

Proceedings of the Ninth International Conference on Urban Pests
Matthew P. Davies, Carolin Pfeiffer, and William H Robinson (editors) 2017
Printed by Pureprint Group, Crowson House, Uckfield, East Sussex TN22 1PH UK

CHARACTERIZATION OF ANTIBACTERIAL ACTIVITIES OF A SUBTERRANEAN TERMITE AGAINST HUMAN PATHOGENS

XING PING HU, SANG-JIN SUH, AND YUAN ZENG

Auburn University, College of Agriculture, 107 Comer Hall, Auburn, Alabama

Abstract The emergence and dissemination of multidrug resistant bacterial pathogens necessitate research to find new antimicrobials against these organisms. We investigated antimicrobial production by eastern subterranean termites against a panel of bacteria including three multidrug resistant (MDR) and four non-MDR human pathogens. We determined that the crude extract of naïve termites had a broad-spectrum activity against the non-MDR bacteria but it was ineffective against the three MDR pathogens including MRSA. Heat or trypsin treatment resulted in a complete loss of activity suggesting that antibacterial activity was proteinaceous in nature. The antimicrobial activity changed dramatically when the termites were fed with either *P. aeruginosa* or MRSA. *P. aeruginosa* induced activity against *P. aeruginosa* and MRSA while maintaining or slightly increasing activity against non-MDR bacteria. MRSA induced activity specifically against MRSA, altered the activity against two other Gram-positive bacteria, and inhibited activity against three Gram-negative bacteria. Further investigation demonstrated that hemolymph, not the hindgut, was the primary source of antibiotic activity. This suggests that the termite produces these antibacterial activities and not the hindgut microbiota. Two-dimensional gel electrophoretic analyses of hemolymph protein spots indicated that a total of 38 and 65 proteins were differentially expressed at least 2.5-fold upon being fed with *P. aeruginosa* and MRSA, respectively. Our results provide the first evidence of constitutive and inducible activities produced by this termite against human bacterial pathogens.

