

Small molecules that can safely exploit copper as an antimicrobial

Value Proposition

The fungal pathogen *Cryptococcus neoformans* can live in both plants and animals, but when inhaled by humans can disseminate from the lungs to the bloodstream and cause life-threatening systemic disease. The brain is particularly vulnerable to *C. neoformans* infections, and there are approximately one million cases of cryptococcal meningitis each year, over 60% of which result in death. Treatment of cryptococcal infections is notoriously difficult, and new antifungal regimens are urgently required. In general, there is a clear need for new strategies to identify antimicrobial therapeutics with minimal toxicity to host cells in the face of escalating antibiotic resistance and lethal fungal infections.

Technology

Duke inventors have reported new compounds for treating microbial infections. This new approach harnesses copper mobilization in phagosomes in combination with another key aspect of the antimicrobial defenses there: the rapid release of reactive oxygen species. This association allows the prodrug QBP to become activated to form antimicrobial 8-hydroxyquinolone (8HQ)-copper complexes. Crucially, these complexes can overcome microbial copper defenses to result in pathogen killing. These compounds were used successfully to reduce the fungal burden in the lungs of infected mice.

Advantages

- Could be a new antifungal drug, which are notoriously difficult to discover
- These molecules utilize and bolster key aspects of the immune system to kill fungi yet minimize cytotoxicity
- The use of these materials is likely to have applicability against a broad spectrum of pathogens

Publications

- [Exploiting Innate Immune Cell Activation of a Copper-Dependent Antimicrobial Agent during Infection](#) (Chemistry & Biology, 2014)

Duke

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Duke File (IDF)

T-004137



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Links

- [From the lab of Dr. Katherine Franz](#)
- [Copper as a Magic Bullet for Targeted Microbial Killing](#)



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Patents

Patent Number: 9,333,213

Title: PROCHELATORS AS BROAD-SPECTRUM
ANTIMICROBIAL AGENTS AND METHODS OF USE

Country: United States of America

Patent Number: 9,333,213

Title: PROCHELATORS AS BROAD-SPECTRUM
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Patent Number: 9,526,740

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