Antimicrobial role of human meibomian lipids at the ocular surface.
Mudgil P1.

Abstract
PURPOSE: Human meibomian lipids form the outermost lipid layer of the tear film and serve many important functions to maintain its integrity. Although not investigated earlier, these lipids may have antimicrobial properties that help in strengthening the innate host defense of tears at the ocular surface. The aim of this study was to investigate the antimicrobial role of human meibomian lipids.

METHODS: Ocular pathogenic bacteria, Staphylococcus aureus 31, Pseudomonas aeruginosa 19, Pseudomonas aeruginosa 20, and Serratia marcescens 35, were grown in the presence and absence of human meibomian lipids in an artificial tear solution at the physiological temperature. Viable counts were obtained to note the number of bacteria surviving the treatment with meibomian lipids. Bacterial cells were imaged using scanning electron microscopy to observe the damages caused by meibomian lipids.

RESULTS: Viable count results showed that in the presence of meibomian lipids, growth of all bacteria was considerably lower. Scanning electron microscopy showed that meibomian lipids caused extensive cellular damage to bacteria as manifested in smaller size, loss of aggregation, abnormal phenotype, cellular distortion, damaged cell wall, and cell lysis.

CONCLUSIONS: This is the first-ever report of the antimicrobial role of human meibomian lipids. These lipids possess antimicrobial properties against both Gram-positive and Gram-negative bacteria and are involved in the innate host defense of tears in protecting the ocular surface against microbial pathogens.

Copyright 2014 The Association for Research in Vision and Ophthalmology, Inc.

KEYWORDS: Pseudomonas; Serratia; Staphylococcus; antimicrobial; electron microscopy; host defense; meibomian lipids

PMID: 25316725 [PubMed - indexed for MEDLINE]