

Innovative DOTA-Linkers for Bacterial Targeting

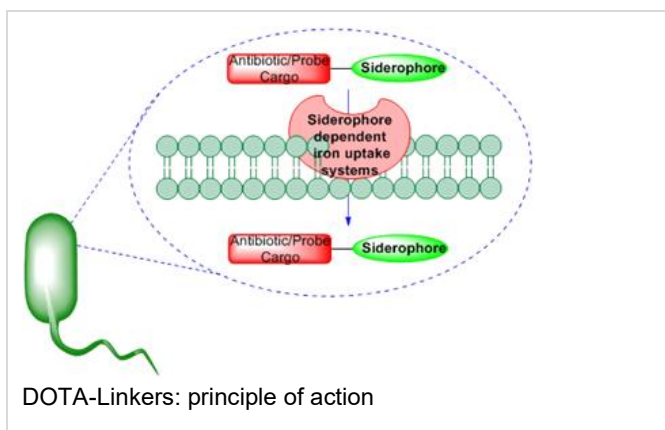
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INVENTION NOVELTY

New DOTA derivatives with siderophore moieties have been developed to target bacterial cells more effectively. These derivatives use bacterial iron uptake systems to deliver antibiotics and other effector molecules directly into bacterial cells, enhancing therapeutic efficacy. Additionally, the derivatives can be coupled to diagnostic probes for in-vivo imaging, enabling precise localization and monitoring of bacterial infections and treatment effects, thus offering a theranostic approach.

VALUE PROPOSITION

Antimicrobial resistance is a growing global threat, with significant health and economic impacts. The development of DOTA derivatives with siderophore moieties presents an innovative solution to combat this issue by improving drug delivery to bacterial cells, enhancing the efficacy of antibiotics, and reducing side effects. The dual function of these molecules—both therapeutic and diagnostic—makes them valuable for both treating infections and monitoring therapeutic outcomes, providing a comprehensive approach to antimicrobial resistance.



TECHNOLOGY DESCRIPTION

This technology introduces DOTA derivatives incorporating siderophore moieties, which leverage bacterial iron uptake systems to actively transport antibiotics and other therapeutic molecules into bacterial cells. These derivatives have shown proof-of-principle for enhanced antibiotic effects. In addition, they can be coupled with diagnostic probes for in-vivo imaging, offering a combined therapeutic and diagnostic approach (theranostics). The technology enables more effective localization of bacterial infections and monitoring of therapeutic efficacy using imaging techniques like PET, SPECT, or MRI.

COMMERCIAL OPPORTUNITY

The technology is offered for co-development or in-licensing.

DEVELOPMENT STATUS

Proof-of-principle for enhanced antibiotic effect achieved; in-vivo data illustrating the potential diagnostic use were obtained in mouse models.

PATENT SITUATION

A PCT application was filed in August 2015 (WO2016026841); granted patents in EU and US.

FURTHER READING

K. Ferreira, H.-Y. Hu, V. Fetz, H. Prochnow, B. Rais, P. P. Müller, M. Brönstrup: Multivalent siderophore-DOTAM conjugates as theranostics for imaging and treatment of bacterial infections. *Angewandte Chemie*, 2017, DOI: 10.1002/anie.201701358