



Protein-to-Lipid Ratio of Meibum as a Metric for Meibomian Gland Dysfunction

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Abstract

Dry eye disease is a condition caused by inadequate moisture levels in the eye that may result from one of two prevalent situations: reduced tear production, or imbalance in tear composition. The imbalance specific to deficiencies in the fatty, outer layer of the tear film is known as meibomian gland dysfunction. Meibomian glands secrete an oily substance, meibum, which slows the evaporation of the aqueous layer of the tear film. It is believed that the chemical composition of the meibum is directly related to its ability to keep the eye at healthy moisture. In analyzing the composition of meibum samples through stimulated Raman scattering (SRS) microscopy, we aim to determine the protein-to-lipid ratio and use it as a metric for classifying the health of the meibum. We predict that samples with higher protein-to-lipid ratios will represent those with higher grades of meibomian gland dysfunction.

Keywords

tear film; meibomian gland dysfunction; meibum; stimulated Raman scattering



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ABSTRACT

Dry eye disease is a condition caused by inadequate moisture levels in the eye that may result from one of two prevalent situations: reduced tear production, or imbalance in tear composition. The imbalance specific to deficiencies in the fatty, outer layer of the tear film is known as meibomian gland dysfunction. Meibomian glands secrete an oily substance, meibum, which slows the evaporation of the aqueous layer of the tear film. It is believed that the chemical composition of the meibum is directly related to its ability to keep the eye at healthy moisture. In analyzing the composition of meibum samples through stimulated Raman scattering (SRS) microscopy, we aim to determine the protein-to-lipid ratio and use it as a metric for classifying the health of the meibum. We predict that samples with higher protein-to-lipid ratios will represent those with higher grades of meibomian gland dysfunction.

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