

# Small Molecule Inhibitors of *Candida albicans* Hyphae and Biofilm Formation [LAB0215]

## Background

- *C. albicans* is a common human fungal pathogen that causes disease ranging from superficial to lethal.
- The fungus can switch between two major forms – yeast and hyphal. Although both forms are associated with virulence, the hyphae form is responsible for forming multi-drug resistant biofilms.
- Compared to yeast forms, *Candida* biofilms are 30-2,000 times more resistant to antifungal drugs.
- Biofilms that form on catheters and other implanted devices are associated with prolonged fungemia, antifungal therapy failure, increased dissemination of infection and death with a mortality rate >40%.
- Therefore, new anti-hyphae agents are needed to inhibit biofilm formation and their associated infections.

## Innovation

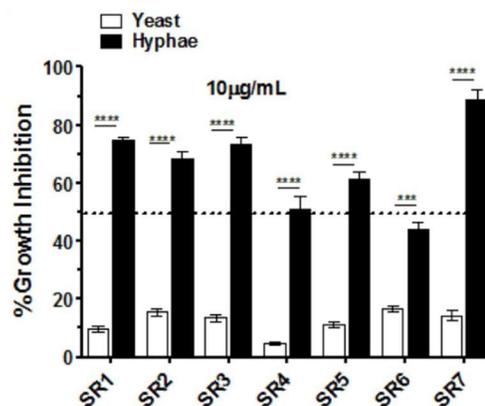
- Dr. Ashraf Ibrahim has developed novel small molecule inhibitors of *C. albicans* hyphae and biofilm formation.
- The inhibitors are rhodanine derivatives that activate *TUP1*, a transcriptional repressor known to negatively regulate the yeast to hyphae conversion.
- *In vitro* data show that these novel inhibitors are specific to *C. albicans* hyphae.
- In addition, the compounds do not show significant cytotoxicity at concentrations required to prevent hyphae formation, as measured by hemolytic activity in human erythrocytes.

## Advantage

- Highly specific and effective inhibitor of *C. albicans* hyphae and biofilm formation
- Minimal toxicity to human cells

## Applications

- Prevention of *C. albicans* hyphae and biofilm formation
- Adjunctive therapy that can be used with currently used antifungal agents



The bar plot shows the growth inhibition effects of these novel small molecule inhibitors ("SR" compounds) at 10 µg/mL on *Candida* growing as either yeast or hyphae.

**Lead Inventor:** Ashraf Ibrahim, PhD

## IP Status

- U.S. Patent Application No. 16/711,839 filed December 12, 2019 – pending

## Related Publications

- Hamdy R, Soliman SSM, Alsaadi AI, ... Ibrahim, AS. Design and synthesis of new drugs inhibitors of *Candida albicans* hyphae and biofilm formation by upregulating the expression of TUP1 transcription repressor gene. Eur J Pharm Sci. 2020;148:105327.