

Thermophiles

Biology and Technology at High Temperatures

We might think of them as living on the very edge of existence. Referred to as extremophiles, these microorganisms exhibit the most radical capacity for adaptation. They survive and in many cases thrive in harsh environments that we believe are just barely conducive to the existence of cellular life. Unlocking the mechanisms and understanding the evolutionary development that allows these simple yet elegant organisms to thrive can teach us much about our own microbiology. One example, thermophiles (literally: heat lovers) are microorganisms that thrive at temperatures above the mesophilic range of 25-40°C.

Until recently, due to the extreme environment they inhabit, the study of thermophiles was highly limited. However with the advent of new tools, particularly whole genome analysis, genetic manipulation and community sequencing, remarkable strides have been made in the study of these extreme examples of living adaptive organisms.

Thermophiles: Biology and Technology at High Temperatures presents a cogent summary of the progress made in studying these extremophiles and speaks directly to the implications of that progress. Much is being learned from the study of thermophiles, especially our understanding of fundamental biology at the molecular level and the genetic mechanisms that permit adaptation and survival. By studying this extreme example of life, its subtle, yet exaggerated response mechanisms, and its development over the course of many short-lived generations, we may begin to understand the mechanisms in a number of diseases linked to improper protein folding, and also begin to more fully understand the ingenious design of DNA, and all that such an understanding implies regarding the health and survival of human life in a rapidly changing environment.

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