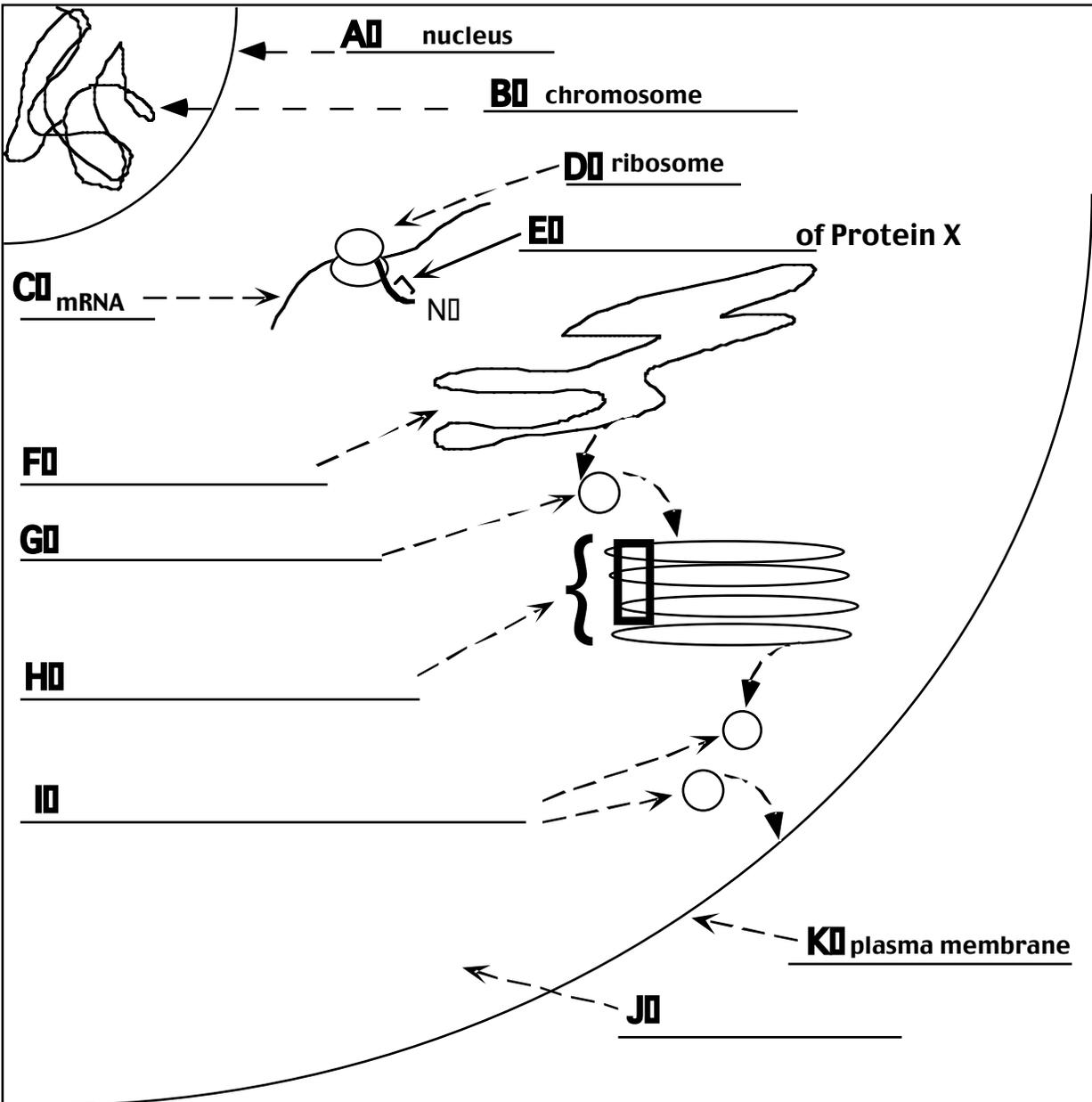


7.012 SECTION PROBLEM PROTEIN SECRETION AND LOCALIZATION



The following 4 proteins are found in a yeast cell.

- Protein 1 is a cytoplasmic protein
- Protein 2 is a secreted protein
- Protein 3 is a secreted protein
- Protein 4 is a plasma membrane protein

Describe how each of the following mutations (a-f) affect the localization of these above proteins.

- outside the cell
- in the cytoplasm
- in the golgi
- in the ER
- in transport vesicles
- in the plasma membrane
- in secretory vesicles
- in the nucleus

Fill in the blanks below with the term(s) from the previous list to indicate the resulting locations of the proteins.

a) Mutation A is a deletion of the signal sequence protein 2. Where would the majority of the following proteins be found in a strain with this mutation?

Protein 1?

Protein 2?

Protein 3?

Protein 4?

b) Mutation B inactivates the SRP (signal recognition particle), preventing it from binding to signal sequences. Where would the majority of the proteins be in a strain with this mutation?

Protein 1?

Protein 2?

Protein 3?

Protein 4?

c) Mutation C results in a deletion of the transmembrane domain of protein 4. Where would the majority of the following proteins be found in a strain with this mutation?

Protein 1?

Protein 2?

Protein 3?

Protein 4?

d) Mutation D blocks the fusion of the transport protein vesicles with the Golgi membrane. Where would the majority of the following proteins be found in a strain with this mutation?

Protein 1?

Protein 2?

Protein 3?

Protein 4?

e) Mutation E eliminates the SRP docking protein on the ER membrane. Where would the majority of the following proteins be found in a strain with this mutation?

Protein 1?

Protein 2?

Protein 3?

Protein 4?

f) Mutation F inserts a signal sequence in frame at the beginning of Protein 1. Where would the majority of the following proteins be found in a strain with this mutation?

Protein 1?

Protein 2?

Protein 3?

Protein 4?