

Publication

3BBX: The Hsp15 protein fitted into the low resolution Cryo-EM map of the 50S.nc-tRNA.Hsp15 complex

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When heat shock prematurely dissociates a translating bacterial ribosome, its 50S subunit is prevented from reinitiating protein synthesis by tRNA covalently linked to the unfinished protein chain that remains threaded through the exit tunnel. Hsp15, a highly upregulated bacterial heat shock protein, reactivates such dead-end complexes. Here, we show with cryo-electron microscopy reconstructions and functional assays that Hsp15 translocates the tRNA moiety from the A site to the P site of stalled 50S subunits. By stabilizing the tRNA in the P site, Hsp15 indirectly frees up the A site, allowing a release factor to land there and cleave off the tRNA. Such a release factor must be stop codon independent, suggesting a possible role for a poorly characterized class of putative release factors that are upregulated by cellular stress, lack a codon recognition domain and are conserved in eukaryotes.

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