

# Laboratory of Molecular Biotechnology

~Functional and Structural Studies of Proteins~

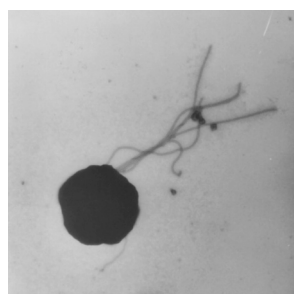
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## Studies on the proteins from extremophiles

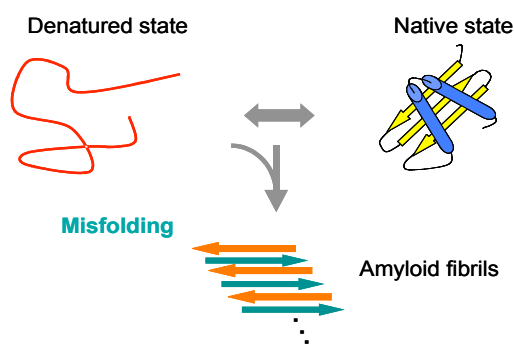
The purpose of this study is to isolate industrially useful proteins from extremophiles, such as hyperthermophiles and psychrophiles, and to understand their adaptation mechanisms. The proteins of interest, which include proteases, RNases, lipases and phosphatase, are overproduced, purified, and analyzed for functions, structures, stability, and folding. These studies contribute to develop a method to improve protein function and to create a protein with novel function.



Hyperthermophile



Tk-subtilisin

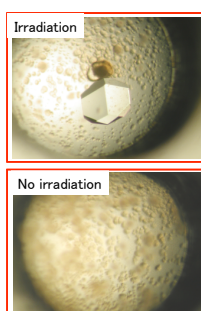
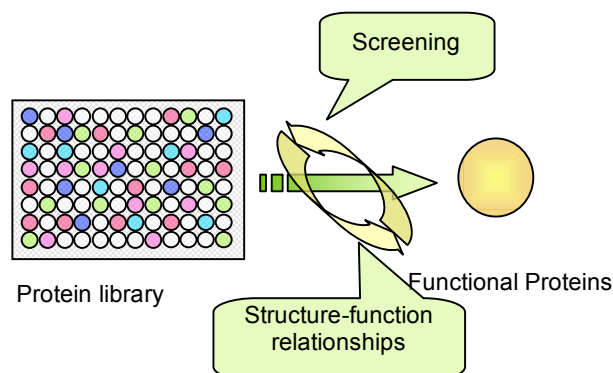


## Principles of protein architecture

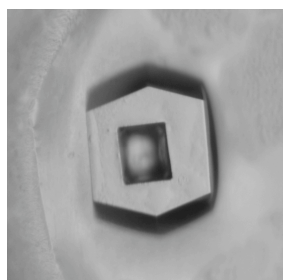
The elucidation of 'principles of protein architecture' is to understand the relationship between three dimensional structures of proteins and their amino acid sequences. We focus stability, folding (misfolding and amyloid) and structures of proteins.

## Molecular evolutionary protein design

We are screening novel genes of unknown functional proteins from genetically engineered DNA library or metagenomic library of unculturable bacteria as a natural genetic source. Through the screening and further analysis of structure-function relationships, we are trying to create new proteins with desired functions.



LIGHT



PULSA

## Biocrystal design

For structural genome sciences and next-generation devices, we have developed new techniques for growth and process of protein crystals: For examples, laser irradiated growth (LIGHT) technique, solution stirring technique for crystal growth, and pulsed UV laser soft ablation (PULSA) technique for processing.