G. MELLONELLA LARVAE AS AN ALTERNATIVE ANIMAL MODEL TO STUDY INTERACTIONS BETWEEN ANTIMICROBIAL RESISTANT BACTERIA AND THE HOST

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Bacterial infections have had a large impact on public health and the discovery of antimicrobial compounds dramatically reduced mortality and morbidity contributing to significantly expand life expectancy. Nevertheless, antimicrobial use places evolutionary pressure on microorganisms and the massive use of antibiotics in human health, agriculture and animal production has led to the emergence of multi-drug resistant bacteria able to survive to several if not all the antibiotics available in the market [1]. At this time, antimicrobial resistance is one of the most dangerous issues for human health contributing to the spread of infectious diseases and, without effective new antimicrobials, the success of modern medicine in treating infections will be at increased risk.

Understanding host defenses, virulence factors and their evolution will help us to fight diseases, develop new drugs, and avoid the emergence of new resistant bacterial populations [2]. Host-pathogen interactions place reciprocal selective pressures on both organisms that need to constantly improve their defenses and virulence mechanisms, respectively, to avoid extinction. This is also known as the "*Red Queen Hypothesis*" or Evolutionary arm-races [3]. In this context, a new model for the study of host-pathogen interactions is becoming increasingly popular: larvae of *Galleria Mellonella*. These larvae could be useful for the study of some steps in the pathogenicity of infectious agents and the identification of new treatments [4].

Galleria Mellonella has several advantages as compared to the more complex mammalian models, including being cost-effective, easy to obtain and maintain, more amenable, and more ethically acceptable. In addition, the innate immune system of wax worms is functionally and structurally similar to mammals and contains both humoral as well as cellular immunity [5]. On top of these features that make the wax worms particularly useful for studying human pathogens, larvae can survive at 37 °C. This is highly advantageous, as many human pathogens undergo significant transcriptomic changes at this human body temperature [6].

In this regard, the aim of my PhD project is to study co-evolution processes of host-pathogen interactions or pathogen-pathogen interactions mimicking a biological environment in the *G. Mellonella* animal model in order to find new possible targets for antimicrobial resistance. The main goals are developing a standardized method for at least one model of bacterial infection with one or more bacteria in the larvae of *Galleria Mellonella*, evaluate bacteria-host interactions after infection, possible comparing results obtained in the insect with results obtained in mouse models of infection to validate the method.

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I declare to the extent of my knowledge that all information provided are true and fair at the time of completion and I will comply with any conditions or limits if the situation changes, or a COI arises

Serena Vastola will be a PhD student of the University of Roma Tor Vergata supervised by GSK Group of companies. Serena Vastola is now an intern at GSK Group of companies.