**Utilization Of The *Galleria mellonella* Infection Model For Antibacterial Compound Development**

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**Background and aims.** *Galleria mellonella* (Greater Wax Moth) is currently being used as an alternative to vertebrate models in *in vivo* studies for investigating pathogen virulence and the efficacy of antibacterial compounds. This model offers ethical advantages, low cost, and ease of use. This study aims to simulate the infection model on larvae to assess the activity of antibacterial agents and to examine changes in the hemocyte profile of *G. mellonella* using Flow Cytometry (FCM).

**Methods.** Experimental *G. mellonella* larvae were directly sourced from Ho Chi Minh City, Vietnam. Identification and assessment of the efficacy of *G. mellonella* as an infection and treatment model were performed. The immune responses of *G. mellonella* were monitored during pathogen exposure and post-infection treatment. The samples were processed and analyzed using FCM (BD Accuri C6 Plus). Data were processed by FlowJo and GraphPad Prism softwares.

**Results.** In the infection model, the larvae showed 100% mortality in 5/6 tested strains at a concentration of 107 CFU/ml. At concentrations below 104 CFU/ml, no larval mortality was observed. The immune response of *G. mellonella* was proved to be dependent on concentration and time. In the treatment model, a single therapeutic dose of meropenem was effective in treating the pathogens (p < 0.05), while it was not suitable for evaluating the efficacy of vancomycin and colistin due to the drugs’ pharmacokinetic properties over time (p > 0.05). The treatment model helped reduce the excessive proliferation of phagocytic blood cell lines in the larvae.

**Conclusion.** The study successfully established an infection model for various bacterial strains and a treatment model for the antibiotic meropenem. The innate immune system of the larvae interacts with foreign agents in a manner similar to that of humans, making the *G. mellonella* model a promising *in vivo* research tool across multiple aspects.

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**References:**

(1) Smitten K, Southam HM, Fairbanks S, et al. Clearing an ESKAPE Pathogen in a Model Organism; A Polypyridyl Ruthenium(II) Complex Theranostic that Treats a Resistant Acinetobacter baumannii Infection in Galleria mellonella. Chemistry. Feb 21 2023;29(11):e202203555. doi:10.1002/chem.202203555.

(2) Kamal F, Peters DL, McCutcheon JG, Dunphy GB, Dennis JJ. Use of greater wax moth larvae (Galleria mellonella) as an alternative animal infection model for analysis of bacterial pathogenesis. Bacteriophages: Methods