Sea Urchin Fertilization
Regulation of Sperm Entry

1. Fusion of sperm and egg

- sperm acrosome extends to egg pm
- sperm & egg pms fuse (bindin/bindin receptors)
- pronucleus and centriole enter egg-zygote

2. Ensure monospermy and not polyspermy

- fast block
  - transient-1-3 seconds (stop gap measure)
  - depolarization-opening of Na/K channel proteins
  - change egg pm electrical potential- 170/+20 mV
  - other sperm do not bind
  - repolarization- re-equilibrate of Na/K gradient

- slow block
  - permanent-cortical granule reaction
  - release of intracellular calcium (from ER)
  - exocytosis of cortical granules-start at fert. site
  - vitellin/egg pm space widens-whole 360 degrees
  - granule contents
    - proteases: hydrolyse bindin receptors/sperm
    - peroxidases: cross link vitellin memb.
    - mucopolysaccharides: osmotic gradient
    - hyalin: rigid protein coat around egg pm microvilli