S01-1 Roles for the two-component system EnvZ-OmpR in virulence control of bacteria

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Bacteria adapt themselves to host environments by altering gene expression pattern mainly with the aid of a transcriptional machinery called the two-component regulatory system (TCS), which consists of two protein components, the sensor kinase and response regulator. In response to environmental changes, the former component acts as a sensor and transfers signals to the latter for activation. Then, the response regulator, as a DNA-binding transcription factor, alters the level of transcription of particular genes. *Escherichia coli* is a genetically tractable Gram-negative bacterium, which possesses 30 sensor kinases and 34 response regulators. Our study aims at comprehensively determining roles for the *E. coli* TCS in the control of bacterial virulence.

We have used fruit fly *Drosophila melanogaster* as a host so that genetic approach may be taken for both an infectious agent and a host organism. Adult flies were infected with bacteria by abdominal injection. Those flies were subjected to the determination of bacterial growth, host survivorship, level of immune responses, expression level of genes coding for the TCS components, and the activity of TCS. We found an increase in the expression of 10 genes coding for the TCS components, including those involved in stress responses. These results suggest a role for the TCS in the control of infectious states of *E. coli* in *Drosophila*.