

SmAP from *Halobacterium salinarum* has two different forms with the same structure but a different RNA-binding affinity

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Lsm (Sm-like) proteins are found in representatives of all the three domains of life. The functions of bacterial and eukaryotic Lsm proteins have been studied well. Eukaryotic Sm/Lsm are part of various RNP particles and are involved in RNA processing. Bacterial Lsm protein Hfq exhibits RNA-chaperone activity, facilitate the interaction of regulatory rRNA with mRNA, thus regulating gene expression. Nowadays, there is a little information about the functions of the archaeal Lsm proteins SmAP, some data shows that they appear to be involved in the processing of some RNA (such as tRNA).

Our work concerns structural and functional studies of SmAP from *Halobacterium salinarum*. The protein has no unstructured N- and C-terminus or extended loops between secondary structure elements thus representing a minimal Lsm core. However, in the genomic data we have found a variant of the protein with nine amino acids length N-terminal extension. Both variants of the SmAP from *H. salinarum* have been isolated and their affinity to oligo(A) and oligo(U) RNA have been measured. A difference in the affinity of the alternatives to the RNA has been found. Besides, the proteins were crystallized and X-ray diffraction data have been collected at ERSF in Grenoble. SmAP from *H. salinarum* has the characteristic for the Lsm proteins doughnut-shape form with seven monomers organized into a torus.

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