

1. Explain necessary and sufficient.
2. Which organelles use post-translational targeting of proteins? co-translational? Explain the processes.

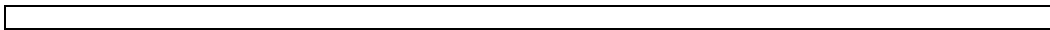
What is the role of (GAP, GEF, RAN, Nuclear protein receptors/importin) in bringing in proteins into the nucleus?

Who are TIM and TOM and why do mitochondria love them so much?

A plasma membrane protein crosses the plasma membrane three times, the N-terminus is in the cytosol, and the C-terminus protrudes outside the cell. The rectangle below represents the protein, add notation to this rectangle to indicate possible locations of its signaling regions, and what sort of signals they provide.

N-terminus

C-terminus



Technique/ Genomics	Uses
Restriction Enzymes	
Gel Electrophoresis	
Hybridization	
Cloning	
PCR	
Sequencing - dideoxy	
Microarrays	
Genomic/c DNA libraries	

6. A scientist needs to clone a gene she is studying, which is involved in organ development in *C. elegans* (worms). The worm genome has been sequenced, so the scientist knows the DNA sequence of the gene. What is the best technique for her to use to amplify and clone the gene? Once the gene is cloned into a plasmid, she transforms the plasmid into *E. coli* bacteria and grows them in the presence of an antibiotic

(ampicillin). Unfortunately, virtually all the bacteria die. She confirms that the gene insert is properly ligated into the vector, and the vector is being efficiently transformed into the bacteria. What two problems may exist in the vector to produce this result?

On what basis does an agarose gel separate DNA fragments? Where in the gel would large sized fragments run?

How was the NLS shown to be necessary AND sufficient for import into the nucleus?

Briefly describe the experiments.

Although NLS and mitochondrial import signal both use Lys and Arg residues, there are important differences between the two signals. Name and explain two differences.

Which molecules are involved in vesicle targeting to organelles. Briefly explain how they work.

The Golgi has cisternae that have different functions. Name the cisternae and state 1 think that happens there.

What “triggers” coat assembly for vesicles moving from ER to Golgi?

Removal of chaperones from folded proteins and inactivation of Sar1 GTPase have similarities when energetics are concerned. What are the similarities?