Technology Offer CSIC/CV/008

First-in-class antibiotics directed to DNA G-quadruplex

Novel compounds based on a repurposed drug to combat gram (+) bacterial infections.

Market need

Antibiotic resistance is a looming global health crisis, posing a formidable challenge to modern medicine. There is a decline in the approval of new antimicrobial agents and many of them are modifications of existing antibiotics. Unfortunately, these modifications often fail to overcome the well-established resistance mechanisms present in bacterial pangenomes, resulting in the rapid emergence of new drug-resistant strains. Thus, new “first-in-class” antibiotics are urgently needed.

Proposed solution

Our solution is based on new compounds that target DNA G-quadruplex structures (G4) in bacteria, a novel therapeutic approach. Our focus is on pyrvinium (PYR), which binds to bacterial G4 structures and shows promise against Gram-positive strains. However, PYR's toxicity limits its clinical application as an antibacterial agent. To address this limitation, we have developed sugar-PYR compounds (S-PYRs). S-PYRs not only enhance antibacterial efficacy but also reduce toxicity, resulting in a more favorable therapeutic window.

Competitive advantages

- S-PYRs show potent antibiotic activity against gram (+) bacterial strains
- The activity of S-PYRs is of the same order or better than first use antibiotics against these bacteria.
- S-PYRs have a completely novel mode of action through their interaction with DNA G-quadruplexes.

Intellectual Property

Priority patent application filed

Stage of development

TRL3 – In vitro efficacy proved

Intended Collaboration

Licensing and/or co-development

Contact

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