

MCB 130 Final Questions, Spring 2002

1. Ribosome assembly begins in the nucleolus, a specialized compartment in the nucleus. Answer the following questions about this process.

- (5pts) a. Ribosomal protein subunits have an NLS (nuclear localization sequence). True or False? Explain your answer briefly.
- (5 pts) b. Ribosomes assembled in the nucleolus have one or more NES (nuclear export signal). True or False? Explain your answer briefly.
- (5 pts) c. Assembled ribosomes diffuse back and forth through the nuclear pore complex. True or False? Explain.
- (10 pts) d. Provide a list of the nuclear transport factors required to get assembled ribosomes into the cytoplasm. Include a diagram of the process and indicate how each factor participates in the process.

2. Membrane fusion requires SNARE proteins that bridge adjoining membranes. One theory is that SNARE proteins are necessary and sufficient to catalyze fusion as long as one participating membrane has a v-(vesicle) SNARE and the other has a t-(target) SNARE.

(5 pts) a. Provide a brief explanation of the meaning of the two criteria, necessary and sufficient, in the context of a protein, such as a SNARE, which is essential for a cell process such as secretion.

(10 pts) b. Describe an experiment to show that SNARE proteins are necessary for membrane fusion.

(10 pts) c. Describe an experiment to show that SNARE proteins are sufficient to catalyze membrane fusion.