University researchers joining forces with British biotech business to tackle global threat of antibiotic resistance

By Matoke Holdings Ltd, September 22 2016

PhD student Thomas Hall, Professor Liam Grover and Dr Sophie Cox

A new spray device to fight superbugs is being developed by researchers at the University of Birmingham.

Professor Liam Grover and Dr Sophie Cox, both biomaterials experts, are leading a team in the School of Chemical Engineering which is collaborating with Matoke Holdings Ltd, inventors of Reactive Oxygen® technology, to develop innovative antimicrobial products.

The team is investigating a number of different formulations to deliver the active compound, including sprays.

Reactive Oxygen® is a novel solution for controlling bacteria growth – both preventing and treating infection - that has already reached early clinical use. It has huge potential in the fight against drug-resistant infections.

Reactive oxygen species (ROS) occur naturally in the body as a host defence against infection and has multiple roles - killing invading microbes, messaging repair cells and stimulating new tissue growth.

Surgihoney RO™, an engineered honey, is the first ROS product invented by Matoke Holdings. Excitingly, it shows great promise as an effective treatment for infected and long-term or chronic wounds, such as leg ulcers, which can leave patients housebound and in some cases, lead to amputations (3).

Surgihoney RO™ is proven to have broad spectrum antimicrobial activity against Gram-positive and Gram-negative bacteria, including multi-drug resistant organisms, such as MRSA, *E.Coli and Pseudomonas aeruginosa* (1-2). Currently, it is available as a bioengineered medical honey packaged in sachets and tubes The research project will formulate innovative delivery systems.

PhD student Thomas Hall

Professor Grover said: “We are making what is a very promising material more usable by clinicians. It will really broaden the appeal of the technology by making it easier to handle.”

The team includes Thomas Hall, a doctoral student sponsored by Matoke Holdings Ltd.

In order to develop a spray, the team combined Surgihoney RO™ with other biomaterials to reduce its viscosity or thickness, making it easier to squirt.

Dr Cox said: “The challenge is the addition of external water activates the production of hydrogen peroxide and reactive oxygen. A lot of typical spray formulations involve water.”

Their answer was to mix Surgihoney RO™ with an oil to create a stable, non-aqueous emulsion to avoid premature production of ROS before clinical

application. The first prototype spray has been developed and is being tested in the laboratory.

Doctoral student Thomas, 23, said: “Antimicrobial resistance is such a massive problem, it is exciting to be involved in something that might be part of a solution.

“There is a need for this research and I can see that my work has the potential to help people. That is the end goal. There can’t really be much of a bigger motivational force than helping to save peoples’ lives.”

Ian Staples, founder and chief executive of Matoke Holdings Ltd, said: “We are delighted to have joined forces with Professor Grover, a world-leader in biomaterials science, and his team at the University of Birmingham.

“Reactive Oxygen® technology is an exciting British innovation and could make a real difference to fighting infections globally.”

ENDS

REFERENCES

1. Dryden M. Lockyer G. Kordo S. Cooke J. Engineered honey: in vitro antimicrobial activity of a novel topical wound care treatment. *Journal of Global Antimicrobial Resistance* 2014.

2. Halstead F, Webber M, Rauf M, Burt R, Dryden M, Oppenheim B. In vitro activity of an engineered honey, standard medical-grade honeys and antimicrobial wound dressings against biofilm-producing clinical bacterial isolates. Journal of Wound Care, Feb 2016

3. Dryden M, Dickinson A, Brooks J, Hudgell L, Saeed K, Cutting K. A multi-centre clinical evaluation of Reactive Oxygen™ topical wound gel in 114 wounds. Journal of Wound Care, March 2016.

NOTES TO EDITORS: According to the Government-sponsored O’Neill report, the global cost of failing to tackle the threat of bacteria becoming increasingly hard to treat with antibiotics could be 10 million lives per year by 2050. Antimicrobial resistance is already killing an estimated 3,000 people in the UK a year and costs the NHS £180m a year.

Reactive oxygen species (ROS) are molecules containing oxygen, including hydrogen peroxide, which are in a highly reactive, radical format.

For more information, interviews or case study requests contact Rachel Masker Rachel.masker@matokeholdings.com See www.reactiveoxygen.co.uk for published papers, posters, case studies, videos and news.