

# High Mannose Binding Lectins – A New Class of Attractive Antifungals

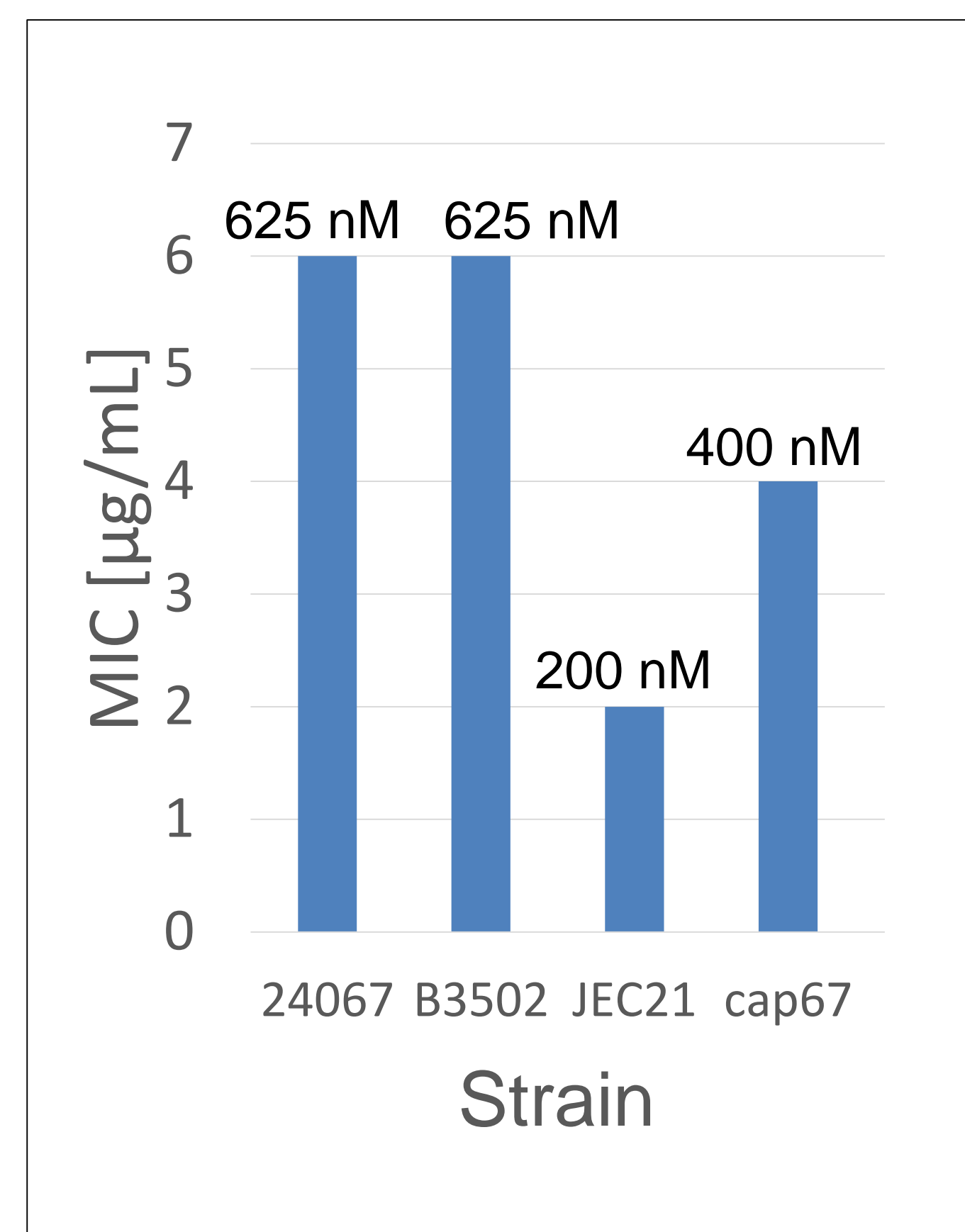
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## Overview

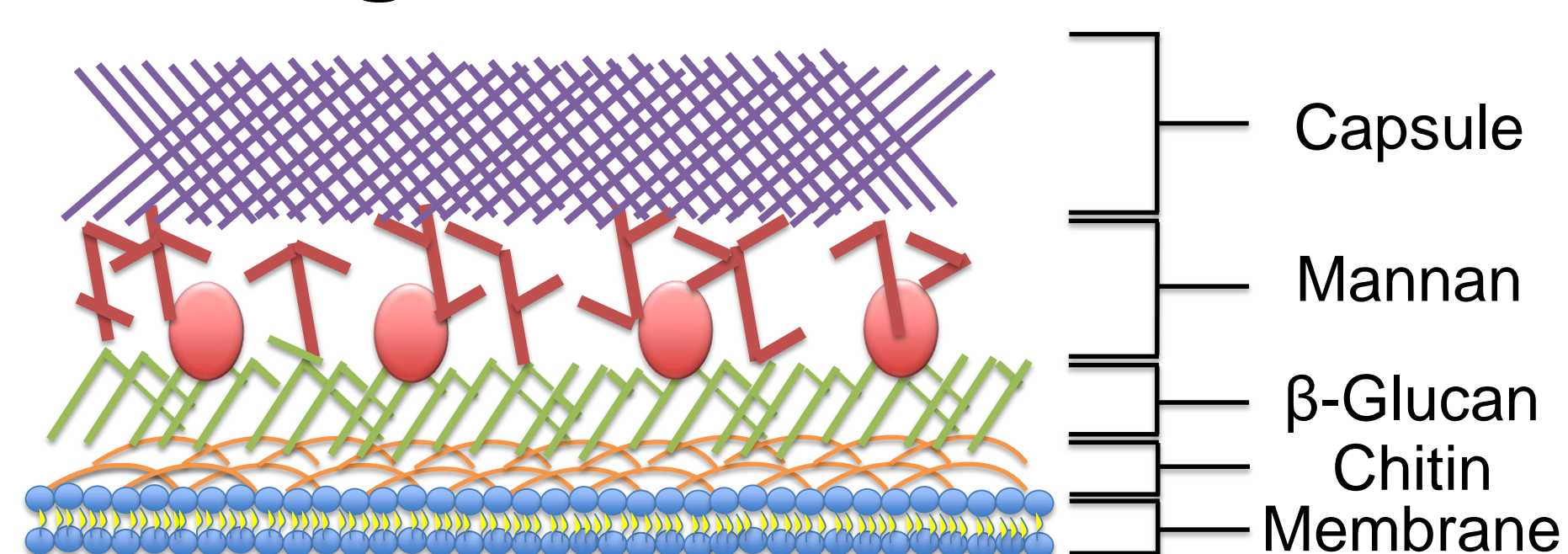
*Cryptococcus neoformans* is a pathogenic yeast responsible for over 625,000 deaths per year. Current treatments are being challenged with an increasing prevalence of antifungal resistant strains. Therefore, the need for new therapeutics is paramount. Drug resistance can be combated by developing antifungals aimed at novel targets. One such target is the cell wall, an essential part of the fungal cell that is composed primarily of carbohydrates. We have discovered that a novel cyanobacterial lectin binds to the cell wall and inhibits cryptococcal growth at nanomolar concentrations.

- ❖ Nanomolar concentrations of lectin completely inhibit the growth of *Cryptococcus neoformans*
- ❖ Lectin binds to the cell wall
- ❖ Lectin does not bind chitin
- ❖ Lectin prevents capsule release

## Key Findings



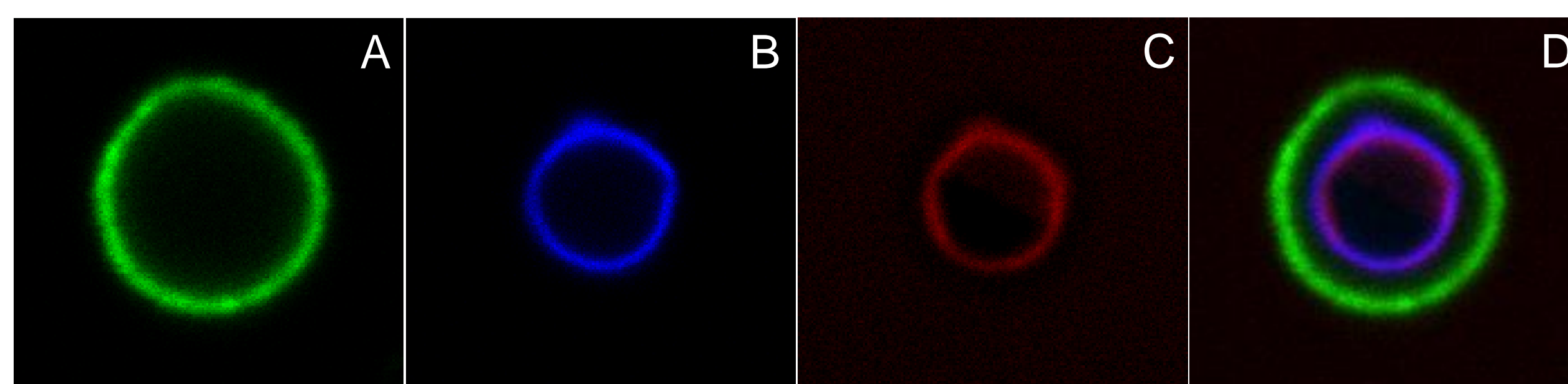
## Fungal Cell Wall



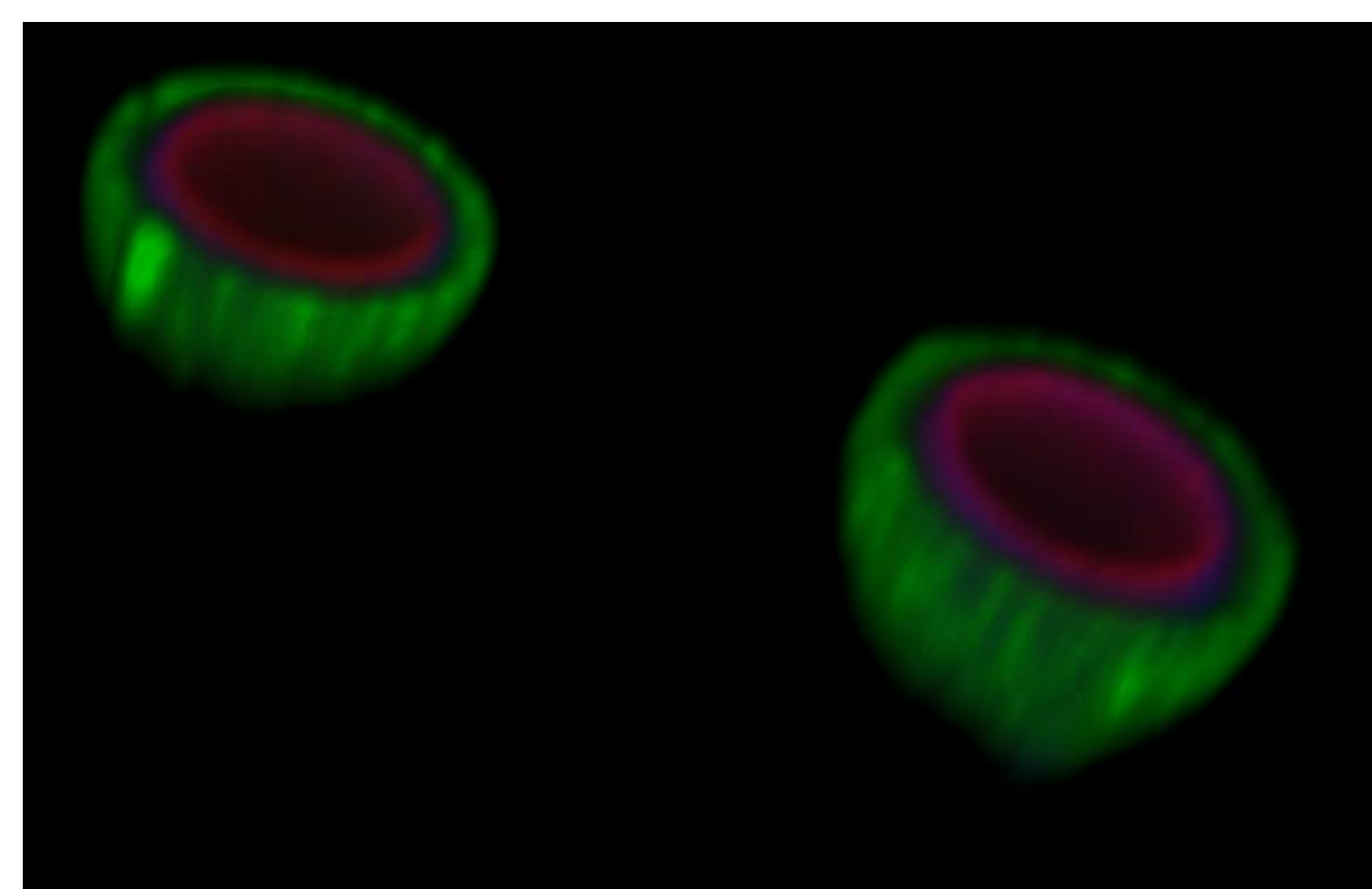
Cryptococcal cell wall is an excellent target for antifungal development. The cell wall is responsible for maintaining structural integrity of the organism and protection from infection. Some processes vital to fungal health are mediated by cell wall glycoproteins. Human cells do not have a cell wall. Thus, targeting this unique element composed of complex carbohydrates and glycoproteins, many side-effects are prevented.

## Localization

Localization of the lectin binding to the cell wall of *Cryptococcus neoformans* was determined by a combination of fluorescence and immunofluorescence detected by confocal microscopy.



Fluorescent microscope images of polysaccharide capsule (A), cell wall (B), AlexaFluor® 568 conjugated lectin (C), and an overlay of the three (D). The purple color is a result of overlap of the red and blue fluorescence.



3D reconstruction of *Cryptococcus neoformans* cells to visualize lectin binding to the fungal cell wall.

## Acknowledgements

We would like to acknowledge Dr. Erin McClelland (Middle Tennessee State University) and other members of the McFeeters Lab.