A NEW CLASS OF ANTIBIOTICS

An Australian biotechnology company is revolutionising antibiotic treatment with a new class of broad-spectrum synthetic antibiotics.

The growing antimicrobial resistance problem

Antibiotics, one of the most powerful tools to combat life-threatening infections, are becoming less and less effective. The rise of antibiotic-resistant bacteria, or superbugs, has outperformed the development of new antibiotics, threatening our ability to treat common infections. There is an urgent global health need for solutions to stop the threat of antibiotic-resistant infections, which cause more than 700,000 deaths worldwide annually. If left untreated, this number could rise to 10 million by 2050.

Existing antibiotics are based on scientific discoveries made more than 30 years ago. Due to the increasing resistance of bacteria, clinicians have had fewer options when treating patients on long-term drug regimens, which leads to patients requiring higher doses with potentially toxic effects.

Enter Recce Pharmaceuticals

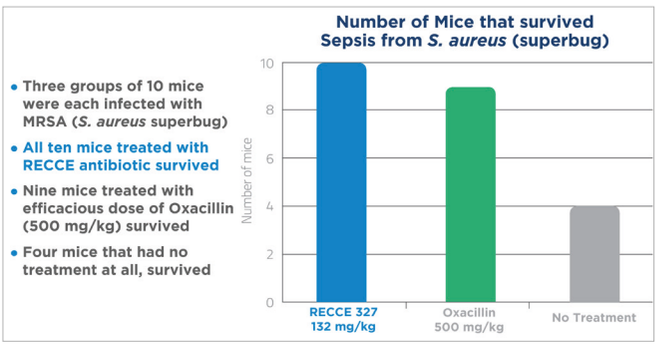
Recce Pharmaceuticals (ASX: RCE), an Australian biotechnology company, has developed a new class of broad-spectrum synthetic antibiotics with a unique mechanism of action (MOA). The company's lead candidate RECCE® 327 has been developed for the treatment of blood infections and sepsis derived from E. coli and S. aureus bacteria – including their superbug forms.

To date, antibiotics have been derived from natural resources, such as fungi, that inhibit a single target, including enzymes required for DNA replication during bacterial cell division. Using a 'lock and key' mechanism at the cellular level, traditional antibiotics lock into a specific part of the bacterial membrane and attack it. Once the bacteria mutate, the antibiotic is rendered useless – the key no longer works for that lock.

Multiple indications

Recce's new class of antibiotics can be used according to multiple administration routes, including intravenous, topical, nasal, oral and inhaler use. This unparalleled versatility sees potential in many serious infections, most notably sepsis.

Sepsis, a life-threatening condition caused by a bacterial infection that spreads to the bloodstream,



is the leading cause of death globally, and the single most expensive condition treated in US hospitals. Currently, no drug therapies exist specifically for the treatment of sepsis, and with every hour left untreated, there is a six per cent increase of mortality.

Additionally, RECCE antibiotics have been used in animal models as a topical application for a broad range of bacterial wounds, burns and skin infections. Recent animal studies show RECCE outperforming the marketed topical antibiotic for the treatment of bacterial infections in burns and wounds.

RECCE's unique MOA

Unlike current antibiotics, Recce's polymer-based antibiotics are wholly synthetic. RECCE 327 is increasingly viewed by experts as a potential 'master key'. Preclinical studies show that RECCE 327 works through hydrophobic interactions that attract and bind the antibiotic to proteins of the bacterial plasma membrane. This results in the subsequent disruption of the bacterial cell wall, leading to bacterial cell lysis (bursting). This unique MOA and composition means it can overcome any attempt of bacterial mutation and can continue to kill the bacteria even with repeated use.

Based on a patented polymeric structure, RECCE 327 comprises tens of thousands of active sites, in comparison to traditional antibiotics, which usually contain less than 12 sites. To date, RECCE 327 has killed every bacterium it has been tested against, and has proven invulnerable to any attempt of the bacteria to mutate and overcome its MOA.

Potential implications against COVID-19

As a broad-spectrum antibiotic, RECCE 327 could be an effective treatment of bacterial respiratory infections. One example includes bacterial pneumonia – a co-infection commonly seen in