Synopsis of Original Research Paper

Development of an in vivo drug efficacy evaluation system and a skin infection model using an invertebrate

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Cutibacterium acnes is a causative agent of inflammatory skin diseases such as acne vulgaris. In this study, we established a silkworm infection model to evaluate the host toxicity caused by *C. acnes*, and the efficacy of antibacterial drugs. Silkworms infected with *C. acnes* died when reared at 37˚C. The dose of injected bacterial cells required to kill half of the silkworms (LD_{50}) was determined under rearing conditions at 37˚C. The viable cell number of *C. acnes* was increased in the hemolymph and fat body of the infected silkworms. The survival time of silkworms injected with *C. acnes* was prolonged by the injection of antibacterial drugs such as tetracycline and clindamycin. Acute melanization, an innate immune response of silkworm, was induced by infection of *C. acnes*, but not by that of *Staphylococcus aureus* that causes a skin disease such as atopic dermatitis. Co-infection of *C. acnes* and *S. aureus* on the skin surface of silkworms led to skin melanization. These findings suggest that the silkworm *C. acnes* infection model can be used to evaluate host toxicity and innate immune response caused by *C. acnes*.