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## THE MECHANISMS OF ADAPTATION ALLOWING BACTERIA TO SURVIVE IN HIGH TEMPERATURES

### Summary

From the anthropocentric point of view, the environments that are characterized by high temperatures have been identified as extreme ones. Originally, they were considered as too extreme to allow any organism to survive. However, later investigations have revealed that there exists a fairly large group of microorganisms thriving very well in these conditions. In order to withstand high temperatures these microorganisms have developed numerous mechanisms and strategies for protecting their cells. They include inter alia production of heat shock proteins, stabilization of the double-stranded DNA structure, rapid re-synthesis of ATP, certain amino acids and other heat-labile components of the cell, enhanced synthesis of: trehalose and other molecules stabilizing cell structures, and specific proteases hydrolyzing denatured proteins, substitution of thermo-labile nicotinamide adenine dinucleotides by more thermally stable ferredoxin, as well as modifications of gene expression. Presently, enzymes produced by thermophilic microorganisms are an important area of research owing to their unique properties and wide industrial applications.

Keywords: bacteria, chaperones, thermophiles, thermostability, trehalose