

Identity of Proteins Extracted from Worn Silicone Hydrogel Contact Lenses

Z. Zhao^{1,2}, N. A. Carnt¹, Y. Aliwarga¹, X. Wei¹, M. D.P. Willcox^{1,2}

¹*Biological Science, Institute for Eye Research, UNSW Sydney, NSW, Australia*

²*The School of Optometry and Vision Science, University of New South Wales, Kensington, NSW, Australia*

Purpose

To identify the proteins deposited on silicon hydrogel contact lenses during wear and analyze the effect of lens materials and multipurpose disinfecting solutions on protein deposition.

Methods

Four contact lenses Lotrafilcon B (CIBA Vision), Balafilcon A (Bausch & Lomb), Galyfilcon A (Johnson & Johnson Vision Care, J&J) and Senofilcon A (J&J) and four disinfecting solutions ClearCare (CIBA Vision), Opti-Free Express (Alcon), Opti-Free RepleniSH (Alcon), and AQUify (CIBA Vision) were used. Worn contact lenses (daily wear, 1 month) were collected from subjects and the protein deposits on the lenses were extracted using a buffer containing 4 M urea and 0.1% SDS. After desalting and concentrating, the samples were digested with trypsin and analyzed by liquid chromatography-mass spectrometry (LC-MS). Peak lists were generated by MassLynx (version 4.0 SP1, Micromass) using the Mass Measure program and submitted to the database search program Mascot. Protein identification was based on matches of detected peptides to reference peptides in NCBI database. Ions scores > 50 indicated identity or extensive homology (P < 0.05).

Proceedings of The Joint 2nd Pacific Rim International
Conference on Protein Science and 4th Asian-Oceania
Human Proteome Organization, Cairns- Australia, 22-26
June 2008

Results

A total of 68 different proteins were identified from the samples. The deposit from Acuvue Oasys with AQUify had the highest number of protein species (31) while the samples from O2 Optix with ClearCare and Acuvue Advance with Opti-Free Express had the lowest number (4). The most frequently detected proteins were lysozyme (15 kDa), lipocalin (19 kDa) and proline rich protein 4 (15 kDa). Three other abundant tear proteins, lactoferrin (69 kDa), IgA (50 kDa) and albumin (69 kDa), were detected in a lower frequency. Immunoglobulin family of proteins were frequently extracted from worn Acuvue Oasys lenses. Keratin was also frequently extracted, probably due to continued touching of lenses by hands during insertion and removal.

Conclusions

Contact lenses absorb/adsorb proteins from tear film and other sources during wear.

Proceedings of The Joint 2nd Pacific Rim International
Conference on Protein Science and 4th Asian-Oceania
Human Proteome Organization, Cairns- Australia, 22-26
June 2008