate the world around them. Vision begins with the detection of light by photoreceptors of the retina - the light sensitive cells of the eye. Photoreceptor types are defined by morphology, gene expression, light sensitivity and function.

Aim of study. The goal of this study was to elucidate the regulatory mechanisms of the process of retina histogenesis while highlighting the distinctive morphological attributes of photoreceptors that contribute to their optimal functionality.

Methods and materials. A bibliographic study of scientific literature specialized at histogenesis and morphological analysis of photoreceptors.

Results. In concordance to the total human photoreceptor population, the rod photoreceptors outnumber cones by 20:1 with average estimated cell numbers of 92 million rods and 4,6 million cones in the adult human retina. This striking difference reflects the visual specialization of these cell types. Rods are extremely sensitive to light, with the ability to produce a response to a single photon of light. On the other hand, cone photoreceptors are adapted for greater spatial resolution and visual acuity. Their shorter outer segments contain continuous open discs formed by invaginations of the ciliary plasma membrane. In addition, the cones do not become saturated at higher light levels and have a more linear circuitry, especially for central vision, where a one-to-one relationship is observed from ganglion cells to bipolar cells to cone cells.

Conclusion. This study reveals a complex network of regulatory mechanisms that are required during retinal development to ensure the correct spatial distribution and optimal function of photoreceptors.