Keep an eye on us! – Bacteria on slit lamps

Furtwangen University publishes the world's first molecular biological study on bacterial contamination of slit lamps. Slit lamps are among the most important tools used by ophthalmologists and opticians. They allow selected areas of the eye to be magnified and examined for diseases.

During examinations, the patient and doctor sit directly opposite one another and both have intensive skin contact with the device. "It therefore stands to reason that slit lamps become contaminated with microorganisms such as bacteria during use," explains Professor Dr Markus Egert, who lectures in microbiology and hygiene at Furtwangen University. These germs pose a potential risk of infection.

Previous studies do suggest that contamination of slit lamp surfaces with typical skin bacteria, such as staphylococci takes place. However, all previous studies have relied on culturing microorganisms. "Unfortunately, such studies always capture only a fraction of the microflora actually present, since not all germs can be cultured on the typical culture media. We therefore resorted to the state-of-the-art molecular biology methods that we have already implemented on similar surfaces such as eyeglasses and microscope eyepieces," explains Chief Investigator Professor Egert.

As part of the study, 91 swab samples from 46 slit lamps in two university eye clinics were analysed using high-throughput sequencing of bacterial genes. Analysable data were provided by 82 samples which showed a total of 3369 different species of bacteria. These were predominantly skin bacteria such as cutibacteria, corynebacteria and the already frequently detected staphylococci. Although the influence of certain parameters such as patient throughput at the device, or length of cleaning interval was suspected, no factors which would have a controlling influence on the diversity of bacteria identified could be discovered. However, this may have been due to the strict hygiene measures, such as the wearing of oral-nasal masks, in place during the current Corona pandemic.

"Many of the bacterial genera detected include species that have pathogenic potential which can lead to eye and skin diseases, especially in those susceptible to infection. Our study therefore underscores the importance of being vigilant for contamination and regularly disinfecting slit lamps," notes Egert. The fact that the bacterial communities found on both the doctor's and the patient's sides of the lamps were often similar also suggests that bacteria can switch sides and that patients and doctors are equally at risk.

One important final finding: the dreaded antibiotic-resistant Stapylococcus areus bacteria (MRSA) could not be detected on any of the 46 lamps examined. "This is very good news for patients and doctors alike," Egert concludes. Future studies should target additional viruses, such as adenoviruses, which, along with bacteria, are among the main triggers of infectious eye diseases.

The new study was conducted by a team of researchers from Furtwangen University, the University of Tübingen and Carl Zeiss Vision International GmbH, Aalen, and was funded by the German Ministry of Education and Research as part of the CoHMed - Connected Health in Medical Mountains project at Furtwangen University (Grant number: 13FH5I02IA). It is published in the open access journal Frontiers in Cellular and Infection Microbiology under the title "Comprehensive Compositional Analysis of the Slit Lamp Bacteriota"; https://doi.org/10.3389/fcimb.2021.745653

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Further information

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