Structures of *B. burgdorferi* OspB Alone, and in Complex with a Bactericidal Fab

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Certain antibody Fab fragments directed against the C-terminus of outer surface protein B (OspB), a major lipoprotein of the Lyme disease spirochete, *Borrelia burgdorferi*, have the unusual property of being bactericidal even in the absence of complement. We report here X-ray crystal structures of a C-terminal fragment of *B. burgdorferi* outer surface protein B (OspB) both alone and in a complex with the bactericidal Fab H6831. The H6831 epitope is topologically analogous to the LA-2 epitope of OspA and is centered around OspB Lys 253, a residue essential for H6831 recognition. A 8-sheet present in the free OspB fragment is either disordered or removed by proteolysis in the H6831-bound complex. In both crystal structures, OspB C-terminal fragments form artificial dimers connected by *inter*molecular 8-sheets. OspB structure, stability, and possible mechanisms of killing by H6831 and other bactericidal Fabs are discussed in light of the structural results.

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