Structure of a Dimeric Single-stranded DNA Binding Protein from *Thermus aquaticus*

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Single-stranded DNA binding (SSB) proteins are involved in DNA replication, repair and recombination. While not showing pronounced sequence specificity they bind strongly to single-stranded DNA (ssDNA) but not to double-stranded DNA(Meyer und Laine 1990). This results in stabilizing the ssDNA, preventing hairpin formation and holding it in a suitable conformation for the action of other proteins involved in e.g. DNA replication. There exist several structural classes of SSB proteins ranging from monomers, homodimers, heterotrimers to homotetramers which all have oligonucleotide/oligosaccharide binding folds (OB-fold) in common(Murzin 1993; Suck 1997). One of these classes is formed by the homotetrameric SSB proteins which occur in eubacteria like *E. coli* and in eukaryotic mitochondria. These proteins contain one OB-fold per monomer resulting in four DNA binding sites in each homotetramer. Recently, SSB proteins were identified in the bacterial Thermus group that share homologies to the tetrameric SSB proteins, but the monomers are twice the size compared to those of the homotetrameric SSBs. These proteins contain two OB-folds per monomer and it could be shown that they form dimers in solution(Dabrowski et al., 2002; Eggington et al., 2004). Thus, the principle of four DNA binding sites per functional unit also is conserved in these bacterial SSB proteins. In this work we have expressed, crystallized and solved the structure of the SSB protein from the thermophilic bacterium *Thermus aquaticus*. New insights, based on the structural information, will be discussed in the context of the SSB function in thermophilic bacteria.

[1] Dabrowski S., Olszewski M., Piatek R., Brillowska-Dabrowska A., Konopa G., Kur J., *Microbiology*, 2002, **148(10)**, 3307-15. [2] Dabrowski S., Olszewski M., Piatek R., Kur J., *Protein Expr Purif*, 2002, **26(1)**, 131. [3] Eggington J. M., Haruta N., Wood E. A., Cox M. M., *BMC Microbiol*, 2004, **4(1)**, 2. [4] Meyer R. R., Laine P. S., *Microbiol Rev*, 1990, **54(4)**, 342-80. [5] Murzin A. G., *Embo J.*, 1993, **12(3)**, 861-7. [6] Suck D., *Nat Struct Biol*, 1997, **4(3)**, 161.

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