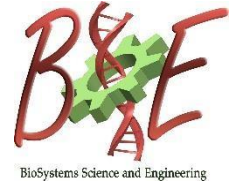




Indian Institute of Science
Centre for BioSystems Science and Engineering



Annual Work Presentation

At 4:00 PM on 1st October 2018 (Monday)

MRDG Seminar Hall, 1st Floor, Biological Sciences Building

Neuronal regulation of Innate Immune Responses in *Caenorhabditis elegans*

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Abstract

The survival of an organism depends on its ability to sense potential threats and develop defense mechanisms to fight against infections. Both anecdotal evidences and published studies indicate that the immune response is influenced by alterations in the state and function of the nervous system. However, the mechanism of regulation of immunity by direct sensing of environmental cues by the nervous system is not known. Using a simple host-pathogen system, *Caenorhabditis elegans*-*Enterococcus faecalis*/*Pseudomonas aeruginosa*, we want to understand how sensory perception of environmental cues by the nervous system regulates the susceptibility to infection. Using a sensory perception-deficit mutant, we find that sensory neurons indeed play a role in fighting against infection by Gram negative and Gram-positive bacteria. The neurons mediate pathogen-specific response via neuropeptides and neurotransmitters to regulate transcription factors that positively regulate transcription of antimicrobial effectors. Then we focussed on a subset of sensory neurons that sense chemicals/odorants and are known as Amphid sensory neurons. By ablating 9 pairs of amphid sensory neurons, we observed that they regulate immune response in a differential manner. Lastly, we show that amphid sensory neurons ASK negatively regulates immunity against both Gram negative and Gram-positive bacteria. Transcriptome analysis of ASK ablation strain reveals several detoxification mechanism that are dysregulated and currently under investigation for link with innate immunity.