Abstract

Bordetella pertussis is human pathogen, which causes severe respiratory disease called pertussis or whooping cough. Pathogenicity of *B. pertussis* is mediated by a wide variety of virulence factors including pertussis toxin, adenylate cyclase toxin, pertactin and filamentous haemagglutinin. Successful infection and colonization of the host depend on the precise timing of virulence factors production. For this purpose bacteria developed miscellaneous mechanisms of gene regulation. Two-component phosphotransferase systems, such as BvgAS, RisAK and PlrSR are involved in response to external stimuli. These systems of signal transduction modulate bacterial gene expression profiles and establish consecutive phases of infection. Non-coding RNAs, particularly sRNAs and RNA chaperone Hfq provide additional level of regulation. Hfq is a post-transcriptional regulator, which mediates interaction of sRNA with target mRNA and thereby modulates their translation. Hfq affects approximately 10% of all *B. pertussis* genes including virulence factors such as type III secretion system, adenylate cyclase toxin, pertussis toxin and filamentous haemagglutinin. Knowledge of these regulatory mechanisms plays a key role in understanding of the pathogenesis of whooping cough and can lead to improved control over the spread of the disease.

Key words: *Bordetella pertussis*, virulence factors, control of gene expression, BvgAS, Hfq chaperone