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Honey bee haemocyte cell culture as a tool for innate immune response in honey bee

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Honey bee (Apis mellifera L.) immunity is characterized by a range of responses to both biotic and abiotic stress factors, occurring at different levels, from the colony (social immunity) to the individual, cellular, humoral, and molecular levels (innate immunity).

Honey bee hemocytes are essential for immune responses, playing a key role in defending against pathogens and responding to various stressors, primarily parasites and pathogens. They are involved in processes such as phagocytosis, encapsulation, and the production of antimicrobial peptides. Understanding the modulation of hemocyte activity is crucial for assessing the impact of stress factors. However, to better understand the molecular mechanisms, an established and standardized cell line is necessary.

In this study, we will assess a standardized honey bee hemocyte cell culture integrated with automatic sensors to evaluate innate immune responses, focusing on cell survival, in vitro encapsulation, and melanization, with variations in nutritional intake. This study aims to provide a foundation for understanding immune function at the cellular and individual levels, particularly in the context of heterogeneous nutritional food sources from the environment.