ASX Announcement

Recce Pharmaceuticals
recce.com.au
ACN 124 849 065

Recce Pharmaceuticals delivers Opening R&D Address at World Anti-Microbial Resistance Congress 2022

SYDNEY Australia, 7 September 2022: Recce Pharmaceuticals Ltd (**ASX:RCE**, **FSE:R9Q**) (the **Company**), the Company developing a New Class of Synthetic Anti-infectives, today announced it will be delivering the **Opening R&D Address** at the **World Anti-Microbial Resistance (AMR) Congress 2022** 7-8 September 2022.

Recce's Chief Scientific Officer, Michele Dilizia will deliver the **Opening R&D Address** titled ***"Antibiotic Development: What does the Future Hold?".*** There has been a historic lack of innovation in new antibiotic drug development, with almost every antibiotic on the market based on scientific discoveries from more than 30 years ago – positioning Recce as a sign of new hope in the fight against superbugs on the international stage.

A panel of the World AMR Congress also selected for presentation Recce's Scientific Poster. The abstract titled: "***RECCE® 327 Demonstrates Bactericidal Activity against Several Microbial Species***" is a snapshot of Mechanism of Action (MoA) data gathered by an independent, world-leading antibiotic MoA specialised organisation.

The two-day **World AMR Congress** taking place in Washington DC, is the World's largest AMR conference with more than 1,000 attendees from over 50 countries and has been the go-to event globally since 2015 for all stakeholders in the AMR space to meet, brainstorm ideas and formulate initiatives that can combat anti-microbial resistance.

Claire Murphy, Production Director, World Anti-Microbial Congress says: Antimicrobial resistance is an urgent global health crisis that requires global attention. Innovative drugs and novel strategies are needed now more than ever. The World AMR Congress continues to be the most impactful event for the innovative companies, such as Recce, to connect with global AMR stakeholders and further initiatives aimed at combatting this pressing global challenge."

All material is provided below and will also be made available on the Company's website post the congress.

This announcement has been approved for release by Recce Pharmaceuticals Board.

RECCE® 327 Demonstrates Bactericidal Activity against Several Microbial Species

Authors: Michele Dilizia[1], Hannah Tsunemoto[2], Diana Quach[2], Marc Sharp[2], John Prendergast[1], James Graham[1]

1 WHO. *Antimicrobial Resistance*. World Health Organization; 2019. Accessed July 1, 2022. https://www.who.int/news-room/fact-sheets/detail/antimicrobial-resistance.
2 Dadgostar P. Antimicrobial Resistance: Implications and Costs. *IDR*. 2019;Volume 12:3903-3910. doi:10.2147/IDR.S234610.
3 Jonas O, Irwin A, Berthe F, Cesar Jean L, Gall FG, Marquez PV. *DRUG-RESISTANT INFECTIONS: A Threat to Our Economic Future*. World Bank Group; 2017:1-172.

Background

The World Health Organization has recognized the growing threat of antimicrobial resistance (AMR) as one of the top 10 dangers to humanity.[1] Common infections are becoming increasingly resistant to available therapies resulting in multi-resistant and pan-resistant microbial species, including *Enterococcus faecium, Staphylococcus aureus, Klebsiella pneumoniae, Acinetobacter baumannii, Pseudomonas aeruginosa* and *Enterobacter* better known as ESKAPE pathogens.[2,3] Beyond AMR's impact on human health, it poses significant economic costs, leading to longer hospital stays, the need for more expensive medicines and a greater financial burden on patients.[2,3] We must take appropriate action to develop antimicrobial substances that not only kill resistant pathogens but also circumvent the mechanisms of resistance.

Materials

We investigated the activity of a new synthetic polymer anti-infective with rapid and potent broad-spectrum bactericidal activity known as RECCE® 327 (R327) against Gram-positive, Gram-negative, and mycobacterial species, including the ESKAPE pathogens, *B. subtilis* and in biofilms of *E. coli* to determine the effects of R327 on these bacterial species.

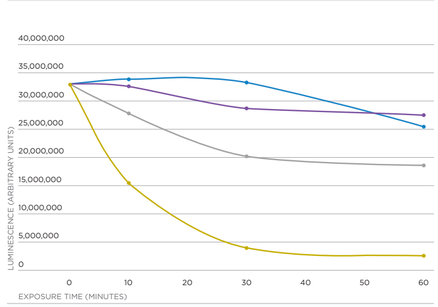
Results

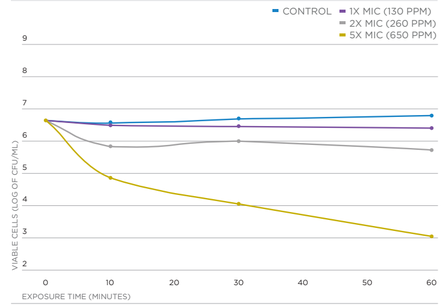
Our results demonstrate that R327 is rapidly bactericidal, reducing viable cell counts across all tested bacterial species and conditions. Cells treated with R327 showed rapid, dose dependent, decreases in cellular ATP levels in luciferase based *in-vitro* ATP assays. R327 treatment of the mycobacteria *M. avium* and *M. abscessus* also led to a decline in ATP levels, though more slowly likely due to the low growth rate of these strains. In some species of gram-positive bacteria, the *in-vitro* ATP assay indicated transient increases in ATP levels upon treatment with R327 at high concentrations, while viable cell counts showed rapid cell death under the same conditions.

Conclusion

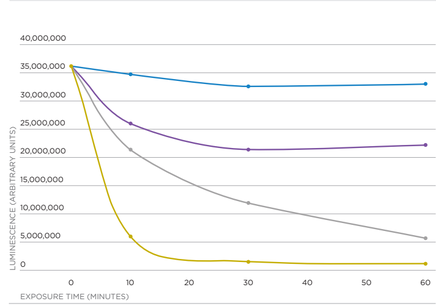
These data suggest that the apparent increase in ATP levels may be an artifact of the in vitro kit and imply that the MOA of R327 may involve destabilization of the cell envelope. Our results further reinforce the broad-spectrum bactericidal activity of R327 and demonstrate its potential as a new anti-infective.

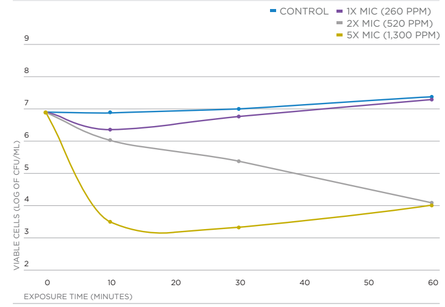
E. coli — RECCE® 327 activity in 10% LB: *E. coli* ATCC 25922



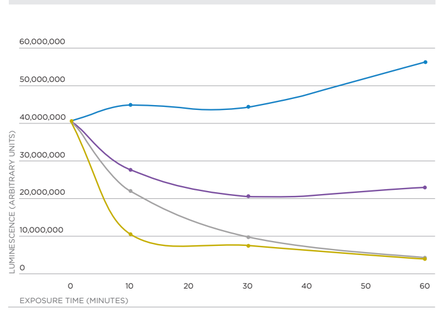


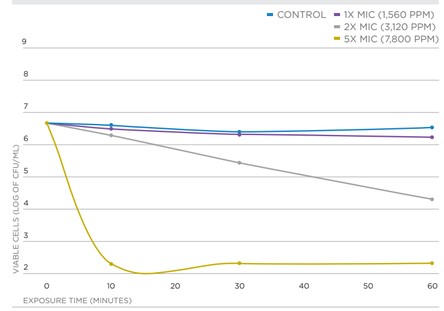
B. subtilis — RECCE® 327 activity in 10% LB: *B. subtilis* PY79



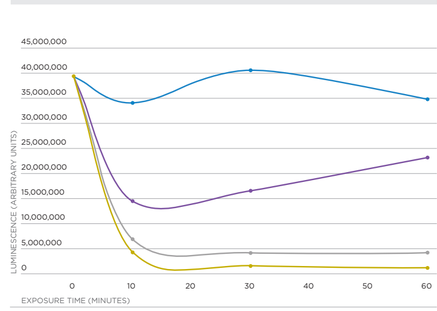


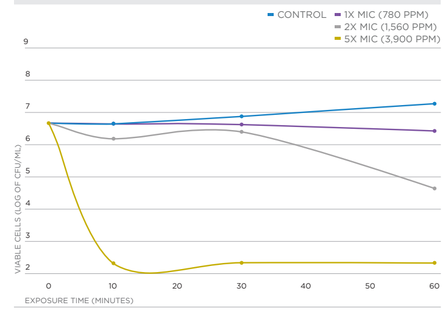
P. aeruginosa — RECCE® 327 activity in 10% LB: *P. aeruginosa* PAO1



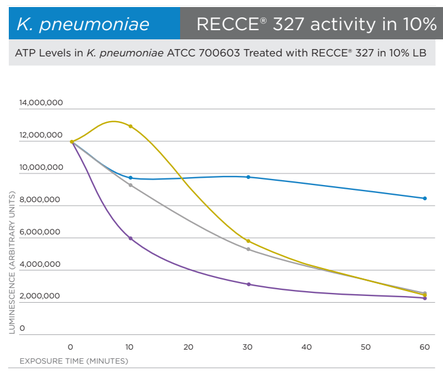


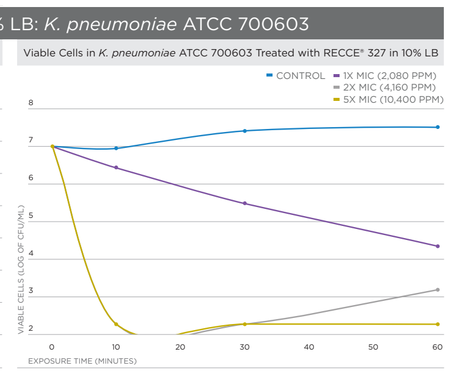
A. baumannii — RECCE® 327 activity in 10% LB: *A. baumannii* ATCC 17978



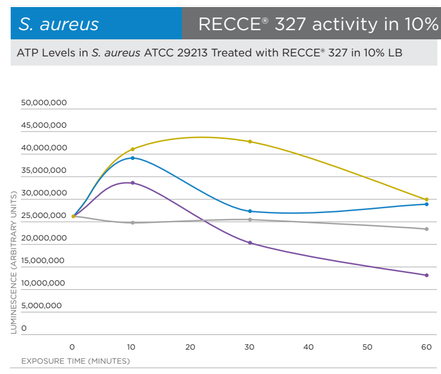


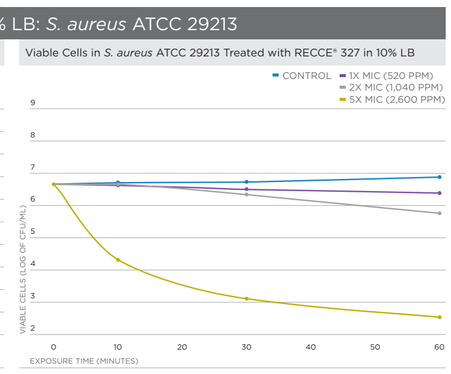
K. pneumoniae — RECCE® 327 activity in 10% LB: *K. pneumoniae* ATCC 700603





S. aureus — RECCE® 327 activity in 10% LB: *S. aureus* ATCC 29213





recce.com.au
ASX:RCE FSE: R9Q

Antibiotic Development: What does the Future Hold?

Michele Dilizia
Vice President & Chief Scientific Officer

Recce Pharmaceuticals

WORLD AMR ANTIMICROBIAL RESISTANCE CONGRESS

September 2022

Disclaimer

DISCLAIMER

This presentation has been prepared by Recce Pharmaceuticals Ltd (the "Company"). It does not purport to contain all the information that a prospective investor may require in connection with any potential investment in the Company. You should not treat the contents of this presentation, or any information provided in connection with it, as financial advice, financial product advice or advice relating to legal, taxation or investment matters.

No representation or warranty (whether express or implied) is made by the Company or any of its officers, advisers, agents or employees as to the accuracy, completeness or reasonableness of the information, statements, opinions or matters (express or implied) arising out of, contained in or derived from this presentation or provided in connection with it, or any omission from this presentation, nor as to the attainability of any estimates, forecasts or projections set out in this presentation.

This presentation is provided expressly on the basis that you will carry out your own independent inquiries into the matters contained in the presentation and make your own independent decisions about the affairs, financial position or prospects of the Company. The Company reserves the right to update, amend or supplement the information at any time in its absolute discretion (without incurring any obligation to do so).

Neither the Company, nor its related bodies corporate, officers, their advisers, agents and employees accept any responsibility or liability to you or to any other person or entity arising out of this presentation including pursuant to the general law (whether for negligence, under statute or otherwise), or under the Australian Securities and Investments Commission Act 2001, Corporations Act 2001, Competition and Consumer Act 2010 or any corresponding provision of any Australian state or territory legislation (or the law of any similar legislation in any other jurisdiction), or similar provision under any applicable law. Any such responsibility or liability is, to the maximum extent permitted by law, expressly disclaimed and excluded. Nothing in this material should be construed as either an offer to sell or a solicitation of an offer to buy or sell securities. It does not include all available information and should not be used in isolation as a basis to invest in the Company.

FUTURE MATTERS

This presentation contains reference to certain intentions, expectations, future plans, strategy and prospects of the Company.

Those intentions, expectations, future plans, strategy and prospects may or may not be achieved. They are based on certain assumptions, which may not be met or on which views may differ and may be affected by known and unknown risks. The performance and operations of the Company may be influenced by a number of factors, many of which are outside the control of the Company. No representation or warranty, express or implied, is made by the Company, or any of its directors, officers, employees, advisers or agents that any intentions, expectations or plans will be achieved either totally or partially or that any particular rate of return will be achieved.

Given the risks and uncertainties that may cause the Company's actual future results, performance or achievements to be materially different from those expected, planned or intended, recipients should not place undue reliance on these intentions, expectations, future plans, strategy and prospects. The Company does not warrant or represent that the actual results, performance or achievements will be as expected, planned or intended.

US DISCLOSURE

This document does not constitute any part of any offer to sell, or the solicitation of an offer to buy, any securities in the United States or to, or for the account or benefit of any "US person" as defined in Regulation S under the US Securities Act of 1993 ("Securities Act"). The Company's shares have not been, and will not be, registered under the Securities Act or the securities laws of any state or other jurisdiction of the United States, and may not be offered or sold in the United States or to any US person without being so registered or pursuant to an exemption from registration including an exemption for qualified institutional buyers.

A Versatile Technology Platform

- Biotech company developing **Anti-infectives** targeting both bacterial and viral indications
- **Strong IP** and **own manufacturing** capability
- Qualified Infectious Disease Product designation
  - 10 years market exclusivity plus fast track approval*
- **Versatile delivery platform** – oral, intravenous and topical formulations
- Designed to safely provide treatment **without developing resistance** over time
- Multiple infectious disease opportunities with RECCE® 327

**Awarded by the US FDA in 2017 for R327 bacteraemia (broad-spectrum bacterial sepsis). Time starts only from potential market approval.*

Strong Pipeline

Over Various Indications and Upcoming Inflection Points

Asset and Route of Administration	Indications	Discovery	Pre-Clinical	Phase I	Phase II	Phase III	Market
R327 Intravenous*	Serious/life threatening bacterial infections including sepsis						
R327 Topical*	Wound infections including infected burns						
RCE Compounds*	Multiple ongoing pre-clinical programs						
R327 Nasal**	COVID & Influenza						
R529 Intravenous & Intranasal**	COVID						

**Anti-bacterial program*
***Anti-viral program*

In-house Manufacturing Capabilities

Wholly owned, automated manufacturing facility in Sydney's Macquarie Park

- Raw **materials plentiful and cheap** – few $/Kg
- **No expensive waste** – 99.9% product yield

- Automated **manufacture process taking approx. 1 hour**
- **500 doses** per fully automated run

- Currently producing in **volumes to support** planned **Phase I & II clinical trials**.

- Facility built to pharmaceutical specification.
- Packaging and labelling to international standards

recce.com.au

Current Landscape of Antimicrobial Resistance (AMR)

Economic challenges

Cost of AMR is **$55 billion every year** in the United States: USD $20 billion for health care and USD $35 billion for loss of productivity.

10 million per year

A 2016 review on antimicrobial resistance estimates that by 2050, **ten million people** could **die** each year as a result of **AMR.**

Barriers to Innovation

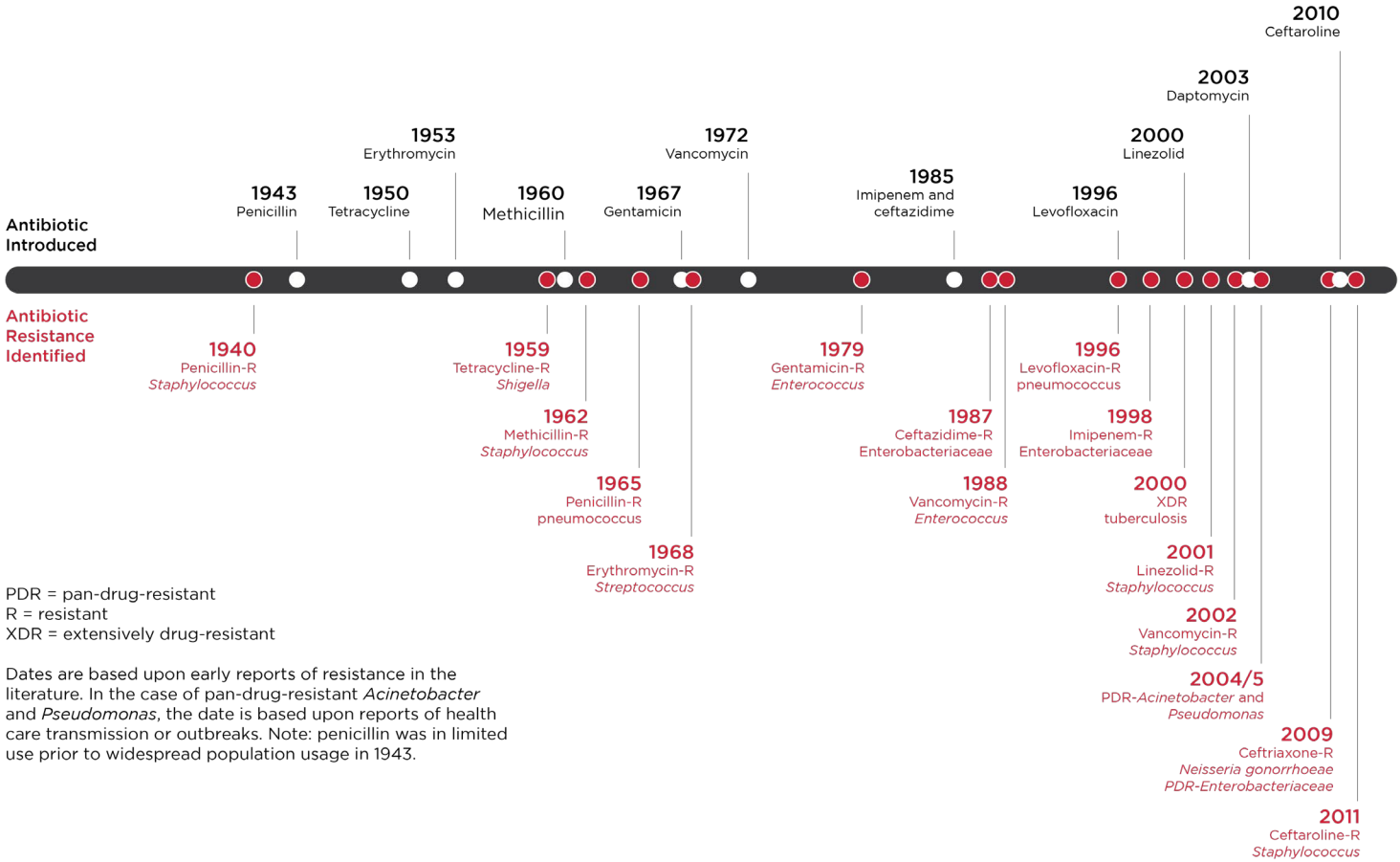
Innovation in **sepsis** has been slow, and not kept up with the rise in **AMR** and pandemics.

What Has Failed?

Bacteria have been on the planet for more than 3.5 billion years.

Roughly **three-quarters of antibiotics in development** are derived from **existing drugs.**

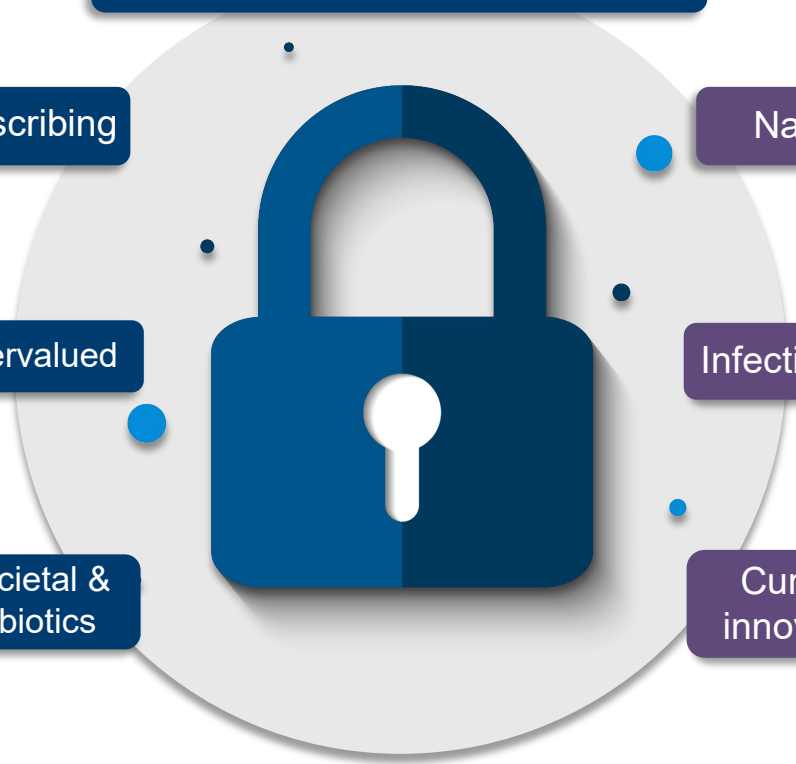
Nearly inevitable that **bacteria will develop resistance** to these newly-derived antibiotics.



PDR = pan-drug-resistant
R = resistant
XDR = extensively drug-resistant

Dates are based upon early reports of resistance in the literature. In the case of pan-drug-resistant *Acinetobacter* and *Pseudomonas*, the date is based upon reports of health care transmission or outbreaks. Note: penicillin was in limited use prior to widespread population usage in 1943.

Why Have They Failed?



- Specific Mechanisms of Action
- Improper & over prescribing
- Naturally Derived
- Antibiotics are greatly undervalued
- Infections becoming harder to treat
- Understanding of the societal & medical benefits of antibiotics
- Current antibiotics based on innovations from 30 years ago

The Need for a New Class of Antibiotics: Synthetic Anti-Infectives

- **NO** pre-formed natural superbugs.
  - Entirely **man-made** and designed with purpose.
    - **Universal Mechanism of Action** - does not succumb to resistance.
    - **Broad Spectrum capability** and maintains its activity even with repeated use.
  - **Empowers clinicians** to confidently and quickly administer an effective antibiotic at first patient presentation.
- On-track to be the only **global clinical stage company** whose drug is shown to be **efficacious** against the full suite of **ESKAPE pathogens.**

Multi-Layered Mechanism of Action

R327 rapidly & irreversibly shuts down cellular energetics (adenosine triphosphate (ATP) production) – primary MoA.

R327 affects the assembly of bacterial cell division complex, components that require cellular energy to remain assembled, confirming its ability to disrupt cellular bioenergetics.

R327 results in the decreased formation of the bacterial cell division complex into ring-like structures (Z-rings) in a concentration dependent manner.

R327 permeabilises the cell membrane/alters the integrity of the outer membrane of *E. coli* cells – intended activity without toxicity.

At higher concentrations and subsequent to ATP shut down cell lysis can occur as a further MoA (bacterial bursting due to their uniquely high internal pressure).

R327 rapidly and irreversibly bactericidal to slow-growing quiescent or stationary phase *E. coli* cells in addition to actively dividing *E. coli* cells.

Within a minute, the highest concentration of R327 used, 5x MIC, was **observed to reduce viable cell counts** reported as colony forming units per millilitre of culture (CFU/ml) 100-fold (>$1x10^7$ to $1x10^5$ at timepoint 0).

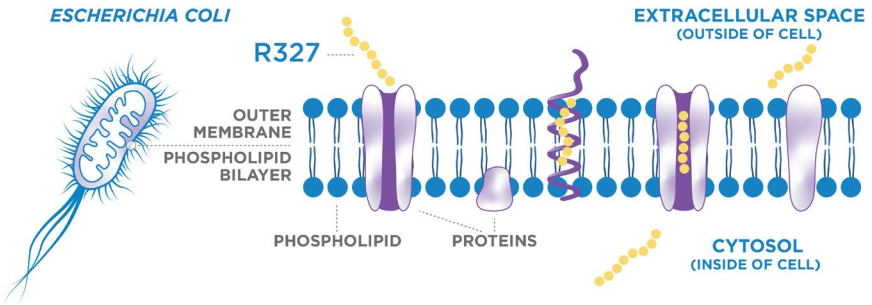
Current antibiotics rarely feature bactericidal activities against non-dividing or stationary phase bacterial cells; however, R327 showed remarkable activity against slow-growing bacteria, indicating potential antibacterial activity in biofilms.

In comparison to ampicillin and ciprofloxacin, **R327 is able to outperform both of these antibiotics** in bactericidal activity (measured by viable cell counts) against stationary cells.

Independent Study Undertaken on R327 MoA[1]

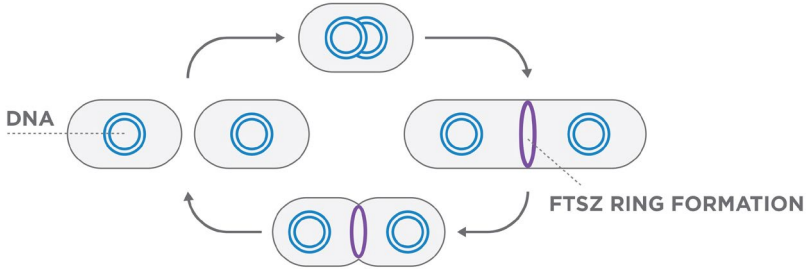
By Leading Experts in Bacterial MoA Analysis

Stage 1



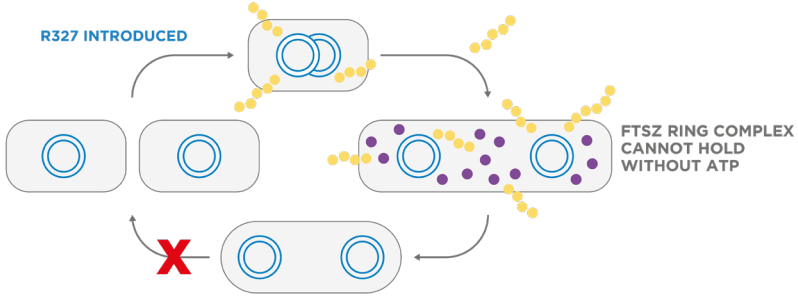
R327 permeabilizes cell membrane and enters the cell

Stage 2



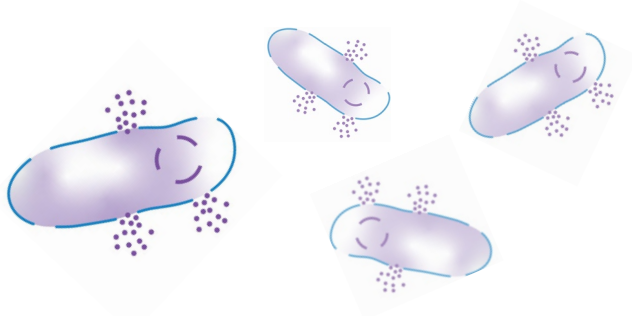
R327 interrupts bacterial cellular energetics via ATP Synthesis

Stage 3



Cellular division & non-dividing cell functions are disrupted

Stage 4

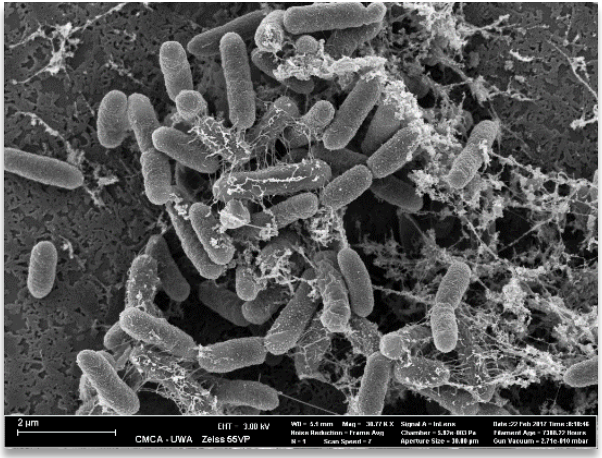


R327 is rapidly and irreversibly bactericidal - at high concentrations causes cell lysis

1 – Dilizia, M., Tsunemoto, H., Quach, D. et al. Elucidating the Mechanism of Action of Novel Polymer-based Synthetic Anti-infective Compound RECCE 327 - Abstract

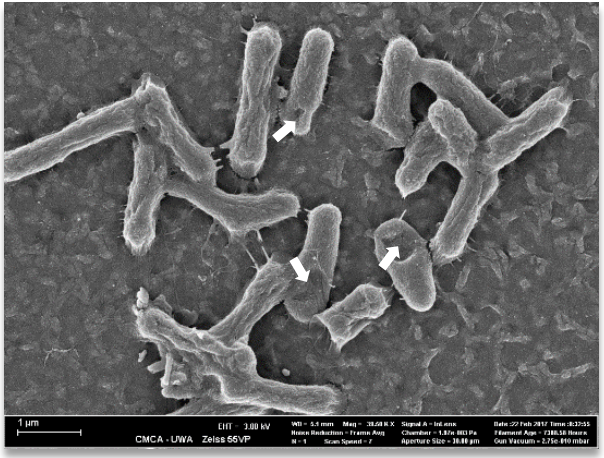
RECCE® 327 In Action

0 minutes



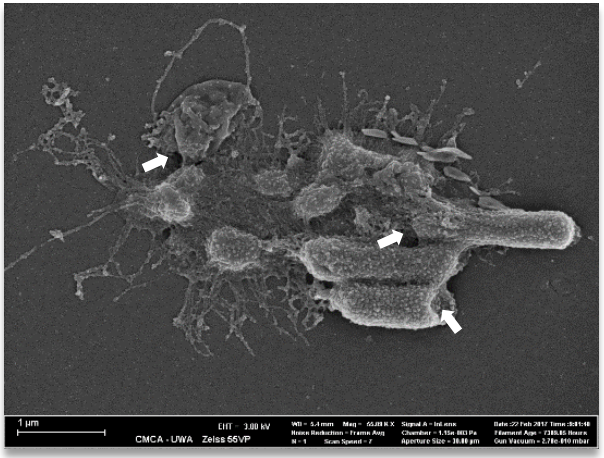
Before application of R327, *E. coli* bacteria cell membrane smooth and intact

20 minutes



After application of R327, *E. coli* bacteria cell membrane begins to weaken and disrupt

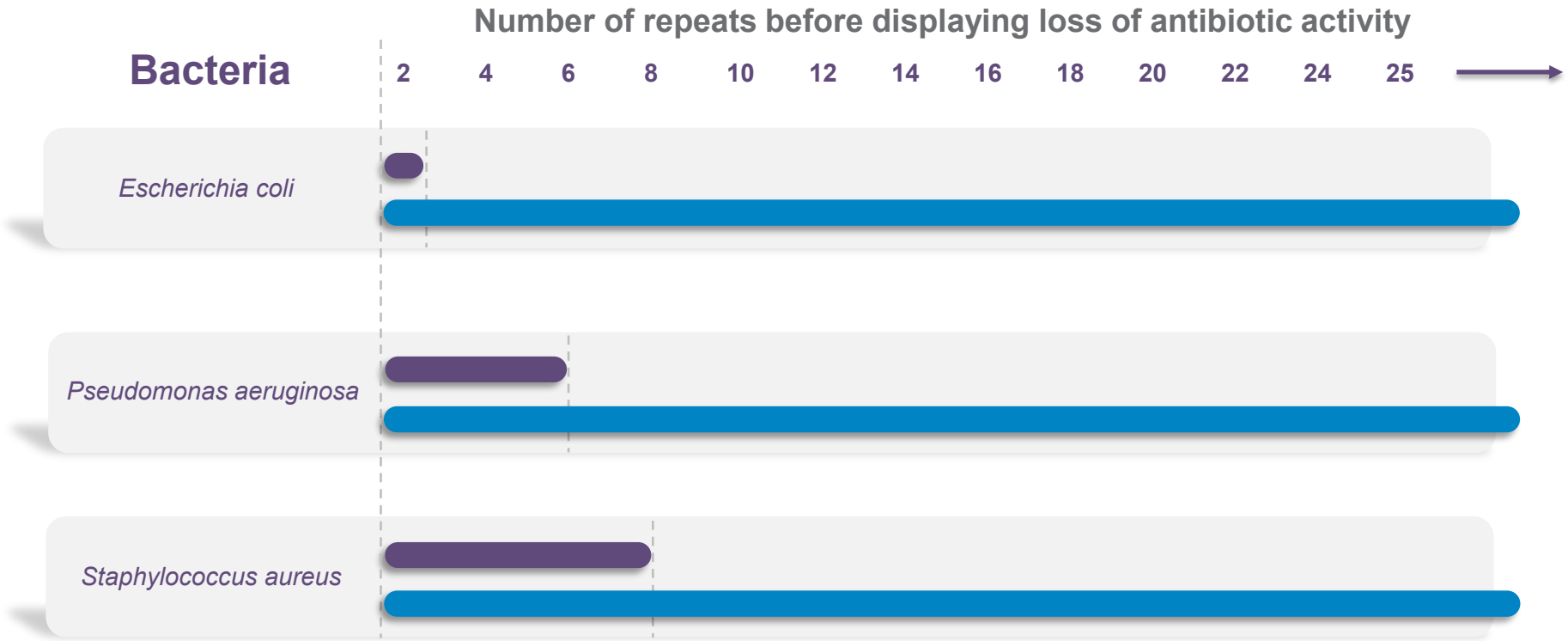
180 minutes



E. coli bacteria (10^6 cfu/ml) having their outer membrane weakened – causing cell lysis from treatment with R327 (1,000 ppm)

This is a high-definition electron microscope image generated in February 2017 by Dr Peta Clode and Lyn Kirilak of the Centre for Microscopy, Characterisation and Analysis, University of Western Australia. It was taken to demonstrate RECCE® 327's unique mechanism of action

RECCE® 327 Maintains Activity[1]



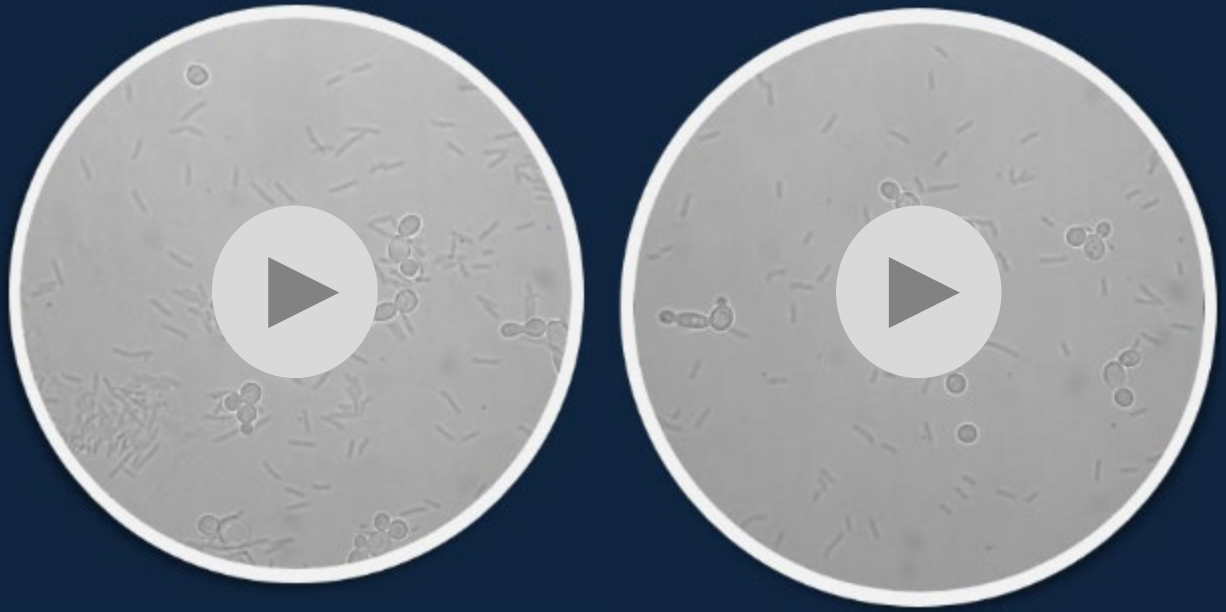
The commercial antibiotic loses activity after a number of repeats; >25 repeats RECCE® 327 **DOES NOT**

'Commercial Antibiotic' *generates over US $10bn in revenue* **RECCE® 327**

RECCE® 327 Activity Against *Escherichia coli*

- *E. coli* grows fast. Eukaryotic cells healthy and not affected.
- R327 at 3,000 ppm shown to be highly effective against *E. coli* without affecting growing, healthy eukaryotic cells.
- R327 rapidly and irreversibly shuts down the ATP in *E. coli*, not allowing it to divide and grow.

Without R327 ***R327 (3,000 ppm)***

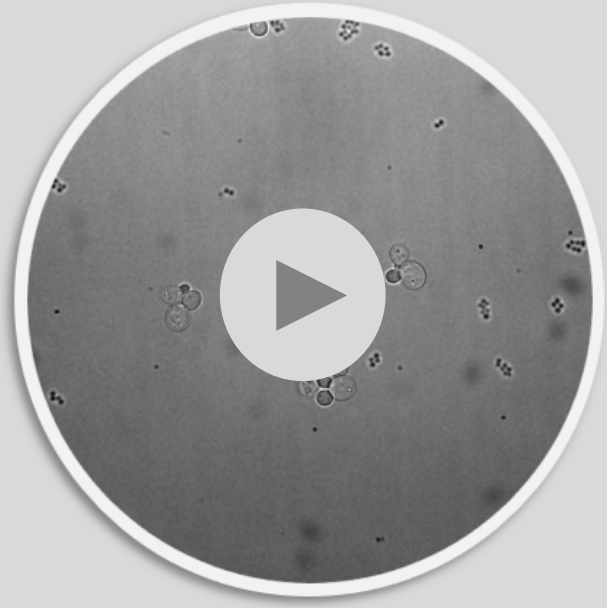


eukaryotic cells ***E. coli***

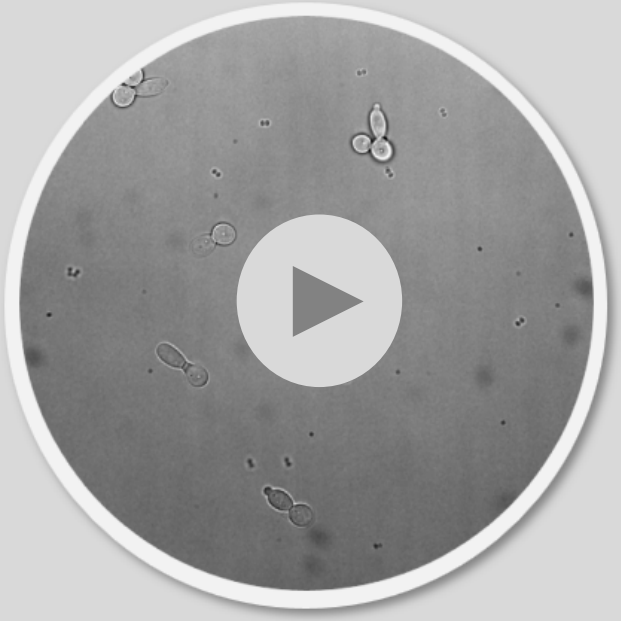
RECCE® 327 Activity Against *Staphylococcus aureus*

- *S. aureus* bacterial growth slower than *E. coli,* not affecting eukaryotic cells.
- **R327 at 2,300 ppm** shows to be highly effective against *S. aureus* without affecting growing, healthy eukaryotic cells.
- **R327 rapidly and irreversibly shuts down the ATP in *S. aureus***, not allowing it to divide and grow.

Without R327



R327 (2,300 ppm)



eukaryotic cells ***S. aureus***

recce.com.au

Sepsis Patient Journey

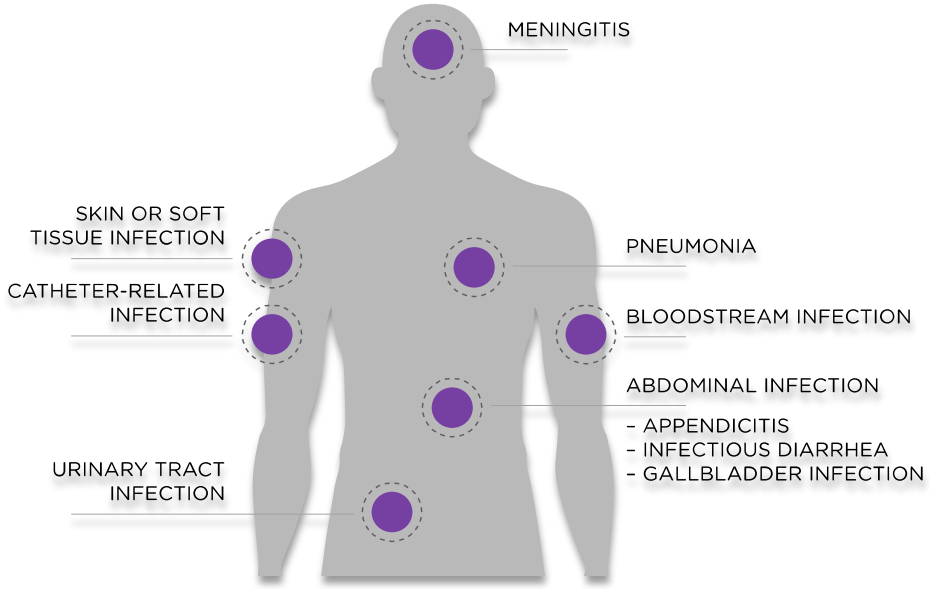
Patient Presents at the Hospital

- 1/3 of patients present non-specific symptoms, leading to delayed treatment and high mortality rate.
- Mortality from sepsis increases by as much as 8% for every hour that treatment is delayed.
- Cost of sepsis care for inpatient admissions and skilled nursing facility: in-patient rehab medical treatment centre admissions was more than USD $62bn/year (USD $170m/day).

Current Treatment Paradigm

- Introducing broad-spectrum antibiotic (s)
- Running antibiograms
- Adjusting antibiotics based on antibiogram results

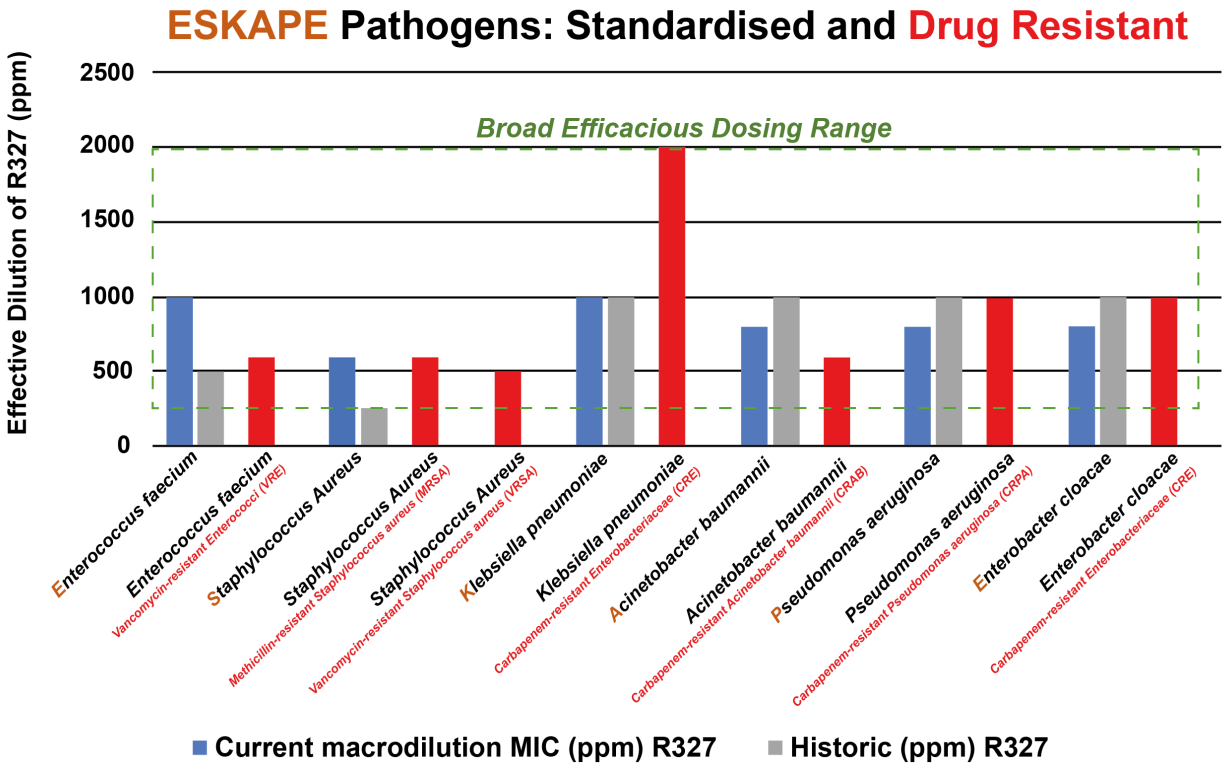
Early treatment with the correct antibiotic is key to improving patient outcome



This is John

ESKAPE Pathogens Can't Escape R327

- Bactericidal activity of R327 demonstrated a **three-log** or **99.9% reduction against all ESKAPE** strains over 24 hrs at various concentrations and times.
- **R327 remains effective against hypermutated ESKAPE superbugs, including multi-drug resistant (MDR) forms.**
- On-track to be the only global clinical stage company whose drug is shown to be efficacious against the full suite of ESKAPE pathogens.

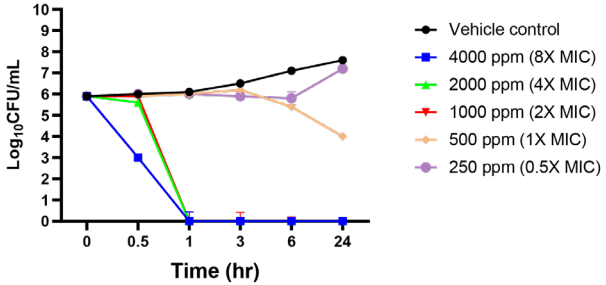


Broad spectrum antibiotic efficacy – drug resistant ESKAPE pathogens especially susceptible to R327 in comparison to standardised bacterial forms
MIC = minimum inhibitory concentration

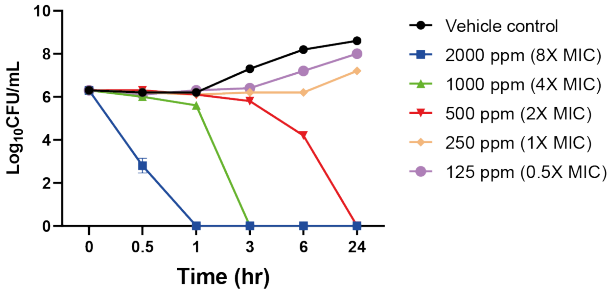
ESKAPE Pathogens Can't Escape R327

On-track to be the only clinical stage company shown to be efficacious against the full suite of **ESKAPE** *pathogens globally*

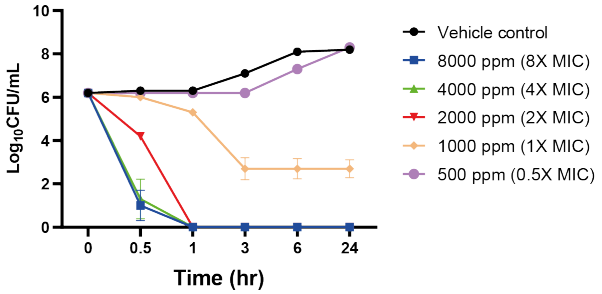
E. faecium **ATCC 19434 with RECCE® 327**
Time-kill curve (average)



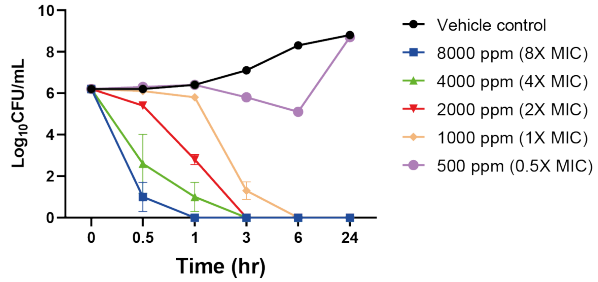
S. aureus **ATCC 29213 with RECCE® 327**
Time-kill curve (average)



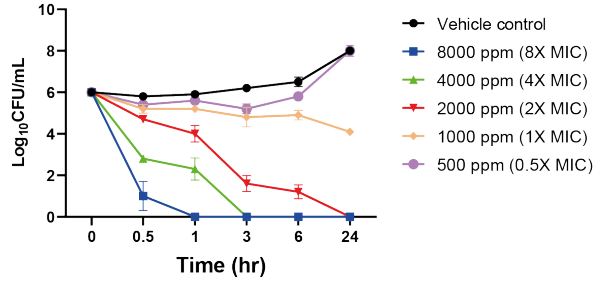
K. pneumoniae **ATCC 43816 with RECCE® 327**
Time-kill curve (average)



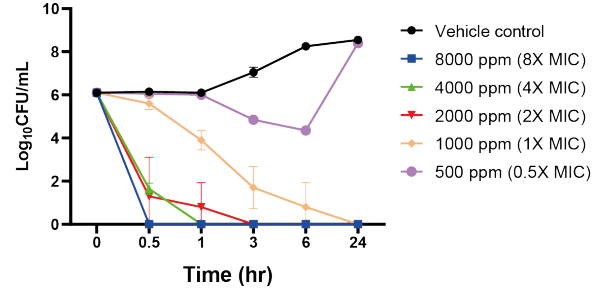
A. baumannii **ATCC 17978 with RECCE® 327**
Time-kill curve (average)



P. aeruginosa **ATCC 27853 with RECCE® 327**
Time-kill curve (average)



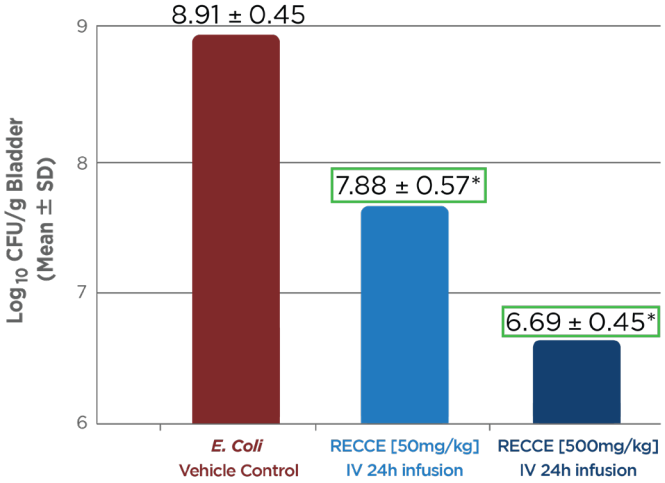
Enterobacter cloacae **ATCC 13047 with RECCE® 327**
Time-kill curve (average)



- ***Time-kill curves of R327 at various concentrations against strains of ESKAPE pathogens. In the time kill assay, each R327 dilution was tested in duplicate with the average plot shown.***
- The minimum inhibitory concentration was first determined to define the test concentrations for the time-kill study. The time-kill study was performed to determine the bacterial killing effect of R327 at a total of five concentrations, ranging from 0.5X to 8X, MIC and to measure killing kinetics of treatment with R327 against each strain.

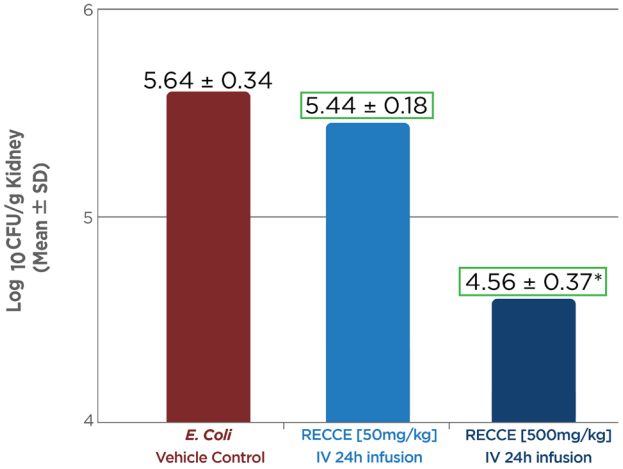
Pre-sepsis UTI and Kidney Models in Rats

Efficacy: Bladder



*(P<0.05) significantly different from vehicle control

Efficacy: Kidneys



*(P<0.05) significantly different from vehicle control

Single 24-hour intravenous infusion

Group 1 – ***E. Coli*** **infection + vehicle control**

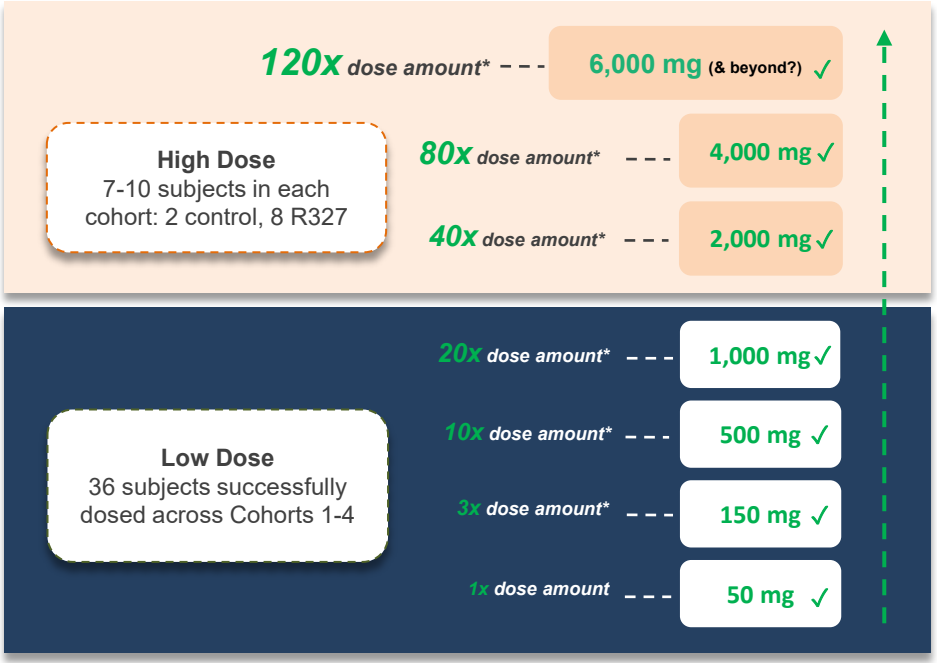
Group 2 – ***E. Coli*** **infection + R327 50mg/kg**

Group 3 – ***E. Coli*** **infection + R327 500mg/kg**

- **R327 showed dose dependent antibacterial effect in the kidney and bladder at 50mg/kg and 500mg/kg when compared to vehicle control (p<0.050).**
- **Rats treated with RECCE® 327: no adverse clinical signs were observed**

Phase I Human Clinical Trial

- **Study to assess IV infusion of RECCE® 327 in 80 healthy male subjects as a single ascending dose.**
- Randomized, double-blind, placebo-controlled, safety, tolerability and pharmacokinetics study.
- Single dose of a 1-hour via IV infusion at a uniform rate in hospital setting.
- Primary endpoint: vital signs, 12-lead ECG parameters, clinical chemistry, hematology, and urinalysis.

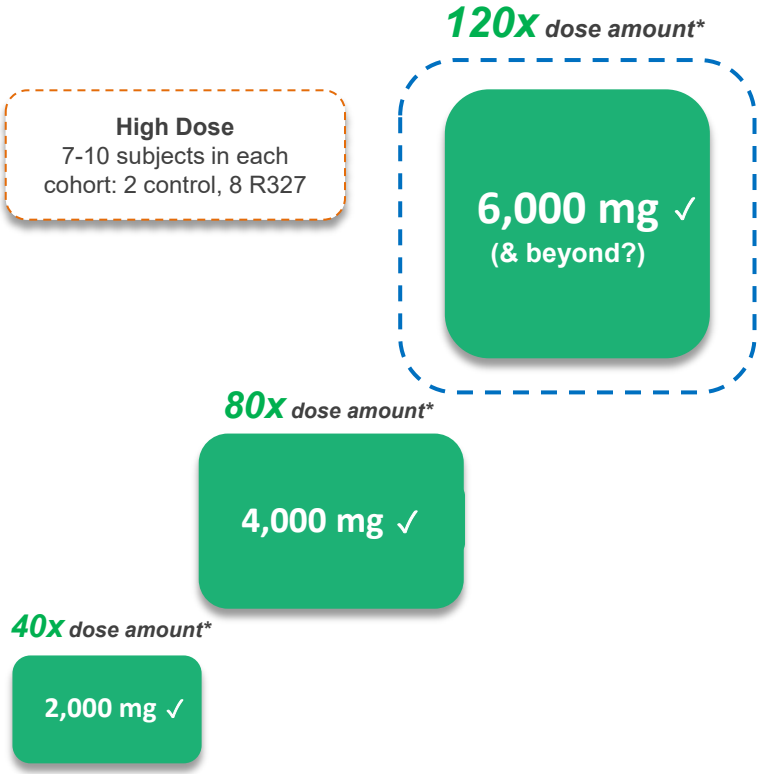


*Dose increase fold based off 50mg

Phase I Human Clinical Trial – ‘High Dose’

Why 6,000mg (R327) over 1 hour infusion?

- Study objectives **broadly achieved** – now ‘dose-ceiling’ focused.
- 6,000mg (6 grams) over 1 hour IV is HIGH.
- **R327 dosing broadly in efficacy range** based on animal models – Phase II (efficacy) to determine.
- Phase I (IV Safety/Tolerability) data sets opportunity for multiple Phase II (efficacy) study potential.
- Next Phase preparations **well underway**

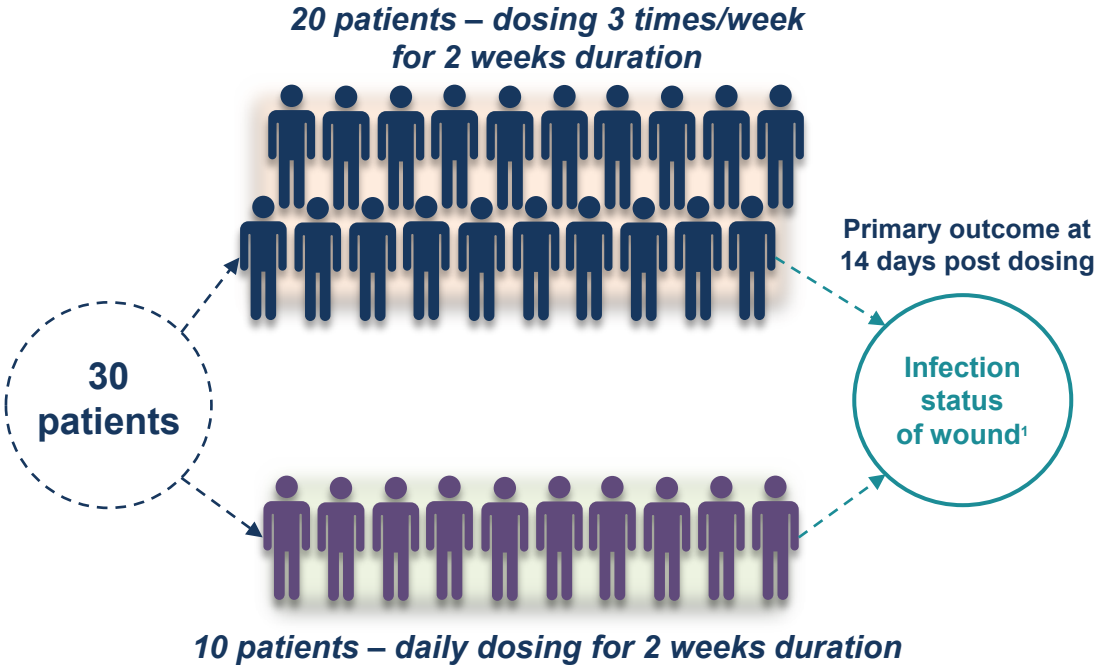


*Dose increase fold based off 50mg

Topical RECCE® 327 - Phase I/II

Burn wound infections

- **Phase I/II** to assess Topical RECCE® 327 in burn wound infections commenced in Q4 2021.
- Sponsored by the South Metropolitan Health Service, Department of Health, Government of Western Australia.
- **Multiple patients have been dosed with R327.**
- **Trial Investigators:**
  - Dr Edward Raby (Clinical Microbiologist and Infectious Diseases expert at Royal Perth and Fiona Stanley Hospitals).
  - Professor Fiona Wood (Head of Burns) – world-renowned burns specialist and spray-on skin pioneer.
  - Dr Chris Heath (Head of Infectious Diseases).



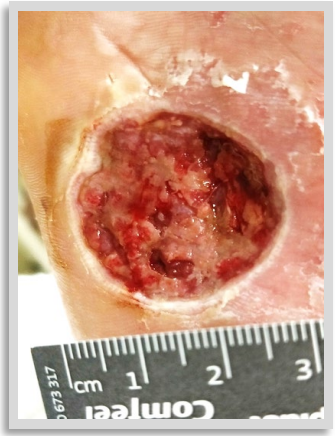
1 - Using the consensus clinical criteria of the International Wound Infection Institute

Topical RECCE® 327 – Phase I/II

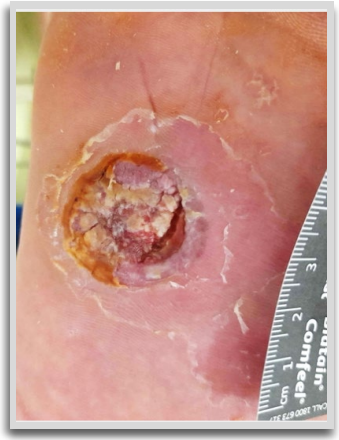
Patient examples from ongoing Burn Wound trial

- Patients suffered major burn injury.
- Multiple bacterial species in and surrounding wound.
- Growth swabs with organisms including pathogens from the ESKAPE group of bacteria.
- **Post R327 treatment: healthy skin growth return, reduced swelling and infection, indications of tissue penetration to underlying infection.**

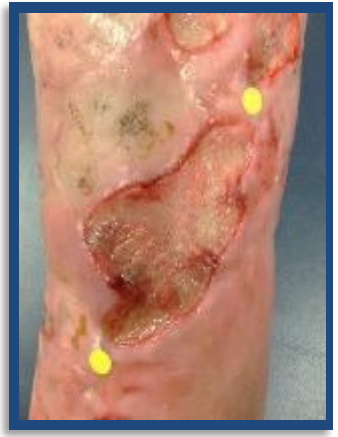
Study data now under-review for next-step considerations.



Pre-treatment, significant bacterial infection



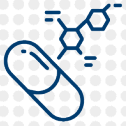
Post R327 treatment



What Does the Future Hold?

Anti-infective therapy **beyond** traditional antibiotics.

Stewardship of existing antibiotics.



A **diverse** battery of **treatments**: vaccines, phage therapy, mAbs, antivirulence strategies.

Preservation of medical advances and quality of life gained over the past century.

Thank you

Michele Dilizia
Chief Scientific Officer
Recce Pharmaceuticals
ASX:RCE; FSE:R9Q

References

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4378521/

https://www.science.org/doi/10.1126/scitranslmed.abo7793

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6929930/

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5354621/

https://www.who.int/news-room/fact-sheets/detail/antimicrobial-resistance

https://www.worldbank.org/en/topic/health/brief/antimicrobial-resistance-amr

CDC (2019). "Antibiotic Resistance Threats in the United States" (PDF). Atlanta, GA: Centres for Disease Control and Prevention, U.S. Department of Health and Human Services.

"Global priority list of antibiotic-resistant bacteria to guide research, discover, and development of new antibiotics" (PDF). World Health Organization. 2017.