Cell Nucleus: Import & Export through Nuclear Pores

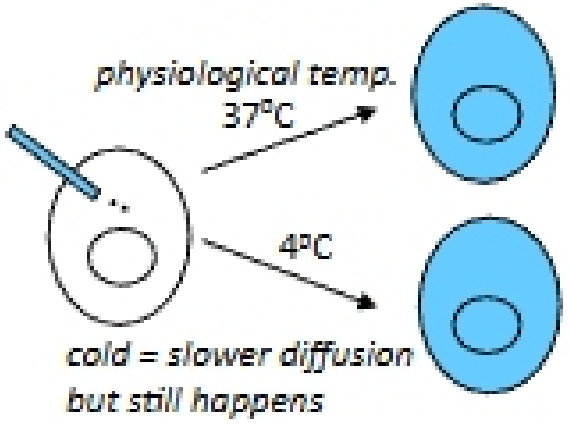
Lecture 2

NUCLEAR IMPORT

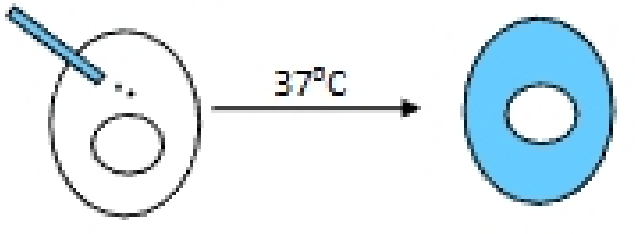
- protein translation ONLY occurs in CYTOPLASM
- nearly all nuclear proteins must be imported from cytoplasm
- major substrate types:
    1. nuclear proteins: histones, chromatin scaffold proteins, pols.
    2. transcription factors
    3. snRNPs
    4. ribosomal subunit components
- after mitosis, NE re-forms & all nuclear proteins need ticket to get back into nucleus → never cut off signal on nuclear protein
    - compared to mitochondrial protein, whose signal gets cut off when it enters mitochondria

NUCLEAR IMPORT

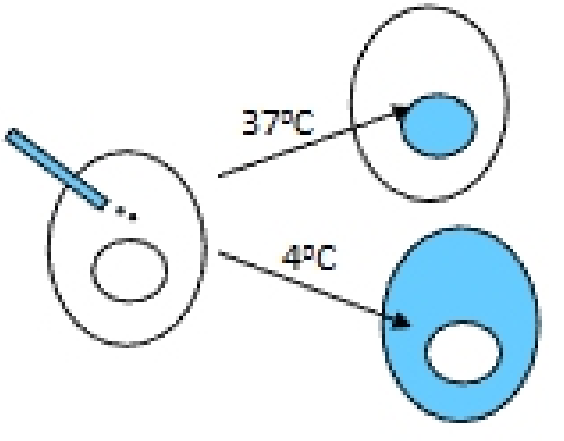
- small proteins enter nucleus via simple diffusion
  - EX: lysozyme conjugated to fluorescein



- large, non-nuclear proteins excluded from nucleus
  - can't enter b/c don't have ticket (signal) to show receptor
  - EX: bovine serum albumin conjugated to fluorescein



- large, nuclear proteins transported to nucleus via an active enzymatic process
  - can't occur @ cold temp.
  - EX: large T antigen of SV40 virus



small → simple diffusion; large, non-nuclear → excluded; large, nuclear → transported

Nuclear Import: Protein Types