Finding the highest-thermo-stable protein, keeping the conformation at nearly $150\ ^{\circ}C$

The function of a protein, which is one of the major living materials, highly depends on the steric structure (conformation). The conformation, however, is very sensitive to be easily denatured by subtle change in the adaptable surrounding conditions such as temperature and pH value. In the nature, surprisingly, it is well-known that proteins from the hyperthermophile living in the hot spring area with the temperature close to the boiling point of water have considerably high stability.

Advanced Protein Crystallography Research Group in RIKEN SPring-8 Center found that the CutA1 protein isolated from the hyperthermophile has an extremely high denaturation temperature of nearly $150\ ^{\circ}C$, which exceeds the highest record determined by a differential scanning calorimeter by about $30\ ^{\circ}C$. The surface of this protein was almost covered with ion-pair networks. This crucial contribution of ion pairs on the surface should maintain the protein conformation at extremely high temperatures.

The present results will provide the idea to design protein architecture with extremely high stability and a better understanding for the physiology of extraordinary high-stable such proteins as prion.


For more information, please contact:

RIKEN Public Relations Office
Email: koho@riken.jp