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Expression of lucifensin in Lucilia sericata medicinal maggots in infected environments

Ivana Valachová & Jana Bohová & Zuzana Pálošová &Peter Takáč & Milan Kozánek & Juraj Majtán

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Abstract

Lucifensin, a novel larval defensin, is one of the antibacterial agents of medicinal maggots involved in maggot therapy. The goal of this study was to examine lucifensin expression in various larval tissues during Lucilia sericata development and in maggots exposed to a variety of infectious environments in vitro. In situ hybridisation revealed lucifensin expression in the salivary glands of all larval stages. Expression was occasionally detected in a few cells of the fat body and in the grease coupler of the salivary glands. Expression of lucifensin in the salivary glands was initiated 5-6 h after hatching from the egg. Maximum expression was reached about 24 h after hatching, remained strong during the second and third instars and declined at the end of the third instar, before the wandering stage. Expression of lucifensin was also investigated in maggots after oral ingestion of certain pathogens regularly found in infected chronic wounds. No differences were detected in the salivary glands after stimulation by wound bacterial isolates. However, lucifensin expression was strongly stimulated in the fat body by the presence of Staphylococcus aureus and Pseudomonas aeruginosa. Our data suggest that certain infectious environments increase lucifensin expression only in the fat body, whereas its production and antimicrobial activity in excretion/secretion products are not affected.