Dry-Eye Formulation

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Technology description

The sensation of ocular discomfort commonly referred to as “dry eye” can be caused by various factors. The principal causative factors are (a) increased tear-evaporation rates attributable to meibomian gland dysfunction and insufficient/unbalanced tear-lipid films; (b) inadequate tear-aqueous production attributable to aging, medical procedures performed on the cornea (e.g., LASIK), or other general health conditions (e.g., autoimmune diseases); (c) environmental irritants (e.g., dust, smoke, wind, sun, or low humidity); and (d) eye strain attributable to extended viewing of computer monitors or other working environment-related factors. There are many different artificial-eye drops marketed and prescribed or recommended by medical practitioners to decrease dry-eye sensations. Unfortunately, all provide only short-term or no effects at all on tear-film stability and evaporation rates. Moreover, many artificial-tear formulations contain petrochemicals, (e.g., mineral oil) which have nothing in common with natural lipids comprising human tear-lipid films and might be potentially harmful to the eye.
Researchers at UC Berkeley have developed bicontinuous microemulsion formulations capable of delivering the components necessary to counteract compromised stability of tear-lipid layers and thus enhance the stability of entire tear films. These bicontinuous microemulsion components disperse spontaneously into a physical state that makes the microemulsion completely miscible with both human tear aqueous and human tear lipids. The components of these microemulsions are chemically identical or very close to natural tear lipids and tear aqueous and thus are completely biocompatible with human tear films. The lipids used in this formulation are biodegradable, and human tear enzymes will be able to metabolize these bicontinuous microemulsion lipids.

Application area

Eye drops for dry eyes

Advantages

Uses natural components chemically identical to the ingredients found in human tear lipids and tear aqueous
Provides durable, non-medicated treatment of ocular dryness
Reduces the rate of tear-evaporation

Alleviates the cause of ocular dryness
Improves contact-lens-wear safety and comfort

Institution

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