

P063 Structural and functional studies of a novel archaeal endonuclease reveal a co-operative molecular regulatory mechanism that participates in processing of stalled replication forks

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We have identified a novel archaeal endonuclease dubbed NucS that interacts in pull-down experiments with the replication clamp PCNA and an archaeal FANCM ortholog. Structural determination of *P. abyssi* NucS revealed a tetrameric ring assembly that provides a unique structural basis for the binding and processing of exposed single stranded DNA extremities. Biochemical, structural and genetic studies indicate that NucS orthologs function in the repair of stalled replication forks by using a built-in molecular regulatory domain that slows down the feeding of the ssDNA into the nuclease channel, thus directing the cleavage activity of NucS proteins toward dsDNA/ssDNA junctions on branched DNA substrates. NucS proteins constitute a new family of structure specific endonucleases that are widely distributed in archaea and in some bacteria.