Antimicrobial peptides (AMPs) capable of combating even highly resistant 'superbugs'

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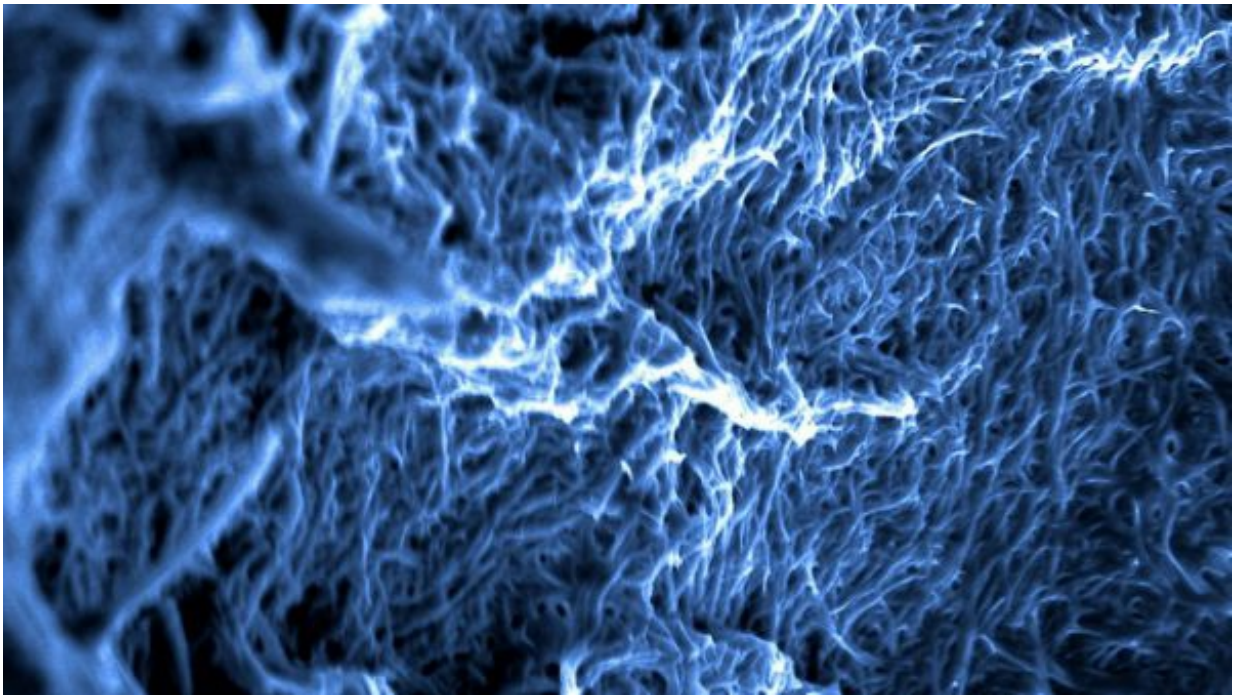

The edge of a peptide nanofibre mesh. Credit: Engineering at Cambridge

The World Health Organisation has warned that a post-antibiotic era in which common infections and minor injuries can kill is far from an 'apocalyptic fantasy' but is a very real possibility in the 21st Century.

The prospect has called for urgent and co-ordinated action to combat the emergence of antimicrobial resistance, which is costing the USA an

estimated 23,000 lives, Thailand 38,000 lives and the European Union 25,000 lives annually.

Perth-based Dr Tatjana Heinrich agrees there is a paucity of research in the field given its urgency, because many of the big pharmaceutical companies have put it in the 'too hard basket'.

They have made-do with tweaking existing antibiotics instead, which remain effective only briefly.

Only two new classes of antibiotics have been approved since 2000.

However, her research for Telethon Kids Institute spin-off drug discovery company Phylogica, is at the forefront of the field.

Phylogica recently partnered with Genentech to develop technology to combat drug resistance.

It is developing a type of antibiotic; antimicrobial peptides (AMPs), capable of combating even highly resistant 'superbugs' like the latest multi-drug resistant Acinetobacter baumannii or Pseudomonas aeruginosa.

Dr Heinrich says AMPs are a totally different class of molecule (compared to traditional antibiotics), to which bacteria have so far, shown little resistance.

Test on Bali bomb victims are promising

Recent tests on 50 samples from Royal Perth Hospital, including some multi-drug resistant bacteria from Bali bomb victims, showed phylomer peptides could be highly effective.

However, Dr Heinrich says much work is needed before they can be used to treat humans, as developing peptides as drugs is challenging because they are small, relatively expensive and easily filtered out of the body.

Their best application may be niche areas like catheter linings and burns wounds where patients develop multi-drug resistance infections because they spend months on antibiotics.

"In this instance you could spray them onto a wound and the issue of the peptides being easily flushed out by kidneys wouldn't be an issue any more," Dr Heinrich says.

She says what is most encouraging is the evidence that AMPs can rejuvenate traditional antibiotics, to which bacteria have become resistant—essentially making them effective again.

Phylomer peptides are a new class of therapeutic peptides derived from natural protein fragments, encoded from biodiverse bacterial genomes.

Many of these live in extreme environments like volcanic streams and geysers.

She says a technique known as 'bio-panning' enables researchers to sift through hundreds of billions of peptides and pull out the right one.

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