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Commentary

Mechanism of Tear Electrolytes Concentration in Tear Formation on Ocular Surface

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DESCRIPTION

To maintain the integrity of the ocular surface and achieve good vision, tears as an extracellular fluid are crucial. The pre cornea tear film is a 3-layer substructure of the tear film that covers the ocular surface. The outermost lipid layer reduces friction during eye blinking, delays tear evaporation, and inhibits tear overflow. Around 90% of the volume of the tear film is made up of an aqueous middle layer, which has the ability to expand further in response to any type of ocular irritation. The aqueous component, in addition to serving as a lavage, is an immunologically-competent medium that combats pathogenic bacteria and neutralizes poisons with its variety of immuno-modulators. The aqueous component is evenly distributed over the ocular surface to the innermost mucin layer. A pre corneal tear coating that is evenly distributed maximizes the efficiency of light refraction over the ocular surface. The air-pre cornea tear film interphase is where the eye's optical system achieves at least 70% of its total light refraction. Without it, the eye will have a high degree of hypermetropia and be substantially underpowered. Tear secretion is controlled by the Lacrimal Functional Unit (LFU), an integrated system made up of the lacrimal glands, ocular surface, and lids, as well as the sensory and motor neurons that link them. Water, electrolytes, proteins, carbohydrates, lipids, and a complex mixture of the aforementioned macromolecules are all present in tear fluid. Tears are primarily produced by the multilobular lachrymal gland, which is made up of acinar, ductal, and myoepithelial cells. The generation of primary tears is carried out by the acinar cells, which are the most common cell type. By absorbing or secreting water and electrolytes as it travels down the lachrymal duct to the outflow orifices, the ductal cells change the main tear. Ductal cells thus control the final electrolyte content in tears. The generation of primary tears is carried out by the acinar cells, which are the most common cell type. By absorbing or secreting water and electrolytes as it travels down the lachrymal duct to the outflow orifices, the ductal cells change the main tear. Ductal cells thus control the final electrolyte content in tears. Sodium, potassium, calcium, and magnesium, along with the corresponding anions chloride and bicarbonate, are the main electrolytes present in tears. Because of the considerable alteration by the lachrymal cells, a tear is not always an ultra-filtrate of blood. According to studies, tears contain higher potassium and chloride concentrations than serum, although their protein and sugar content, like that of other extracellular fluids, is lower than that of blood. Electrolytes, which are crucial elements of tear fluid, stabilize the tear film, and help to maintain the thickness of the corneal epithelium. For the best ocular comfort, the bicarbonate ion buffers tear to maintain the pH within physiologic limits. The quantity of solutes in one litre or kilogram of tears is known as tear osmolality. Because they are present in tears in far larger concentrations than other dissolved macromolecules like proteins and carbohydrates, electrolytes effectively govern the osmolality of tears. Tear osmolality affects tear film stability. Because of this, abnormal tear osmolality causes unstable tear films and predisposes to Dry Eye Disease (DES), one of the most prevalent ocular disorders affecting up to 5%–50% of the world's population. It has been demonstrated that potassium ions are crucial for maintaining corneal epithelial thickness. The main cells that absorb UVB light, or ultraviolet light with a wavelength between 290 nm and 315 nm, are corneal epithelial cells. Solar radiation's UVB component has been implicated in the etiopathogenesis of a variety of ocular disorders affecting both the front and posterior portions of the eye. Pterigium, pingueculum, climatic droplet keratopathy, Ocular Surface Squamous Neoplasia (OSSN), cataract, and glaucoma can all develop due to direct retinal ganglion cell poisoning as well as harm to the trabecular meshwork.

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