Bacterial resistance is futile against wound-cleaning laser

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A laser-activated antimicrobial offers hope for new treatments of bacterial infections, even those that are resistant to current drugs. Research published today in the open access journal *BMC Microbiology* describes the use of a dye, indocyanine green, which produces bacteria-killing chemicals when lit by a specific kind of laser light.

Michael Wilson led a team from UCL (University College London) who carried out experiments showing that activated indocyanine green is capable of killing a wide range of bacteria including Staphylococcus aureus, Streptococcus pyogenes and Pseudomonas aeruginosa. The dye is safe for humans. The strength of this new approach lies in the variety of ways in which the chemicals produced by the activated dye harm bacteria.

As Wilson explains, this means that resistance is unlikely to develop, "The mechanism of killing is non-specific, with reactive oxygen species causing damage to many bacterial components, so resistance is unlikely to develop - even from repeated use". Michael Wilson's co-authors on the study include Ghada Omar and Sean Nair of the Division of Microbial Diseases, UCL Eastman Dental Institute.

The increasing occurrence of bacterial resistance is a well-known problem facing modern medicine. The laser-powered treatment described in the study will be useful in the treatment of infections that occur in wounds. According to Wilson "Infected wounds are responsible for significant morbidity and mortality, and an increase in the duration

and the cost of hospital stay. The growing resistance to conventional antibiotics among organisms that infect wounds and burns makes such infections difficult to treat. The technique we are exploring is driven by the need to develop novel strategies to which pathogens will not easily develop resistance."

The laser used by the researchers emits 'near-infrared' light, which is known to be capable of producing heat. However, as Wilson describes, "Substantial killing of all of the bacteria tested was achieved without causing any temperature rise. The benefit of the laser described in this study is that it produces light that is more able to penetrate deep wounds, increasing the area cleansed".

Source: BioMed Central