

New study finds resistant organisms at core of soft contact lens corneal infections

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In 2006, Bausch & Lomb withdrew its ReNu with MoistureLoc contact lens solution because a high proportion of corneal infections were associated with it. Now in a new study from University Hospitals Case Medical Center, researchers show that these infections were fueled and made resistant to treatment by the formation of a highly resistant structure of microbial cells held together with a glue-like matrix material. Scientists call this conglomeration of cells biofilms.

“Once they live in that type of state, the cells become resistant to lens solutions and immune to the body’s own defense system,” said Mahmoud A. Ghannoum, Ph.D., director of the Center for Medical Mycology at University Hospitals Case Medical Center and senior investigator of the study which appears in the January 2008 issue of the journal *Antimicrobial Agents and Chemotherapy*. “This study should alert contact lens wearers to the importance of proper care for contact lenses to protect against potentially virulent eye infections,” he said.

“Biofilms are a constellation of resistant organisms,” Dr. Ghannoum said. They were suspected with the spate of infections in 2005-2006, but until this study, there were no data to prove this. This is the first in-vitro model for cornea keratitis infections caused by the fungus *Fusarium*, which was one of the main culprits in the ReNu with Moisture Loc cases, and another fungus called *Candida albicans*.

The researchers also discovered that the strain of fungus (ATCC 36031) used for testing the effectiveness of lens care solutions is a strain that

does not produce biofilms as the clinical fungal strains do. Lens care solutions currently are tested against an old and rare genotype fungal strain obtained in the 1970s from a patient from Nigeria. The contact lens solutions, therefore, are effective in the laboratory, but fail when faced with strains in real-world situations. “The multipurpose contact lens solutions cannot kill these germs, to put it simply,” said Dr. Ghannoum.

“We recommend that solutions be tested for biofilms produced by more recent clinical isolates,” said Dr. Ghannoum. “One of the underlying reasons for ReNu with MoistureLoc not being effective against the outbreak of keratitis is that the solution is not effective against biofilms and the organisms contained in biofilms.”

The researchers tested six kinds of contact lenses made by three different manufacturers and two lens care solutions (Bausch & Lomb’s MoistureLoc and MultiPlus) against three fungal strains (two recent clinical strains and the one from the 1970s) of *Fusarium* and one strain of *C. albicans*.

Since biofilm contamination of contact lens cases is a common finding, and ReNu with MoistureLoc is ineffective against fungal biofilm, the industry must ensure that their multipurpose solutions are effective against biofilms, said Dr. Ghannoum. In the meantime, extreme caution must be taken to ensure the contact lens care case is not contaminated with biofilm.

Dr. Ghannoum recommends that soft contact lens wearers use only fresh lens care solution, not add fresh solution to old solution, a phenomenon known as topping off, and use solution by expiration dates written on the package. He also recommends a rub and rinse method, regardless of which cleaning or disinfecting solution used (which also is recommended by the Centers for Disease Control and Prevention). An additional

preventative measure to prohibit the development of biofilms is to ensure that the bottle caps and tips of multipurpose solutions are clean.

Source: University Hospitals of Cleveland

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