

Docket #: S17-474

Synthesis and Characterization of a New Antibiotic

Researchers at Stanford and their colleagues have developed new antibiotic compounds that could be used to treat staph infection (caused by *Staphylococcus aureus*) and TB infection (caused by *Mycobacterium tuberculosis*). Antibiotic resistance is increasing and has become a global health threat. Thus, there is a great need for new antibiotics.

To help meet this need the inventors have identified two 1,4- benzoquinone derivatives that could serve as new antibiotics. They have isolated the compounds, one red and the other blue, from the venom of the scorpion *Diplocentrus melici*. Further, they have developed methods to synthesize these compounds from commercially available reagents and have characterized the biological activity of the compounds. The red compound is very effective at killing *S. aureus* (the cause of staph infections, including MRSA), while the blue compound is very effective against *M. tuberculosis* (the cause of TB infections and multidrug-resistant tuberculosis (MDR-TB)). This technology provides much needed new antibiotic compounds that can be used to treat staph and TB infections.

Stage of Research

Using mouse models of MDR-TB infection, the inventors have shown that the blue compound dramatically decreases the bacterial load and amount of tissue damage. Additional validation studies are ongoing.

Applications

- Antibiotic for treating:
 - Staph infection
 - TB, including MDR-TB

Advantages

- Solves an unmet need- provides new antibiotics
- Could be used to treat multidrug-resistant TB
- Potency comparable to commercial antibiotics
- Compounds can be synthesized using commercially available reagents
- Non-toxic in animal studies
- Compounds do not damage lung endothelium cells and thus can be directly applied to the lungs
- Can be used to rid the body of dormant infection to prevent recurrence

Publications

- E.N. Carcamo-Noriega, S. Sathyamoorthi, S. Banerjee, E. Gnanamani, M. Mendoza-Trujillo, D. Mata-Espinosa, R. Hernandez-Pando, J. I. Veytia-Bucheli, L.D. Possani and R.N. Zare. [1,4-Benzoquinone Antimicrobial Agents Against Staphylococcus aureus and Mycobacterium tuberculosis Derived from Scorpion Venom](#). *PNAS*. June 10, 2019
- Than, K. [Stanford researchers synthesize healing compounds in scorpion venom](#). Stanford News. June 10, 2019

Patents

- Published Application: [WO2019231735](#)

Innovators

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