

NprRX Regulation on Surface Spreading Motility in Bacillus cereus

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Abstract : Bacillus cereus is a foodborne pathogen that causes two types of foodborne illness, the emetic and diarrheal syndromes. B. cereus consistently ranks among the top three among bacterial foodborne outbreaks in the ten years of 2001 to 2010 in Taiwan. Foodborne outbreak caused by B. cereus has been increased, and recently it ranks second foodborne pathogen after Vibrio parahaemolyticus. This pathogen is difficult to control due to its ubiquitousness in the environment, the psychrotrophic nature of many strains, and the heat resistance of their spores. Because complete elimination of biofilms is difficult, a better understanding of the molecular mechanisms of biofilm formation by B. cereus will help to develop better strategies to control this pathogen. Surface translocation can be an important factor in biofilm formation. In B. cereus, NprR is a quorum sensor, and its apo NprR is a dimer and changes to a tetramer in the presence of NprX. The small peptide NprX may induce conformational change allowing the apo dimer to switch to an active tetramer specifically recognizing target DNA sequences. Our result showed that mutation of nprRX causes surface spreading deficiency. Mutation of flagella, pili and surfactant genes (flgAB, bcpAB, krsABC), did not abolish spreading motility. Under nprRX mutant, mutation of spo0A restored the spreading deficiency. This suggests that spreading motility is not related surfactant, pili and flagella but other unknown mechanism and Spo0A, a sporulation initiation protein, inhibits spreading motility.

Keywords : Bacillus cereus, nprRX, spo0A, spreading motility

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