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Bovine Herpesvirus Expressing Envelope Protein (E2) of Bovine Viral Diarrhea Virus As a Vaccine Candidate

Chang-Hee Kweon

Natl Vet Res Inst, Anyang, Republic of Korea

The gene encoding the envelope protein (E2) of bovine viral diarrhea virus (BVDV) was expressed under the thymidine kinase (TK) promoter of Korean bovine herpesvirus 1 (BHV-1) isolate. Thymidine kinase negative (tk-) BHV-1 recombinants expressing E2 of BVDV were derived and the expression of E2 of BVDV was identified by immunofluorescence and western blotting. Compared to wild type BHV-1, the recombinant BHV-1 showed the delayed cytopathogenic effect in cells. The immunogenicity of the recombinant BHV-1 was examined in guinea pigs and cattle. Although the increased body temperature was detected for a few days, the inoculated cattle return to normal with development of neutralizing antibodies against BVDV.

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Characterization of the Stress Response in *Streptococcus pneumoniae*

In-Hwa Choi, Seung-Whan Kim, Su-Nam Kim, Suhk-Neung Pyo,
Dong-Kwon Rhee*
College of Pharmacy, Sungkyunkwan University

Virtually all biological systems exhibit induction of heat shock proteins (HSPs) when exposed to high temperatures and other environmental stresses. *Streptococcus pneumoniae* (pneumococcus) is present in nasopharynx as a part of normal flora, and it experiences a change in temperature, pH, and ethanol concentration. Invading pneumococci encounter macrophages and are exposed to an extremely hostile environment, which may act as strong stress to pneumococci and may influence gene expression of HSPs. Therefore, the elucidation of HSP's role in the pathogenesis seems to be very crucial in understanding pathogenesis and host response. As a first step to understand the heat shock response in pneumococcus, protein profiles were examined upon stress challenge. Our results showed that the stress response in pneumococcus is significantly different from other organisms in overall stress response, HSPs profile, and stability, and may provide a foundation for evaluating the role of the response in the pathogenesis of pneumococcus.