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The role of stabilization centers in protein thermal stability

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Abstract

The definition of stabilization centers was introduced almost two decades ago. They are centers of noncovalent long range interaction clusters, believed to have a role in maintaining the three-dimensional structure of proteins by preventing their decay due to their cooperative long range interactions. Here, this hypothesis is investigated from the viewpoint of thermal stability for the first time, using a large protein thermodynamics database. The positions of amino acids belonging to stabilization centers are correlated with available experimental thermodynamic data on protein thermal stability. Our analysis suggests that stabilization centers, especially solvent exposed ones, do contribute to the thermal stabilization of proteins.

Keywords

protein stability; stabilization centers; stability changing mutations; thermal stability; thermophiles

Abbreviations

CD: Circular Dichroism

DSC: Differential Scanning Calorimetry

PDB: Protein Data Bank

SC: Stabilization Center

SCE: Stabilization Center Element

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