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The antibiotic Polymyxin B exhibits novel antifungal activity against *Fusarium* species infecting humans and plants

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The genus *Fusarium* comprises many species, including *F. oxysporum*, *F. solani*, *F. graminearum*, and *F. verticillioides* and causes severe infections in plants and humans. In clinical settings, *Fusarium* is the third most frequent mold to cause invasive fungal infections, after *Aspergillus* and the mucorales. *F. solani* and *F. oxysporum* are the most prevalent *Fusarium* species to cause clinical disease. However, few effective antifungal drugs are available to treat both human and plant *Fusarium* infections. The cationic peptide antibiotic Polymyxin B (PMB) exhibits antifungal activity against the human fungal pathogens *Candida albicans* and *Cryptococcus neoformans*, but its efficacy against *Fusarium* species is unknown. In this study, we tested the antifungal activity of PMB against 12 *Fusarium* strains that infect humans and plants (banana, tomato, melon, pea, wheat and maize). PMB was fungicidal against all 12 *Fusarium* strains, with minimum fungicidal concentrations of 32 or 64 µg/mL for most strains tested, as evidenced by broth dilution, methylene blue staining and XTT reduction assays. PMB can reduce the germination rates of conidia, but not chlamydo spores and can cause defects in cell membrane integrity in *Fusarium* strains. PMB exhibits synergistic activity with posaconazole and can potentiate the effect of fluconazole, voriconazole or amphotericin B against *Fusarium* species. However, PMB does not show synergistic effects with fluconazole against *Fusarium* species as it does against *Candida glabrata* and *C. neoformans*, indicating evolutionary divergence of mechanisms between yeast pathogens and the filamentous fungus *Fusarium*.

Biography

Ying-Lien Chen is an assistant professor at National Taiwan University, Taiwan and is interested in research topics like fungal and antifungal activity.

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