CONCEPT: STUDYING PROTEINS

● Scientists use a variety of _____ to study protein structure and function

□ **SDS Polyacrylamide gel-electrophoresis (SDS-PAGE)** is used to detect proteins

- Protein solutions are run through a polyacrylamide matrix (contains adjustable pores for migration)

- Proteins unfold when attached to negatively charged SDS, and therefore migrate in response to + charge

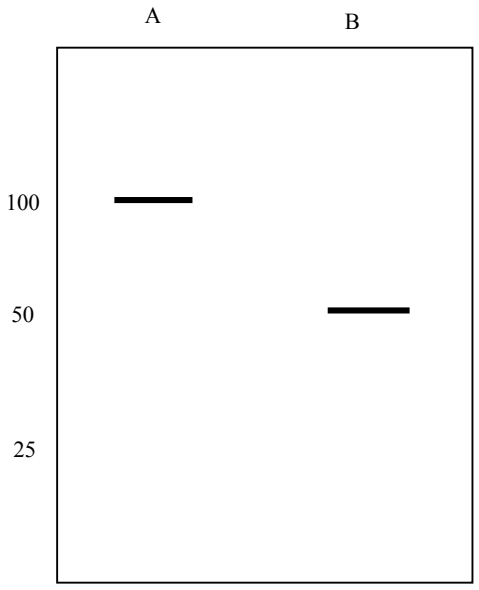
- The gel is then transferred onto nitrocellulose paper via a second electric field

- The membrane is then *immunoblotted* with antibodies to identify if proteins are present

□ **2D Gel electrophoresis** can separate up to 2000 proteins on one membrane

- Proteins are separated by intrinsic charges and pH

EXAMPLE: SDS PAGE



□ **Mass spectroscopy** is used to identify unknown proteins

- Samples _____ peptides via a mass to charge ratio

- Provides sequences of proteins from unknown protein solutions

□ **Nuclear magnetic resonance spectroscopy (NMR)** is used to analyze structures of proteins in solution

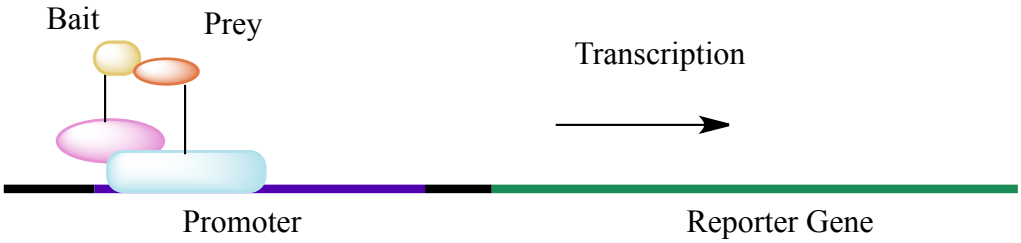
□ **Yeast-two hybrid system** is able to examine if two proteins interact inside a living organisms

- Two proteins of interest (called “bait” or “prey”) are fused to transcription factors

- If bait and prey proteins interact, then the transcription factors interact

- The interaction is created so that when the bait and prey interact it activates transcription of a gene

EXAMPLE: Yeast two hybrid system



PRACTICE:

1. Which method would be best to use if you wanted to identify unknown proteins?
    a. SDS-PAGE
    b. Mass Spec
    c. NMR
    d. Yeast two-hybrid test

2. Which method would be best to use if you wanted to analyze the structure of a protein?
    a. SDS-PAGE
    b. Mass Spec
    c. NMR
    d. Yeast two-hybrid test