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**Interaction between host and pathogen: Bacteria producing HlyII.**

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One of several cytolytic proteins produced by opportunistic pathogen *B. cereus* is hemolysin II (HlyII). The *hlyII* gene is widely spread among bacteria, which belong to the *B. cereus* group, including *B. thuringiensis*, some subspecies of which are used as insecticide, and *B. anthracis* is an agent of anthrax, a mortal disease of man and animals. HlyII is a secreted microbial protein, which belong to the oligomeric  $\beta$ -barrel pore-forming toxins family that includes the *Staphylococcus aureus*  $\alpha$ -toxin. HlyII can disrupt membranes of erythrocytes and other eukaryotic cells *in vitro* by forming membrane ionic oligomeric pores. Pore formation leads to perturbation of cell ion–osmotic homeostasis and to cell death and lysis. The *hlyII* expression in *B. subtilis* renders bacteria hemolytic. Recombinant *B. subtilis::hlyII* can lead to death of macroorganisms: *Chara corallina* and *Daphnia magna*. Expression of HlyII in the crustacean gut leads to destruction of intestine cells, followed by a gradual disruption of other tissues. Fluorescent microscopy reveals post-infection changes in mitochondrial potential of intestine tissues during the first 24 h of infection, suggesting that formation of ionic pores leads to cell lysis and finally, to the host death. Expression of *hlyII* in *B. subtilis::hlyII-hlyIIR* is strongly suppressed by HlyIIR regulator and this recombinant is not pathogenic to the crustacean. The data presented show that hemolysin II, when acts alone, is sufficient virulence factor, and the regulation of *hlyII* expression could be an important step in the adaptation of bacteria to different environmental niches.

Keywords: hemolysin II, *B. cereus*, pore-forming toxin, microbial protein