

PHYS-468 Exercise 02 – Protein purification

Due date: The exercise is due one week after the lecture on Tuesday before 13:00hrs.

Hand in: Submit the assignment to Moodle as a PDF file with the file name PHYS-468-Exercise-<number>-<name>.pdf, where <number> is a two-digit number (starting with "01"), and <name> is your name.

Name: Last name, First name

Sciper: #####

1) Biophysical properties of proteins:

- a) What biophysical properties influence the movement of a protein through solution, and how?

- b) How do amino acids determine the different biophysical properties of a protein?

2) Chromatography columns used in biochemistry:

a) According to which property does a gel filtration column separate proteins?

b) According to which property does an ion exchange column separate proteins?

c) How can an IMAC column be used to purify one protein out of many?

3) Gel electrophoresis

a) Explain/Draw + label the mechanism of SDS-PAGE

b) You run an SDS-PAGE gel and see multiple bands for your purified protein. What are possible explanations? How would you refine the purification?

4) Spectroscopy Calculation

A protein solution has an **absorbance (A280) of 1.5** in a **1 cm cuvette**. The extinction coefficient for this protein is **50,000 M⁻¹cm⁻¹**. What is the protein concentration?

Hint: Use Beer-Lambert Law: $A = \epsilon cl$.

5) Membrane proteins

Explain/Draw + label how detergents can be used to aid in the purification of membrane proteins?