

# Crystal Structure of the Extracellular Metalloprotease Precursor from *Bacillus subtilis*

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## Abstract

*Bacillus subtilis*, a gram-positive bacterium, secretes at least eight extracellular proteases at the end of exponential phase of growth. These bacteria have two major of extracellular proteases produced during the onset of sporulation, alkaline serine protease subtilisin (AprE) and a neutral protease (NprE). The other proteases, include Epr, bacillopeptidase F (Bpr) metalloprotease (Mpr), neutral protease B (NprB), wall-associated extracellular protease (WprA), and Vpr. One intriguing feature of the extracellular protease is the existence of a pro-peptide sequence between the signal sequence (pre-form) and the mature enzyme sequence, suggesting a tightly controlled release of a mature enzyme. In this study we elucidate the crystal structure of an inactive mutant pro-form of metalloprotease (pro-Mpr S267A) from *Bacillus subtilis*. The pro-Mpr S267A crystal structure is determined to 1.1-Å resolution by using the multi-wavelength anomalous dispersion methods. The crystal structure shows a basic planar structure. Furthermore, the pro-peptide region (residues 85-93) covers over the active site, but not in the entrance of substrate peptides. Based on the results, we report here the first structure determination of metalloprotease precursor from *Bacillus subtilis*. This structure provides a great snapshot for better understanding the activities and properties of Mpr.

**Keywords – *Bacillus subtilis*, Crystal structure, Metalloprotease, Protein crystallography.**