**PENICILLIN-BINDING PROTEIN SPOVD IS A SUBSTRATE FOR THIOL-DISULFIDE OXIDOREDUCTASE STOA IN THE BACILLUS SUBTILIS FORESPORE**

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**Background:** StoA (SpoIVH) is an extracytoplasmic, membrane-anchored, thioredoxin-like, thiol-disulfide oxidoreductase important for endospore cortex synthesis in *B. subtilis*¹.²

**Objective:** Identify substrate protein(s) for StoA in the forespore inter-membrane compartment.

**Methods:** Candidate substrate proteins are searched by a bioinformatics approach. Genes for candidate proteins in *B. subtilis* are inactivated and the spore phenotype of the mutants is determined. Identified protein(s) are characterized biochemically and functional to StoA demonstrated in vivo using a genetics approach.

**Results:** SpoVD was identified as a probable substrate. It is a predicted membrane-anchored, high-molecular weight, penicillin-binding protein³. SpoVD was isolated and shown to bind penicillin and to contain two redox active cysteines that probably are connected by a disulfide bridge. Using Cys-substituted variants of SpoVD it was demonstrated that the disulfide is linked to a requirement for StoA but not required for activity of SpoVD.

**Conclusion:** A disulfide bond can form in the vicinity of the active site of the transpeptidase domain of SpoVD and this probably blocks its enzyme activity. StoA functions to specifically break that bond. The overall results show that the disulfide in SpoVD is not essential for endospore synthesis and is a means to tune the transpeptidase activity of SpoVD.

**References:**

