TECHNOLOGY ID#BM-009

UNIVERSIDAD DE CHILE

Novel quinonic antibiotics for drug resistant bacteria

University of Chile has generated novel family of antibiotics with activity against multi-resistant gran positive bacteria

THE CHALLENGE

According to the WHO, antibiotic resistance is one of the biggest threats to global health, food security and development nowadays. A growing number of infections, such as pneumonia, tuberculosis, gonorrhea and salmonellosis, are becoming harder to treat as the antibiotics used to treat them become less effective. In order to deal with this problem, more active, as well as more toxic, drugs are being used.

THE TECHNOLOGY

New family of synthetic antibiotics that target the ubiquinone complex of the bacterial electron transport chain, with activity **against current multidrug-resistant gram positive bacteria**. *In vitro* studies with multi-resistant bacteria isolated from patients suffering infections of *S. aureus* and *Enterococcus spp.* demonstrated potent activity of these antibiotics against these strains. Furthermore, these antibiotics showed **superior activity to the antibiotic of choice used to treat infections of *Enterococcus spp*.** and to the first line of treatment against infections with **methicillin-resistant *S. aureus***. Also, *in vivo* studies in larvae achieved a survival rate close to 100% after administering a single dose. Currently, a new formulation is being developed and will be tested in mouse models.

STAGE OF DEVELOPMENT

- ***In vitro* studies with 100 multi-resistant bacteria** isolated from patients
- **Toxicity studies in human and murine cells** – No toxicity
- ***In vivo* studies in larvae of *G. mellonela***

COMPETITIVE ADVANTAGES

- **New structure and mechanism of action**
- **Unlikely to develop resistance –** Mechanism of action attacks evolutionarily conserved targets
- **64 to 128 times more active than vancomycine** in clinical isolates of vancomycin-resistant *E. faecium*
- **Simple to produce in good yield, identify and purify**
- **High stability of compounds** in powder form – After 3 months, no modifications and polymorphs detected
- **Potential good tolerance in clinical use –** Similar structure to some anticancer compounds

Table I. Summary of antibacterial activity pf compounds 7, 16 and vancomycin against multidrug-resistant* Enterococcus spp. *MIC and MBC (µg/mL)

Compound	Isolates	MIC Range	MI C_{50}	MIC_{90}	GM_{MIC}
7	44	4-2	2	4	2.51
16	41*	8-2	4	4	3.13
VAN	44	512-128	256	512	256.30

APPLICATIONS

- Antibiotic drugs
- Antibacterial products

OPPORTUNITY

University of Chile is searching for industry partners for **out-licensing** and/or **collaborating** to further develop this technology.

INTELLECTUAL PROPERTY/REFERENCES

- Chilean patent application XXX
- US patent application 16/067033
- "A new kind of quinonic-antiobiotic useful against multidrug-resistant *S. aureus* and *E. faecium* infections". Molecules. 2018; 23(7), 1776

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