Master's degree project / Research Training / Internship

Title: **Structure-functional study of a chloroplast peptidase**

We are looking for an ambitious student with an interest in molecular biology, protein purification, and structural biology to study chloroplast peptidase for a project to answer a fundamental question of the specific role of the Glutamyl peptidase enzyme.

Background

Peptidases are enzymes involved in digesting protein chains into smaller fragments by splitting the peptide bond that links amino acid residues. One important function of peptidases is to maintain protein homeostasis within cells.

A chloroplast peptidase called chloroplast glutamyl endopeptidase (CGEP) was recently identified in Arabidopsis thaliana and is the only known plant endopeptidase. CGEP belongs to the S9D subfamily of Ser proteases but is evolutionarily unrelated to other γ-glutamyl peptidases/transferases of the S9 family. The S9 family peptidases provide some clues about the catalytic residues and its endo-/exo-glutamyl peptidase activity but currently, there are no known crystal or Cryo-EM structures of plant CGEP available to provide a structural basis to interpret CGEP function.

Work plan

In this project, you will (i) transform the already generated plasmid into *E. coli*, (ii) perform affinity and size exclusion chromatography to purify CGEP, and (iii) characterize the purifying enzyme using PAGE and other biophysical techniques. This purified enzyme will further crystallize, and solve the structure of CGEP and CGEP truncation mutants through X-rays crystallography- does the experimentally obtained crystal structure agree with homology models, and what are the implications for our understanding of CGEP structure-function?

Contacts

If you find this project interesting, please contact Afshan Begum:

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