17.2: Applications of the Cell Cycle

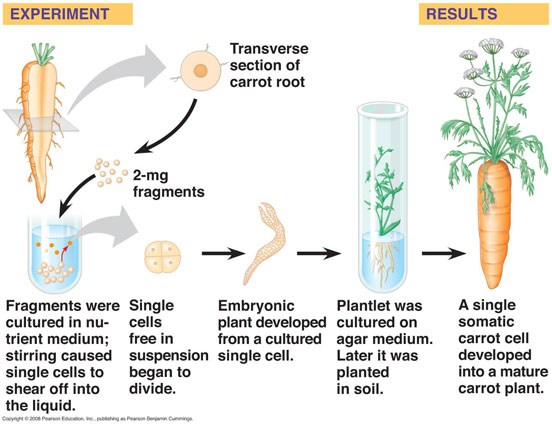
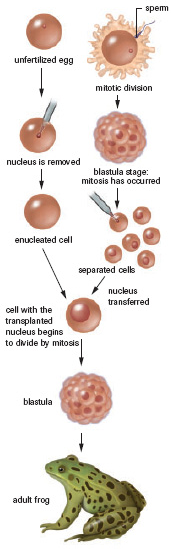
* **Cloning** is the process of forming \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_identical offspring from a single cell or tissue.
  + i.e., asexual reproduction or identical twins

Types of Cloning:

* Strawberries –\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ = clones of parent plant
* Hydra – reproduce \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. The bud break off to form genetically identical organisms

Fredrick Stewart – Carrots (cloning) [late 50’s]

* any carrot cell can be used to clone another carrot
* cells of a carrot remain \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* trick – how do we \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ specialization or differentiation processes that occur in cells?



Robert Brigs & Thomas King

* pioneers in animal cloning
* nuclear \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in frogs

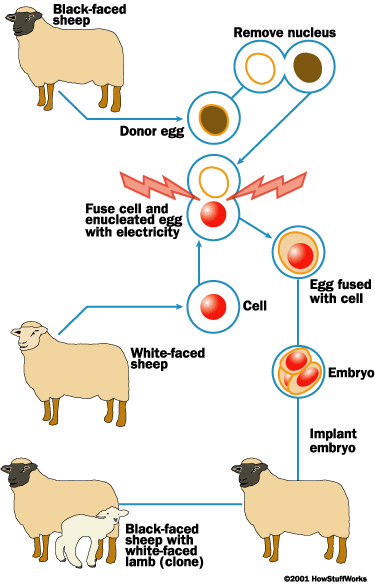
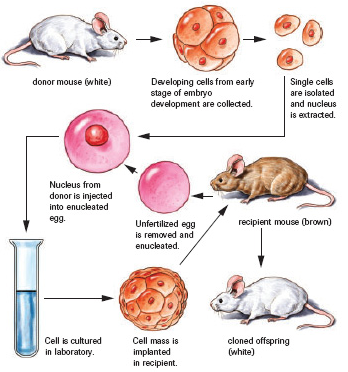
steps:

* extracted a nucleus from an unfertilized egg cell (*\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*)
* next they extracted a nucleus of a frog cell in the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_stage
* inserted this nucleus into the enucleated egg cell.

Terms:

* Totipotent: any nucleus that is able to bring a cell from egg to adult (i.e., \_\_\_\_\_\_\_\_\_\_\_\_)
* Pluripotent: Can become almost any type of cell (i.e\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_)
* Multipotent: Can become a limited range of cells (i.e., \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, etc)

Cloning Mammals:

* mammal cells are not totipotent, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ cells are
* in humans – identical twins (monozygotic)

Dolly the Sheep:

* nucleus of a cell from an \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ was inserted into an egg cell of another cell that had been enucleated (\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ removed)
* Then, stimulated with electricity to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* at the blastocyst stage, its \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ into a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Cancer

* Cancerous cells are regular cells that have a decreased interphase
  + What are the ramifications of a short interphase? Why is it problematic?
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_