

Membrane-Active Hydantoin Derivatives as Antibiotic Agents

Researchers at the University of South Florida have developed novel versions of known antibacterial compounds with potent antimicrobial activity.

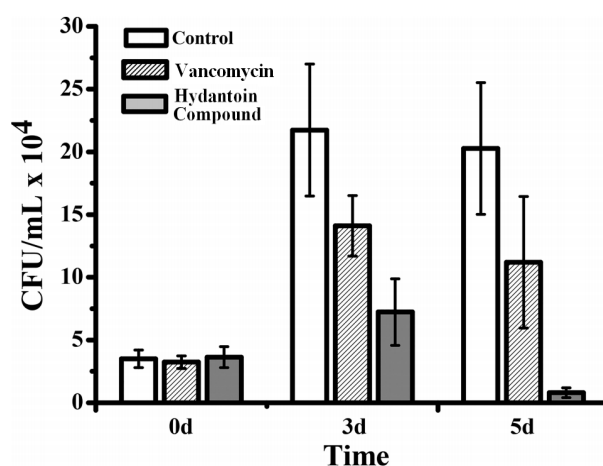
Infections caused by drug-resistant bacteria have become one of the greatest threats to public health in the 21st century. As such, there is a huge demand for alternative therapeutic strategies. One promising approach to developing new drugs is to reinvestigate known antibiotics and design new versions of them in the hope of finding novel agents that combat antibiotic resistance. The development of known antibacterial compounds called hydantoins has been taking place for a long time. As an old antibiotic class, it has recently attracted interest due to its low probability of bacterial resistance compared to other conventional antibiotics. However, hydantoin derivatives generally show only moderate antibacterial activity, which may limit their application.

USF inventors have found a way to enhance the antibacterial activity of hydantoins by adding new components to the central structure of the compounds. These components are cationic groups and lipid tails, which enable the hydantoins to break down bacterial membranes, thus killing the pathogens. In addition, the compounds are able to pass through bacterial membranes and directly act on other targets such as DNA and ribosomes. This dual approach to killing bacteria could lead to a new generation of antibiotics with high potency and novel mechanisms, as well as lower probability of developing resistance. These compounds also show a higher effectiveness compared to standard antibiotics. They will be promising alternatives to killing drug resistant bacteria.

ADVANTAGES:

- Enhanced effect of known hydantoins
- Dual targeting of both bacterial membrane and DNA/ribosomes
- Does not appear to induce resistance

Highly Potent Treatment for Drug Resistant Pathogens



Rats with MRSA Pneumonia - Hydantoin Compound Shows More Activity Reducing Colony Forming Unit (CFU)