The induction of caspase depending apoptosis as a defense immune mechanism

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Apoptosis, known as programmed cell death, is a carefully controlled, energy-dependent process of cell death that is orchestrated by a family of cysteine proteases known as the caspases. However, the relative contributions that the "executioner" caspases make to the demolition of the cell remains speculative. *Listeria monocytogenes* the main bacteria model in this project uses Listeriolysin O (LLO) a secreted pore-forming protein for its escape from the vacuole upon initial internalization.

The aim of this project is to investigate the specific roles of executioner caspase activity and its activities with intercellular growth of bacteria. Using bioinformatics prediction site, potential cleavage site of *Listeria* were degraded by active executioner caspase. The impact of this active caspase were examined by generating uncleavable executioner caspase and establishing infection models using Hela cells that were infected with *Listeria monocytogenes* LLO wild-type, LM LLO caspase (3, 6, 7 and 3/7) uncleavable mutants, and LM empty vector.

This project was able to establish that caspase activation does interfere with intracellular bacterial growth in Hela cells by specifically targeting secreted bacterial proteins that mediate their virulence and single point mutation render LLO uncleavable towards executioner caspase and resulted in increased bacteria virulence in infected Hela cells.

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