



Expression and Purification of an Antifreeze Protein from a Broadleaf Desert Shrub

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Background

Antifreeze Proteins

- Protect organisms from ice damage



Dehydrins

- Intrinsically disordered proteins that can become transiently structured

AnAFP

- From *Ammopiptanthus nanus* (broadleaf desert shrub)
- Sequence homology with dehydrins



Figure adapted from Sun et al. 2021

Potential Applications

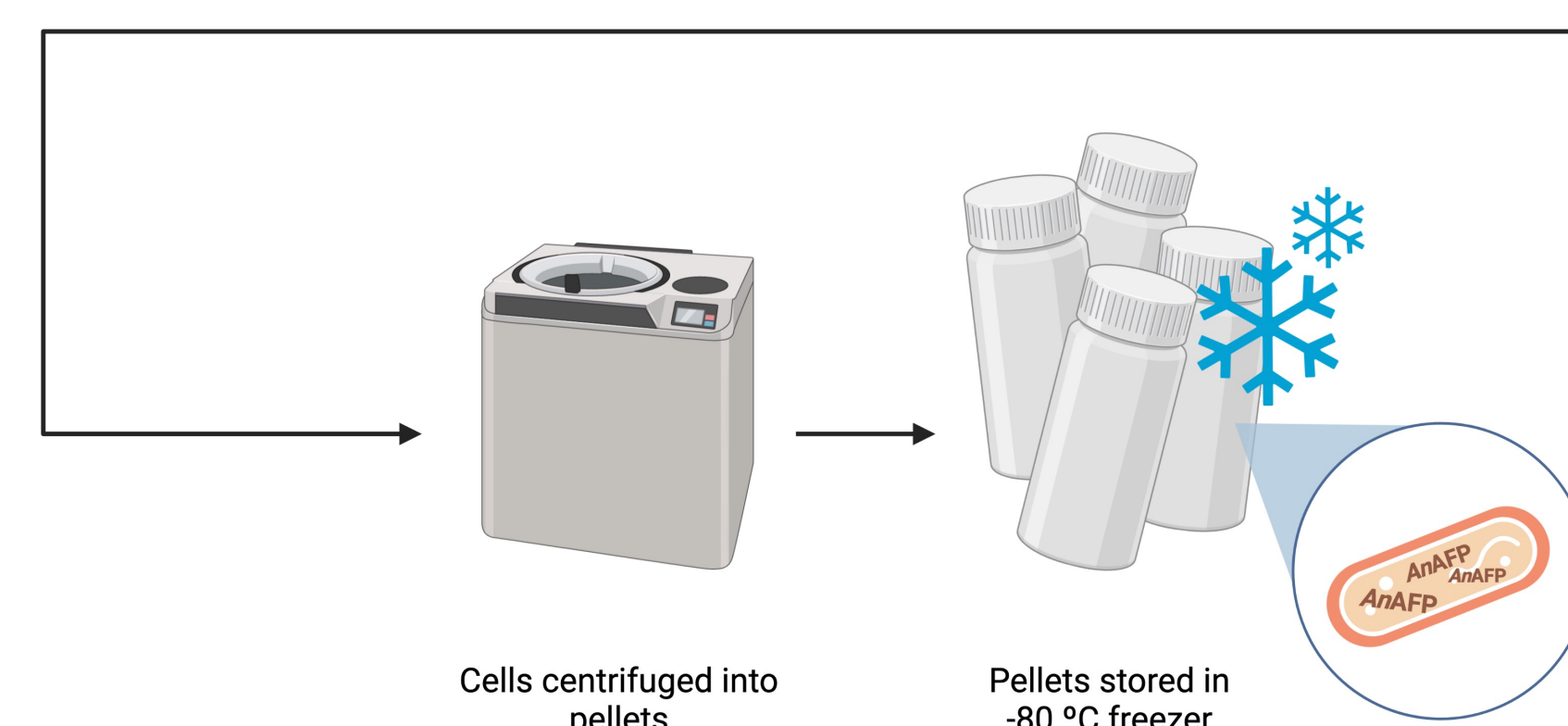
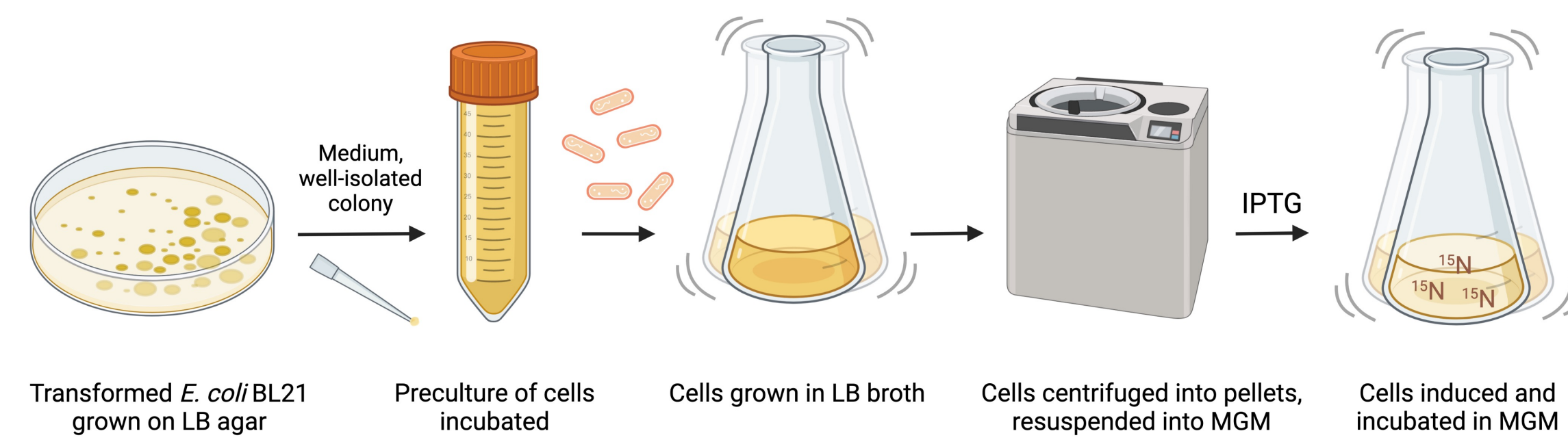
Agriculture

Pharmaceuticals

Blood and tissue storage



Protein Expression



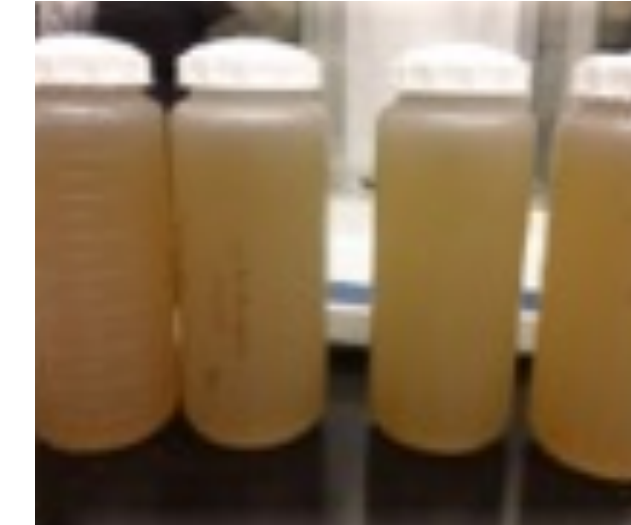
E. coli grown on agar



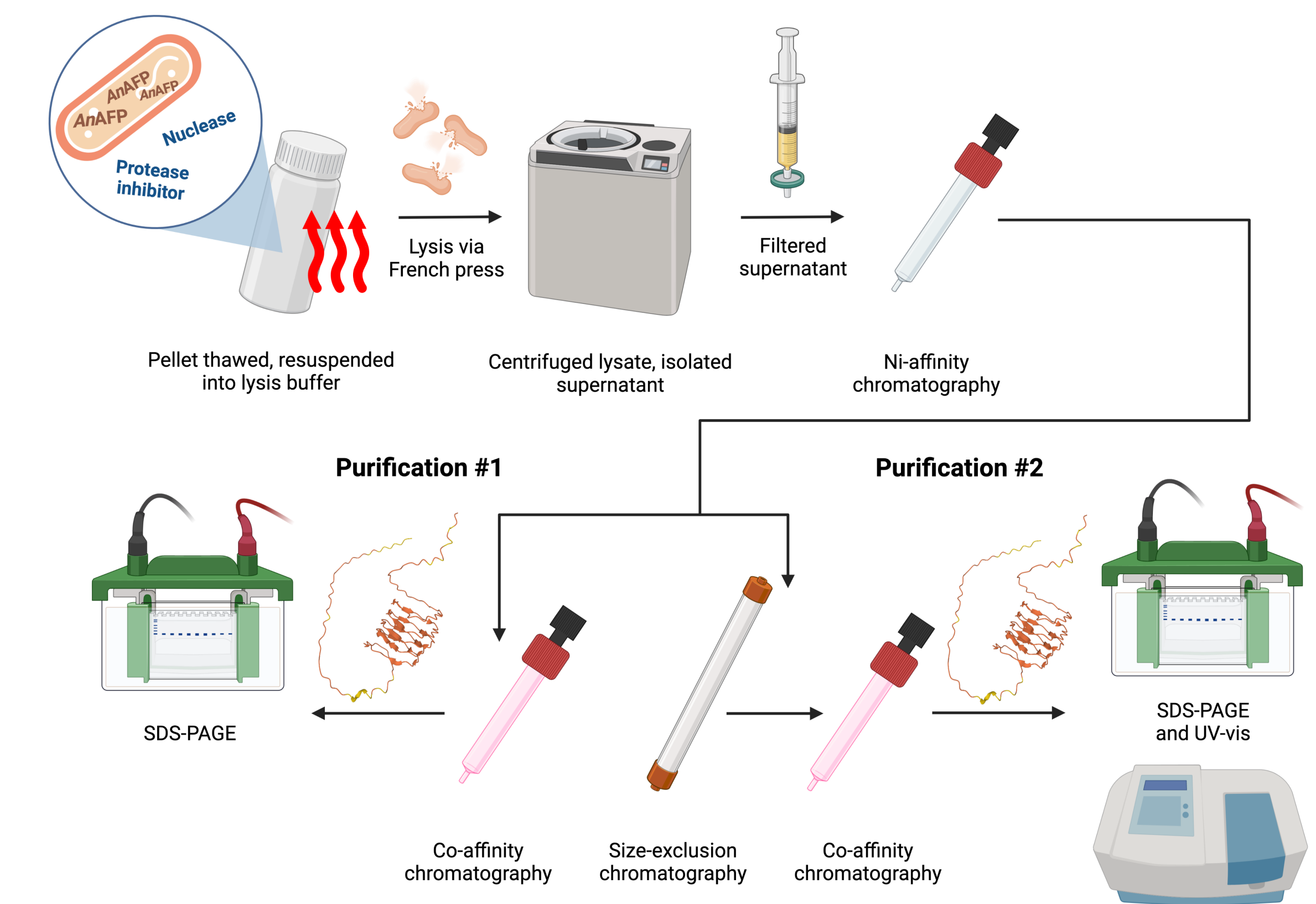
Broth with growing cells



Cells in broth before centrifuging



Protein Purification



FPLC System



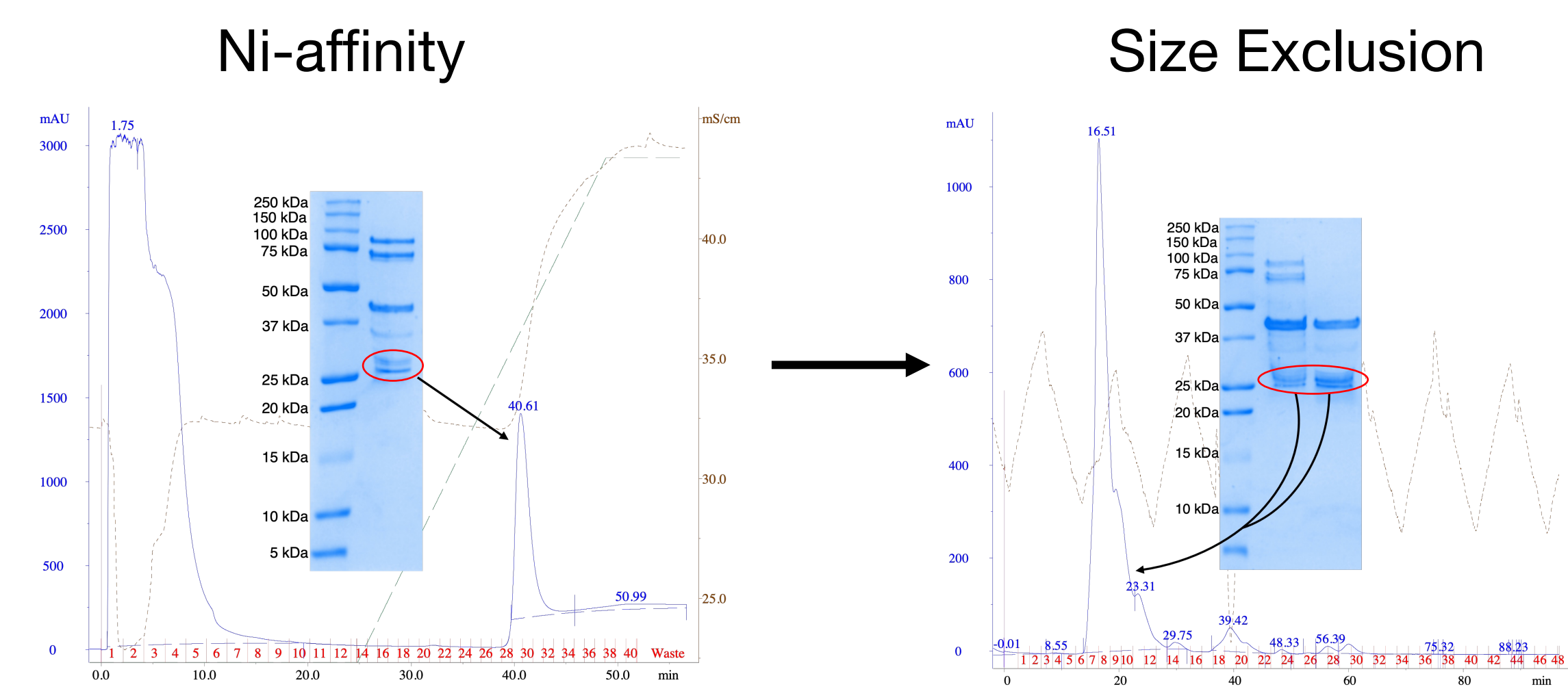
FPLC Columns



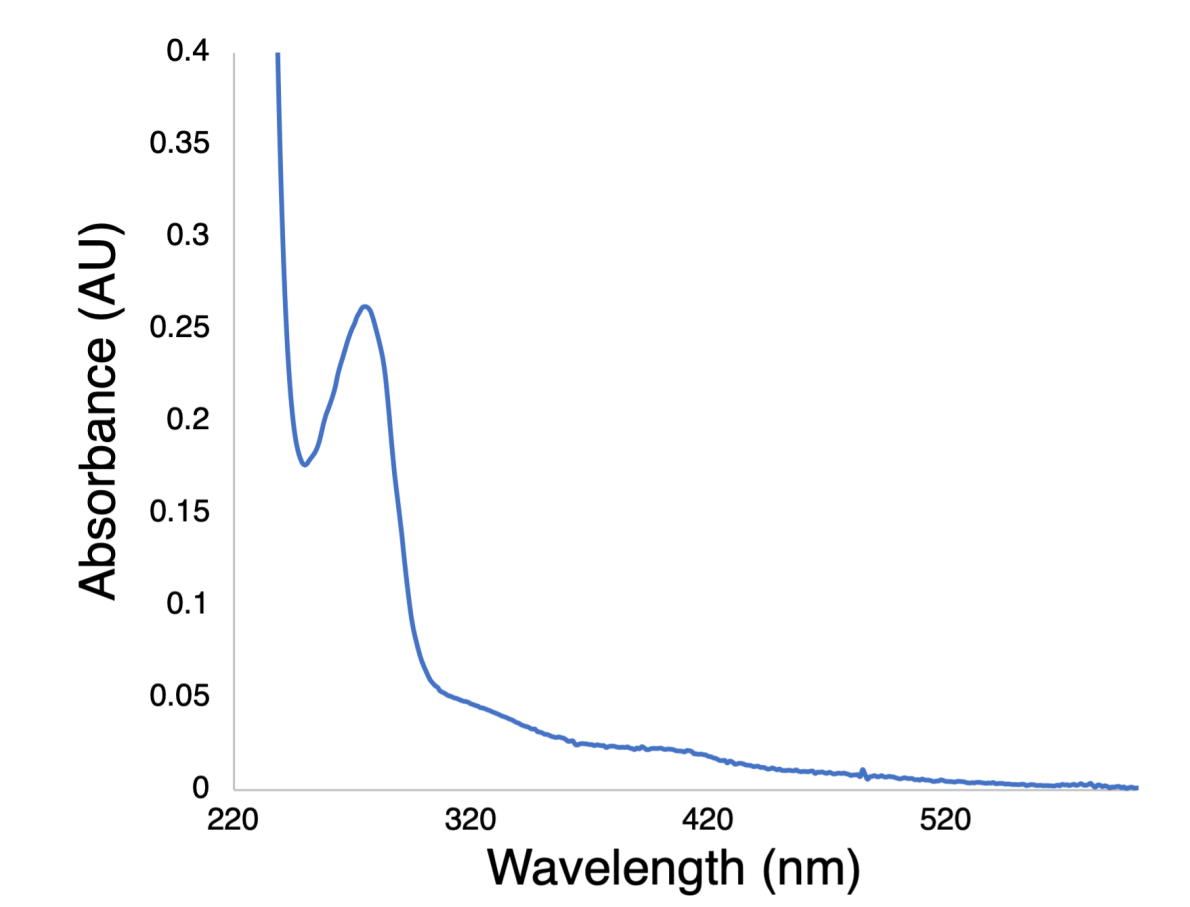
FPLC = Fast protein liquid chromatography

Results

AnAFP Purification by Chromatography



AnAFP Characterization by UV-Vis Spectroscopy



Objectives

- Our goal is to determine the structure and function of AnAFP, then study its applications
- This research focused on optimizing the protein expression and purification to produce AnAFP of sufficient quantity and purity for NMR structural studies

Discussion

- AnAFP was successfully purified
- Aggregation may have contributed to low concentration and difficulties in purification
- For future experiments, truncated versions of the AnAFP protein may be used

Acknowledgements

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References

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