

Scientists use frogs to battle superbugs

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(PhysOrg.com) -- Nuclear scientists using frogs in a battle against superbugs might sound like some kind of 1980s computer game – but it’s actually scientific research underway right now.

In search of ways to fight antibiotic-resistant bacteria, Australian scientists are analysing synthetic anti-microbial skin secretions of Australian Green-Eyed and Growling Grass [frogs](#).

These two species were selected because [peptides](#) secreted from their skin form a defence to a broad spectrum of bacteria including Staphylococcus (such as the infamous “Golden Staph”.)

Commonly known as superbugs, antibiotic-resistant bacteria can pose significant risks to human health. Data on the MyHospitals website shows in Australian hospitals there are around 7,000 Staphylococcus aureus bacteraemia infections alone each year.

The cutting-edge research is underway at the Australian Nuclear Science and Technology Organisation (ANSTO), with scientists using neutrons from Australia’s only nuclear reactor.

The project is being led by Professor Frances Separovic from the School of Chemistry at the University of Melbourne, using expertise of ANSTO’s Post Doctoral Research Fellow, Dr Anton Le Brun, and Professor Michael James.

“With the increase in antibiotic resistance, peptides (small proteins) that

destroy cell membranes are being considered as therapeutics. However, there is a need for peptides that preferentially destroy bacterial membranes,” Professor Separovic said.

“We have characterised several peptides from the skin glands of Australian tree frogs. These peptides are host defence compounds, which have strong antibacterial activity.

“By understanding their 3D structure and mechanism of action at the molecular level, we may be able to increase their antibiotic potency and specificity.”

Dr Le Brun explained there are three questions that need to be answered when studying the active ingredients of the secretions or antimicrobial peptides:

“Firstly, we’re using facilities at the OPAL reactor to analyse how and why the peptides from the frog skin secretions work, and how they are efficient at killing bacterial cells,” Dr Le Brun said.

“And, of course, given that we don’t want them to attack healthy human (or frog) cells, we also need to establish whether and how these antimicrobial peptides are selective for bacterial cells.

“The OPAL reactor and neutron reflectometer will help us provide further information to answer those questions, and research possible alternative treatments or cures for [superbugs](#).

“With neutron reflectivity, we can individually detect both the peptide that attacks the cell membrane of bacteria, and the membrane itself – providing a better picture of the process.

“It’s this component by component analysis that will help us understand

how two different types of frog peptides from two different types of frogs deliver the same outcome: dead [bacteria](#).”

Provided by University of Melbourne

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