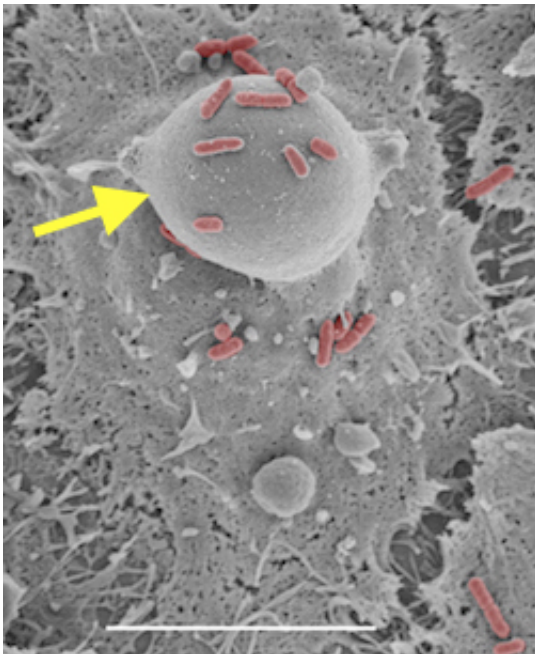


Research shows new mechanism that can cause eye inflammation

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Credit: American Society for Microbiology

Research presented at the ASM Microbe research meeting demonstrates a new way bacteria can cause dramatic morphological changes in human cells. Specifically, the researchers discovered that a common bacterial contaminant of contact lenses and cases can cause the formation of large bubble-like membrane structures on human ocular cells, which can contribute to contact lens wear complications and inflammation.

Eye infections caused by bacteria are a common and costly vision-threatening problem in the United States and abroad. Contact lens use is a major risk factor for contracting microbial keratitis, yet the reasons for this increased risk are not well understood. The scientific mechanism uncovered by this study could establish the foundation for more effective treatments, which are especially important to find given the rise of [antibiotic resistant bacteria](#) in the clinic and community

"Use of contacts lenses is so prevalent, yet until now, we've had limited understanding of how bacteria, associated with contacts lenses and cases, damage cells on the surface of the eye. Our study paves the way for new therapies that alleviate inflammation associated with these often serious [eye infections](#)," said Robert Shanks, PhD, Associate Professor, Charles T. Campbell Laboratory of Ophthalmic Microbiology, Department of Ophthalmology, UPMC Eye Center, University of Pittsburgh.

The researchers observed bacteria including *Proteus mirabilis* and *Serratia marcescens* that cause [eye](#) and other infections, induce major morphological changes in the surface of epithelial and other cell types. "These changes look like large membrane bubbles on the human cell surface, noted here as blebs," said Shanks. Cells that experience the blebs do not survive.

The researchers used molecular genetics to determine the bacterial genes necessary to cause these blebs. They found that a regulatory protein that they are calling GumB and a secreted protein called ShlA are responsible for bleb formation, and ShlA is sufficient to induce bleb formation. ShlA-like proteins are found in a wide range of pathogenic [bacteria](#). Blocking GumB and/or ShlA function may be an effective tool in preventing infection associated inflammation and tissue damage.

Provided by American Society for Microbiology

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