Bioprospecting for Benthic Fungi and Their Bactericidal Antibiotics

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The increasing global threat of antibiotic resistance and the exhaustion of terrestrial sources of microorganisms with antimicrobial properties, necessitates efforts to augment the current arsenal of antibiotic compounds. The productivity of, and microbial density in hydrothermal environments make them a promising hunting ground for clinically significant molecules. This study assessed the bactericidal properties of fungal isolates derived from the Guaymas Basin and related to seven fungal species: Penicillium commune, Penicillium expansum, Penicillium verrucosum, Cadophora malorum, Ramularia eucalypti, Rhodotorula mucilaginosa, and Ramularia glennii. These isolates were obtained from off-axis and hydrothermal sediments, cultured using conventional methods, isolated, taxonomically identified using modern molecular techniques and screened for antimicrobial activity against two human pathogens: Staphylococcus aureus and Escherichia coli. The antimicrobial screening revealed that 86% of the isolates (different media and culture age) synthesized bioactive compounds against at least one of the pathogens. Six of the isolates displayed antagonistic activity against S. aureus, while only P. commune inhibited the growth of E. coli. 82% of observed inhibitions were complete within the visual inhibition zone, indicating that the compounds produced were bacteriocidal. Only the species C. malorum has been studied in the context of bioprospecting. The results of this study contribute to the ongoing scientific effort toward recovery of novel fungal taxa from distinct ecological niches and suggest that deep-sea fungi may be promising targets for new sources of antibiotics. Continuing analyses will focus on identification of the antibacterial molecules produced by these isolates.

Awards Won:

Second Award of $2,000