So far:

1. What is a cell?
   Replicating, membrane-bound entity, with metabolic functions.

2. What do cells do?
   Maintenance metabolism, specific function, division, death, move, change shape.....

1. Cell division cycle
Frog cell division: 0 - 10 hours after fertilization

See slide #3, lecture 1. This is the same movie!!

Budding yeast: used to isolate cell cycle mutants
Lee Hartwell, Paul Nurse, Tim Hunt: Nobel Prize 2001

Sea urchin
2. Cell death (apoptosis)

Metamorphosis in frogs

Caenorhabditis elegans
Soil nematode
~1,000 cells
~130 undergo apoptosis

Each nucleus is stained blue

Prof. Robert Horvitz
MIT Biology Dept
Nobel Prize 2002
Apoptosis
("programmed cell death")
Apoptosis (Programmed Cell Death)

- Normal cell
- Cell shrinkage
- Chromatin Condensation
- Membrane Blebbing
- Apoptotic Body Formation
- Lysis of Apoptotic Bodies
- Nuclear Collapse
- Continued Blebbing

DNA fragments in apoptotic cells

Apoptosis in lymphocytes

Patient 1 2 3

DNA fragments in apoptotic cells

Extrinsic Pathway

Intrinsic Pathway

DNA Damage
Chemotherapy
Stress
Fas Ligand
Death Receptors
Caspase-8
Caspase-7
Caspase-9
IAPs
Survivin
ApoA-1
Caspase-8
Caspase-2
Caspase-4
Caspase-9
Cytochrome C
Have a great Spring Break!!!!!