RECCE® 327 DEMONSTRATES BACTERICIDAL ACTIVITY AGAINST SEVERAL MICROBIAL SPECIES

Category – Drug Discovery

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Background:
The World Health Organization has recognized the growing threat of antimicrobial resistance (AMR) as one of the top 10 dangers to humanity. 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. 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. We must take appropriate action to develop antimicrobial substances that not only kill resistant pathogens but also circumvent the mechanisms of resistance.

Methods:
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.

Keywords: Antimicrobial resistance, superbugs, mechanism of action