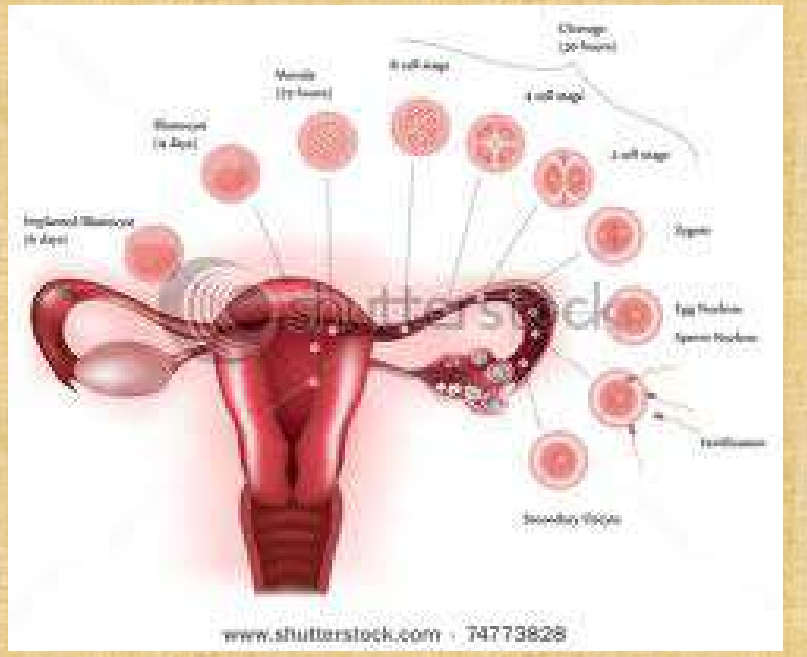
Reproductive System and Development

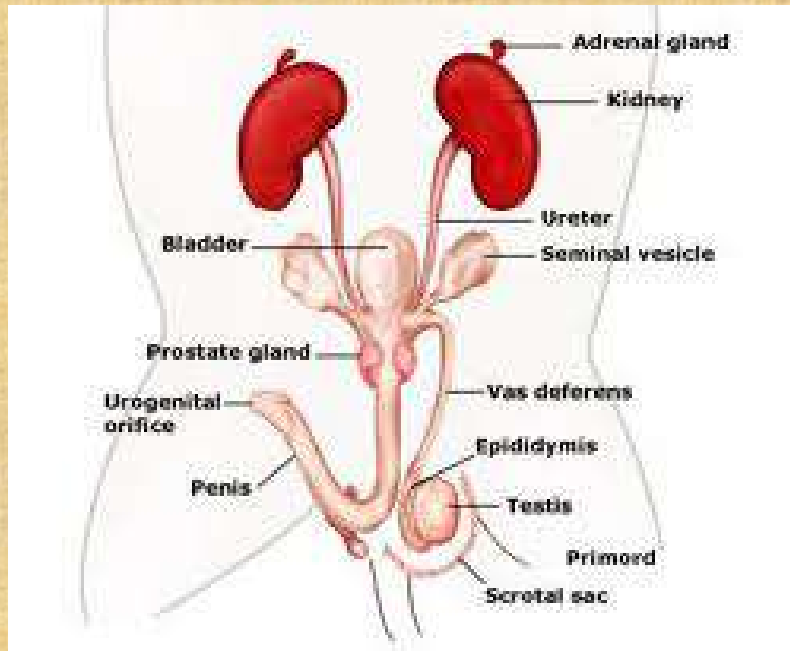
John Donovan

4/9/12

Reproductive System and Development

- The function of this system is to have offspring and to reproduce fertile offspring for later generations.



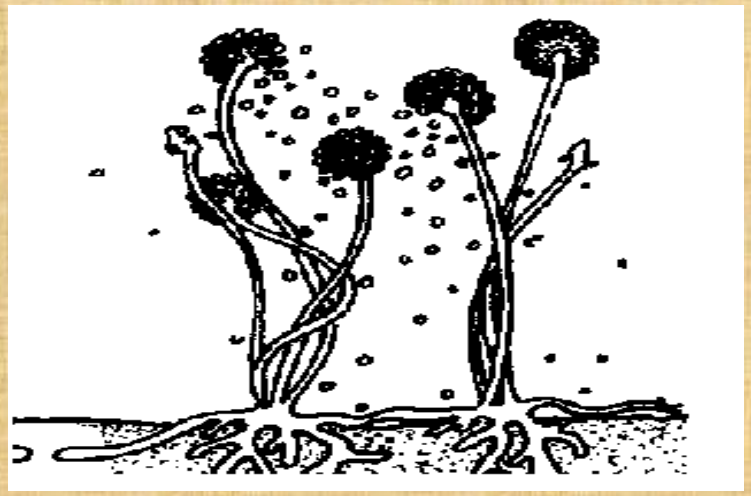


Sexual vs Asexual reproduction

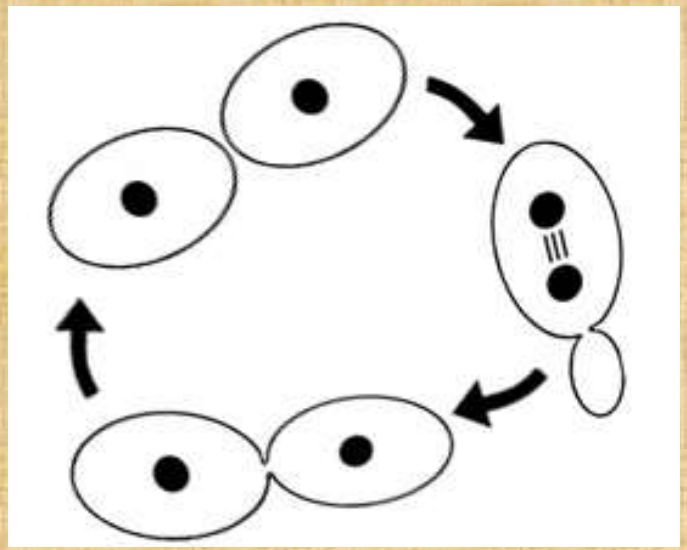
- Sexual: Involves 2 parents in which they mate and create an offspring that shares half of the fathers genes and half of the mothers genes.
- Asexual: Involves only one parent in which the parent produces an offspring that is genetically identical as the parent.

Asexual Examples:

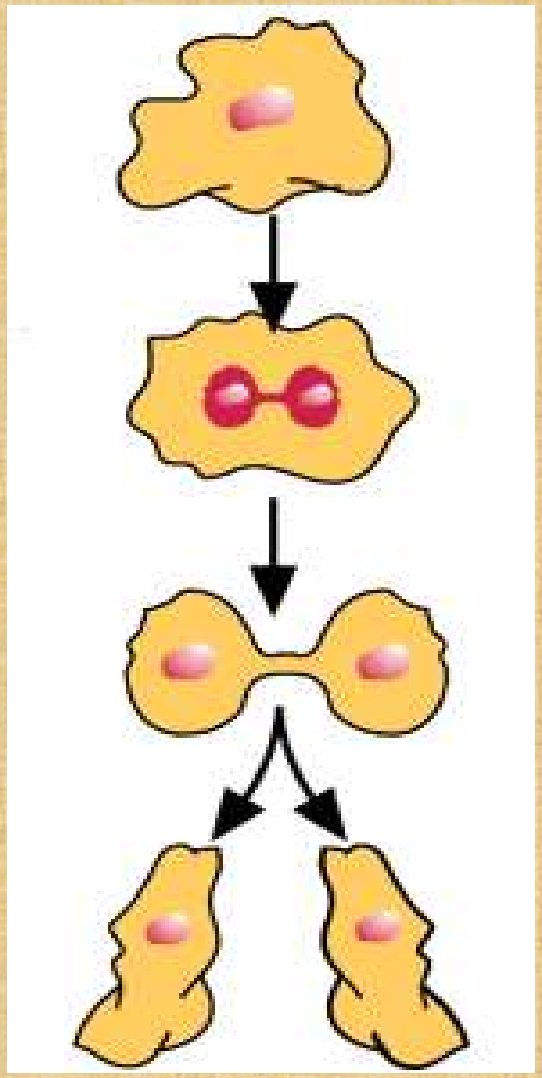
- Sporulation:



Budding:

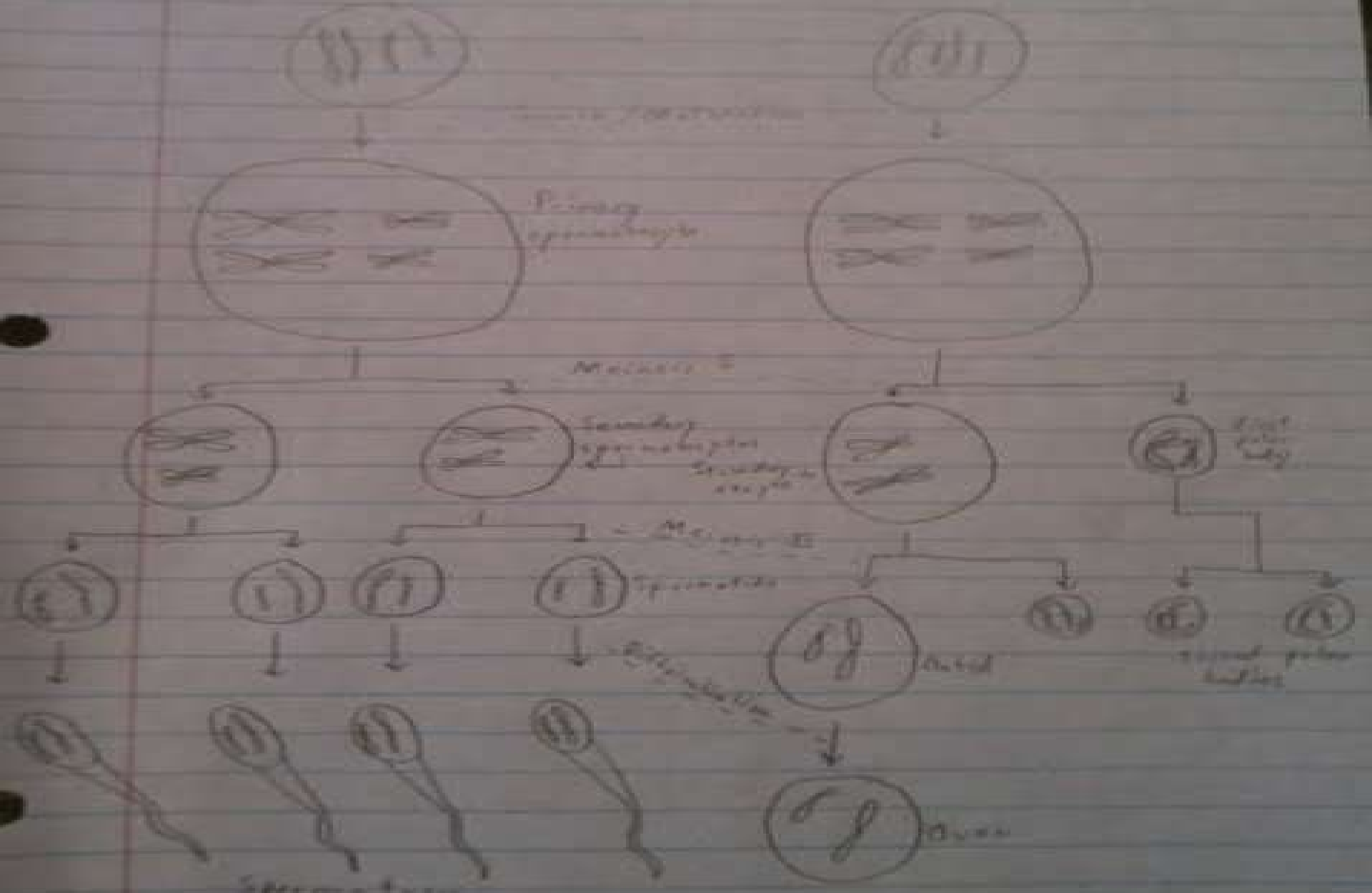


Binary fission:



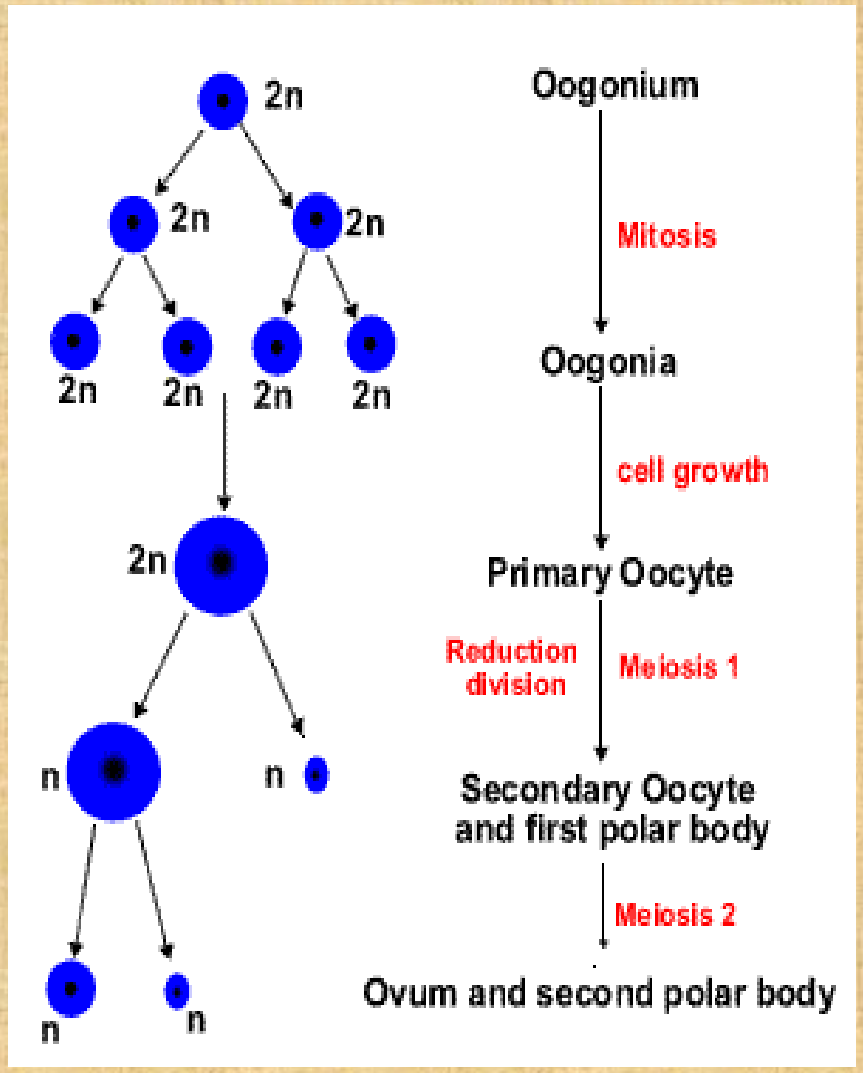
Spermatogenesis

Oogenesis



Oogenesis (unequal division of cytoplasm)

- The cells divide asymmetrically to preserve as many nutrients as possible for the one egg that will go on and have a chance to be fertilized.
- The cell divides so that most of the nutrients and cytoplasm will end up in one egg.



Menstrual vs Estrous cycle

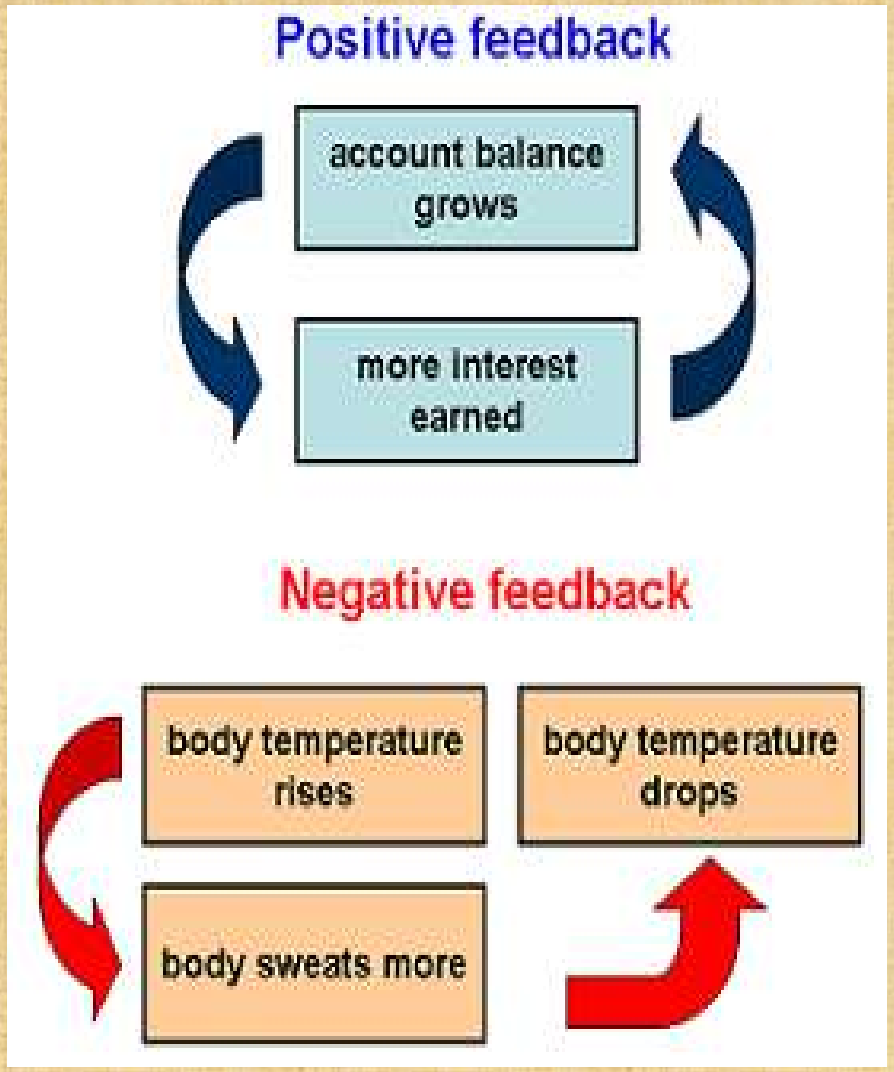
- The estrous cycle comprises the recurring physiologic changes that are induced by reproductive hormones in most mammalian placental females, while humans undergo the menstrual cycle.
- The estrous cycle starts after puberty in sexually mature females. Estrous cycles usually continue until death.
- Some animals may display bloody vaginal discharge, often mistaken for menstruation.

Hormonal Control

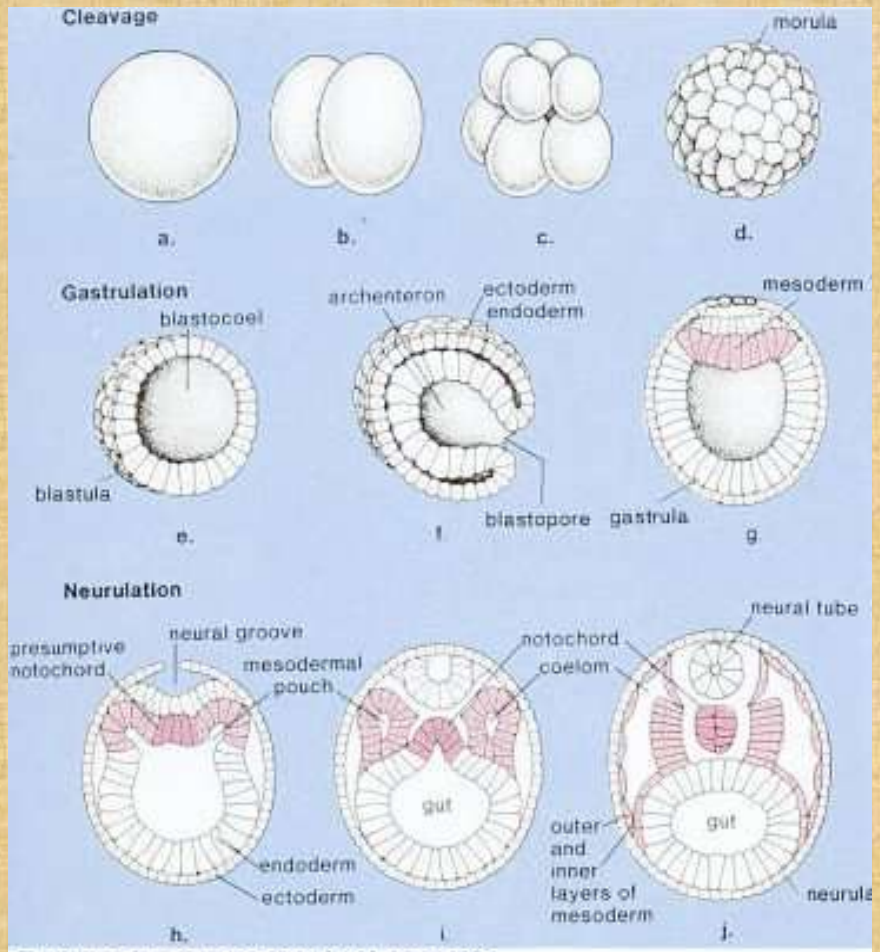
- Hormones are produced in one cellular location in an organism, and their effects are seen in another tissue or cell type.
- In mammals hormones can be proteins or steroids.
- Protein hormones bind to receptors in the cell membrane and mediate gene expression through intermediate molecules.
- Steroids enter the cell and interact with steroid receptor proteins to control gene expression.

Feedback Mech

- Positive and negative feedback refer to characteristics of complex systems.
- Negative feedback systems are referred to as deviation inhibiting systems.
- An example is at the right and another example is maintaining the temperature in a room or in our house.



Cleavage and Gastrulation

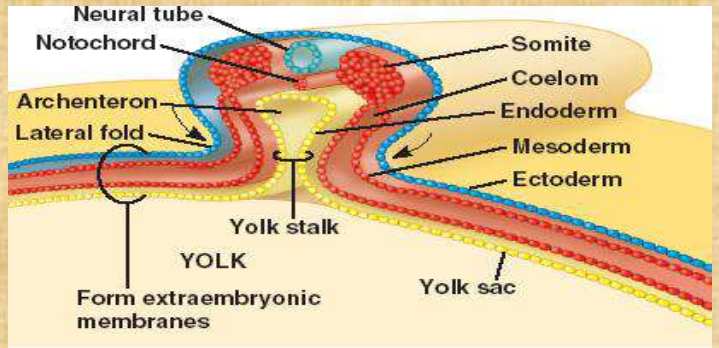


Embryonic Development of Lancelet:
Cleavage produces the morula
Gastrulation by invagination produces the three germ layers
Neurulation produces the neural tube called the neurula

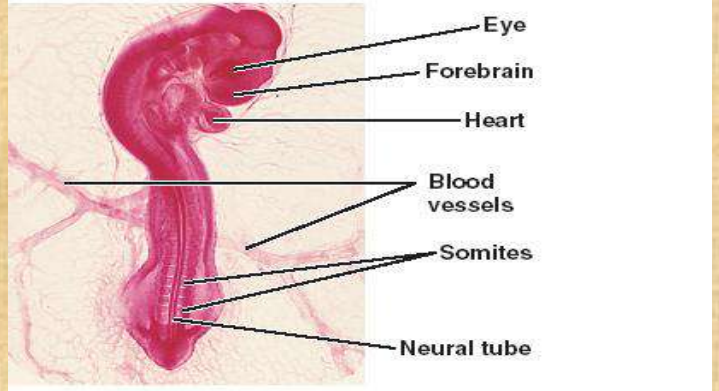
- Cleavage through Gastrulation:
- Cleavage is a series of mitotic divisions in which a large egg is divided into many smaller nucleated cells called blastomeres.
- Cytoplasmic volume decreases no growth occurs between these divisions.
- In most species these early cell divisions are under the control of proteins and mRNAs stored in the oocyte.

Organogenesis

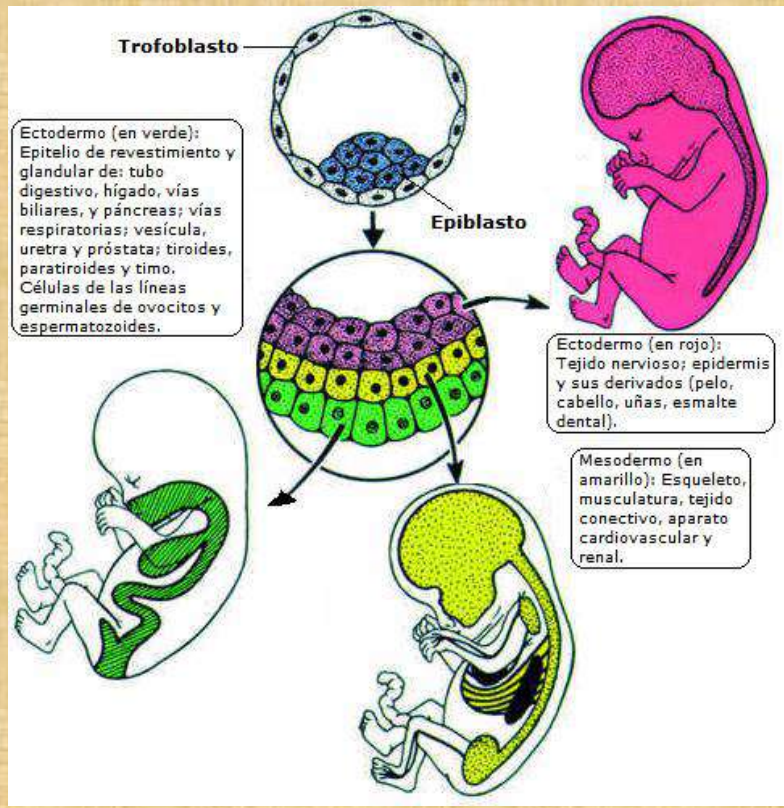
- This is the process of the mesoderm, the ectoderm ,and the endoderm developing into the internal organs of organisms.



(a) Early organogenesis

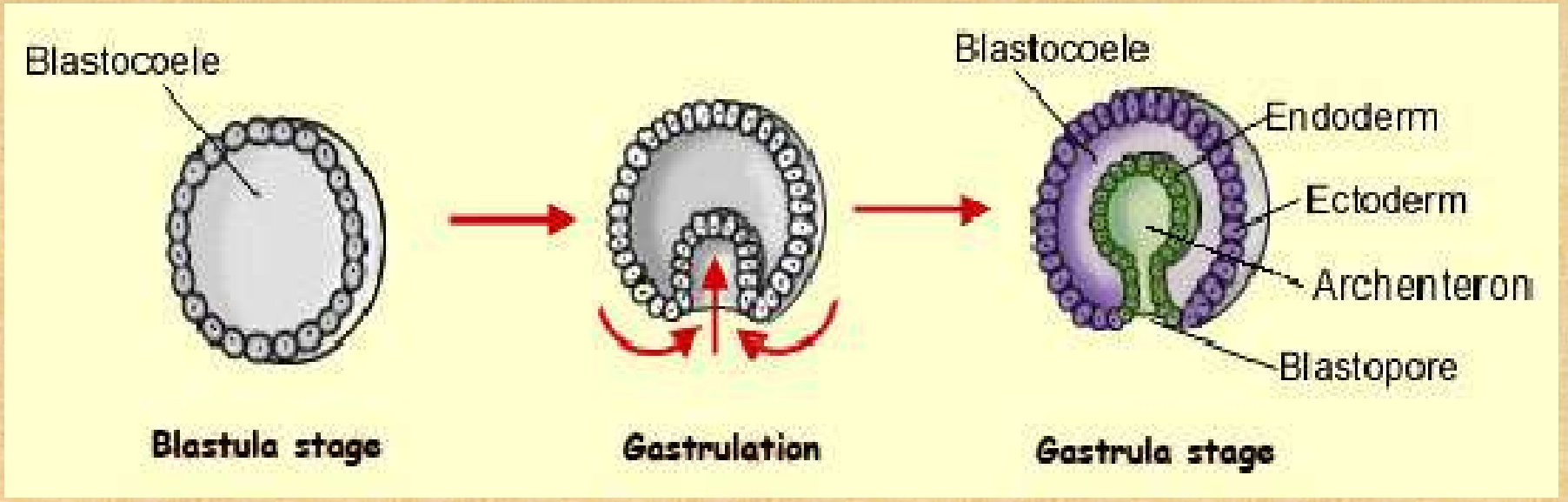


(b) Late organogenesis

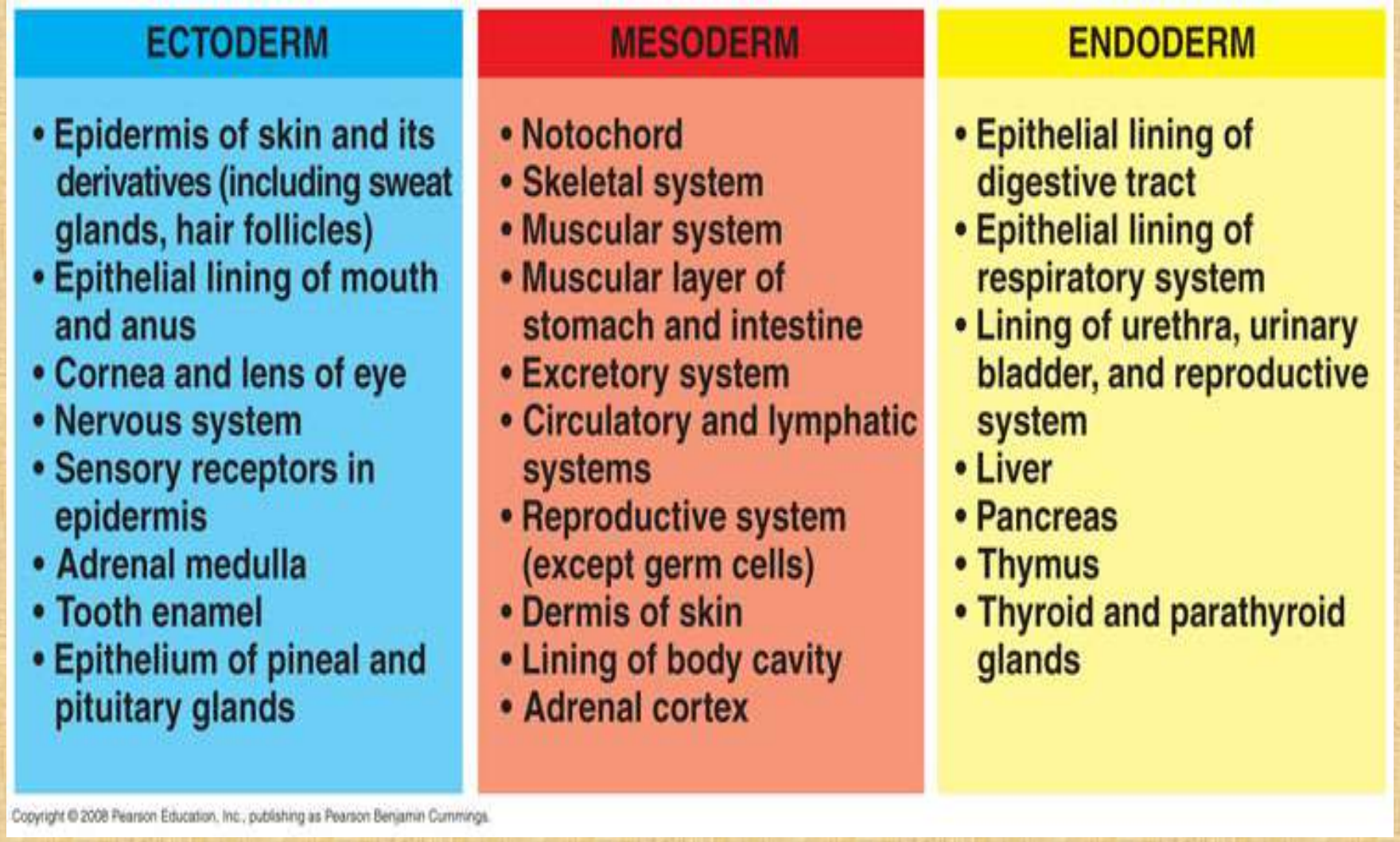


Morula, Blastula, and Gastrula

- The blastula turns into the gastrula after gastrulation (Both pictured below). The morula (Pictured at the right) is an embryo in the early embryonic development.

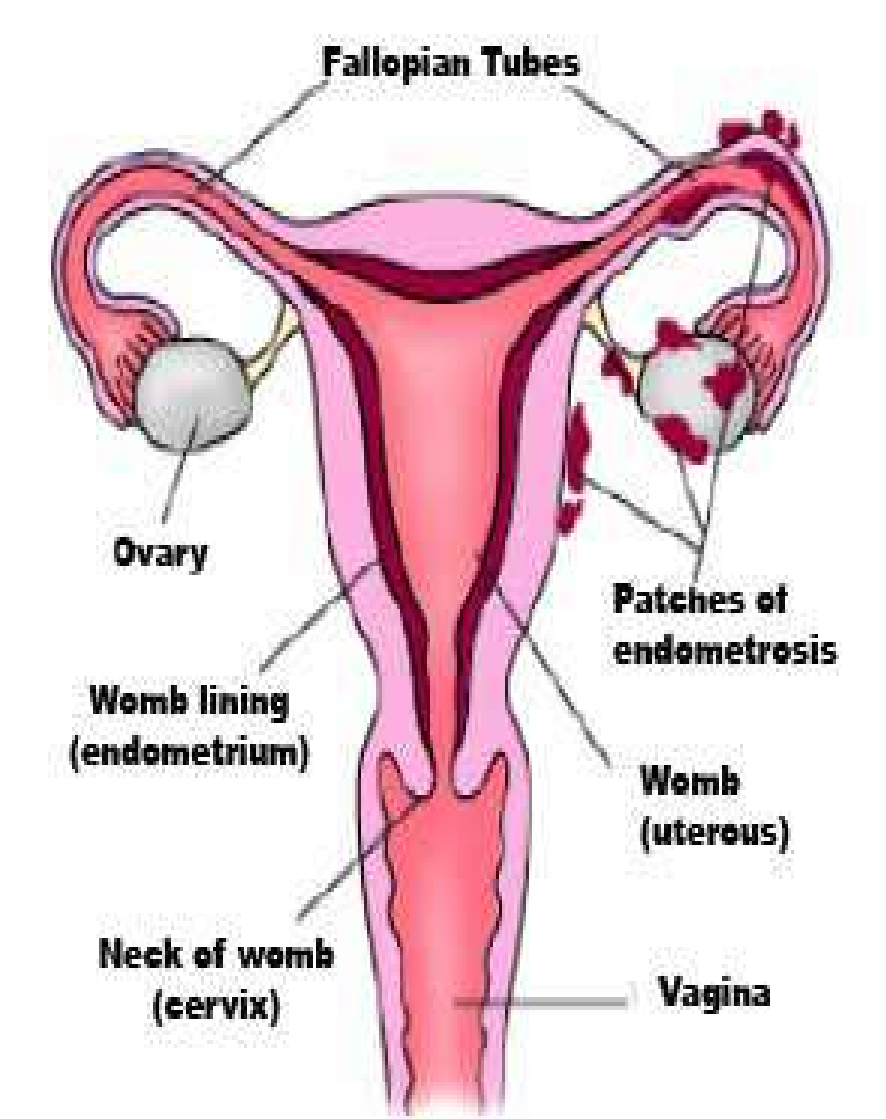


Germ Layers



- I couldn't explain it better. ☺

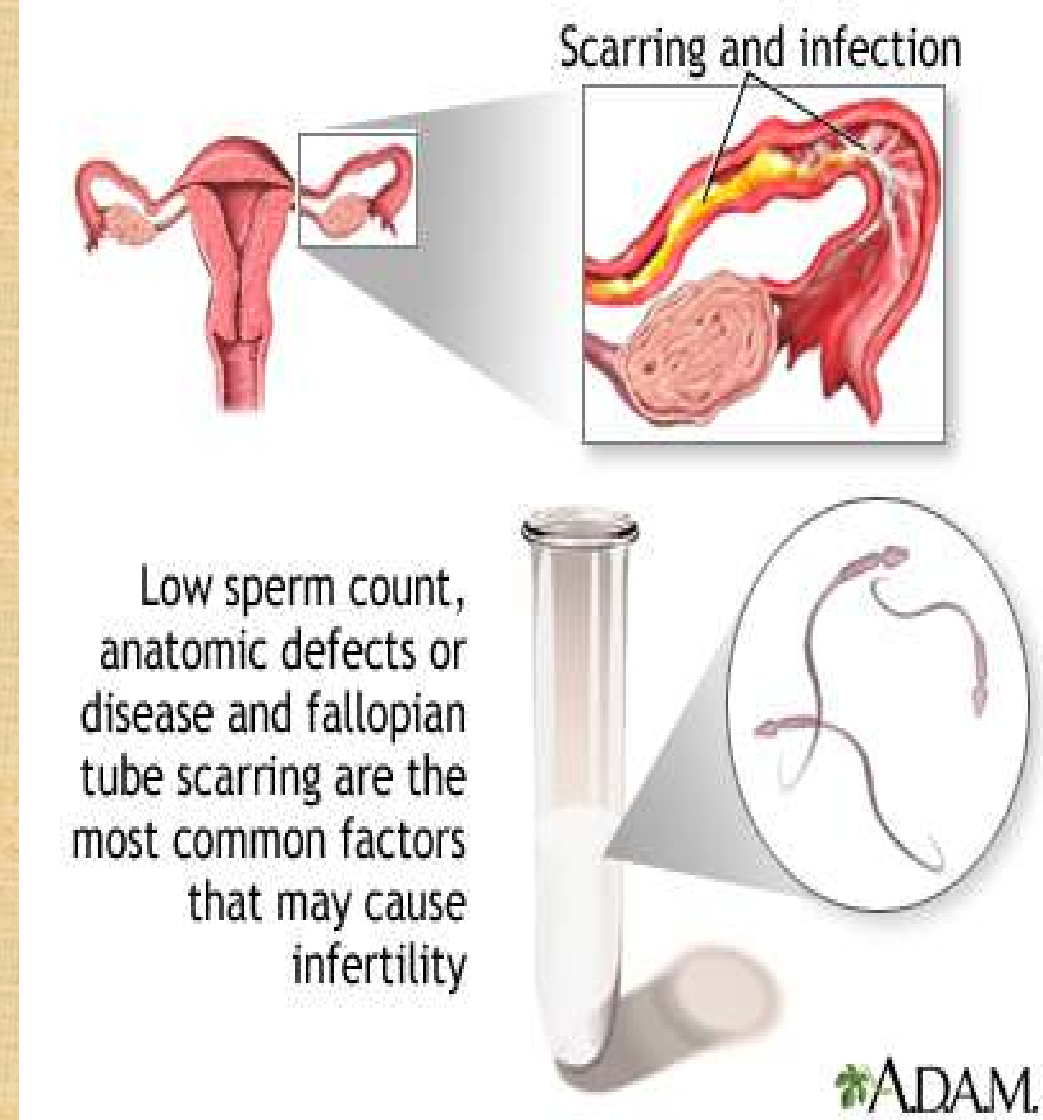
Endometriosis



- Endometriosis is an often painful disorder in which tissue that normally lines the inside of your uterus grows outside your uterus.
- This involves the ovaries, bowel or the tissue lining your pelvis.

Infertility

- This disorder is when a female cannot get pregnant from either because of the father or the mother.



References

- www.google.com
- http://www.google.com/imgres?um=1&hl=en&biw=1366&bih=649&tbm=isch&tbnid=06zwGotMVg__9M:&imgrefurl=http://www.ncdc.noaa.gov/paleo/abrupt/story2.html&docid=kUPmT0oRrZuRhM&imgurl=http://www.ncdc.noaa.gov/paleo/abrupt/images/story2-feedbacks.png&w=276&h=276&ei=JT-cT8WPH8HZgQe13M31Dg&zoom=1&iact=hc&vpx=579&vpy=137&dur=550&hovh=220&hovw=220&tx=110&ty=61&sig=106529015298774878259&page=1&tbnh=140&tbnw=140&start=0&ndsp=18&ved=1t:429,r:2,s:0,i:72
- http://www.google.com/imgres?um=1&hl=en&biw=1366&bih=649&tbm=isch&tbnid=9v06r-urJ6kBUM:&imgrefurl=http://regentsprep.org/regents/biology/units/reproduction/asexual.cfm&docid=thWf0sS_N0XbPM&imgurl=http://regentsprep.org/regents/biology/units/reproduction/moldspores.gif&w=320&h=315&ei=K1GcT-uzIMLBgAfT1PGBDw&zoom=1&iact=hc&vpx=541&vpy=137&dur=4501&hovh=223&hovw=226&tx=123&ty=118&sig=106529015298774878259&page=1&tbnh=143&tbnw=139&start=0&ndsp=20&ved=1t:429,r:2,s:0,i:72
- Myself
- http://answers.yahoo.com/question/index?qid=20070828195917AAE6j0y
- http://www.google.com/imgres?um=1&hl=en&biw=1366&bih=649&tbm=isch&tbnid=MCniFE05Yuj87M:&imgrefurl=http://smabiology.blogspot.com/2009_04_01_archive.html&docid=MSAc7N1vRX-03M&imgurl=http://universe-review.ca/I10-55-gastrulation.jpg&w=367&h=460&ei=62ScT8TUA4_TgQeXwKDpDg&zoom=1&iact=hc&vpx=353&vpy=123&dur=385&hovh=251&hovw=200&tx=130&ty=146&sig=106529015298774878259&page=1&tbnh=143&tbnw=113&start=0&ndsp=20&ved=1t:429,r:1,s:0,i:70
- http://en.wikipedia.org/wiki/Organogenesis
- http://www.google.com/imgres?um=1&hl=en&sa=N&biw=1366&bih=649&tbm=isch&tbnid=JAW3R0x-BDnaBM:&imgrefurl=http://bio1152.nicerweb.com/Locked/media/ch47/organogenesis-chick.html&docid=aLIzUlrneyZ7IM&imgurl=http://bio1152.nicerweb.com/Locked/media/ch47/47_15ChickOrganogenesis.jpg&w=412&h=586&ei=kGicT8W-BYbJgQfwl_CBDw&zoom=1&iact=hc&vpx=172&vpy=145&dur=352&hovh=268&hovw=188&tx=103&ty=138&sig=106529015298774878259&page=1&tbnh=131&tbnw=92&start=0&ndsp=21&ved=1t:429,r:0,s:0,i:110
- http://www.google.com/imgres?um=1&hl=en&sa=N&biw=1366&bih=649&tbm=isch&tbnid=6TCgAS0ybuEL4M:&imgrefurl=http://grupos.emagister.com/imagen/histologia_embrionaria_organogenesis/2038-239774&docid=zcmVQ9m61XFVQM&imgurl=http://cdn2.grupos.emagister.com/imagen/histologia_embrionaria_organogenesis_239774_t0.jpg&w=482&h=496&ei=kGicT8W-BYbJgQfwl_CBDw&zoom=1&iact=hc&vpx=597&vpy=165&dur=5773&hovh=228&hovw=221&tx=132&ty=93&sig=106529015298774878259&page=1&tbnh=131&tbnw=127&start=0&ndsp=21&ved=1t:429,r:3,s:0,i:116
- http://www.google.com/imgres?um=1&hl=en&biw=1366&bih=649&tbm=isch&tbnid=AGnsI5e7kOjqGM:&imgrefurl=http://www.flashcardmachine.com/bio-120-1.html&docid=EUOL0DQjSlnl6M&imgurl=http://www.bio.miami.edu/~cmallery/150/devel/c8.47x14.germ.layer.jpg&w=750&h=342&ei=J2mcT82GIofEgQeq_92BDw&zoom=1&iact=hc&vpx=576&vpy=171&dur=1105&hovh=151&hovw=333&tx=114&ty=56&sig=106529015298774878259&page=1&tbnh=86&tbnw=189&start=0&ndsp=19&ved=1t:429,r:2,s:0,i:72
- http://www.google.com/imgres?um=1&hl=en&biw=1366&bih=649&tbm=isch&tbnid=pK5v-jtWuaxIrM:&imgrefurl=http://thebrain.mcgill.ca/flash/i/i_09/i_09_cr/i_09_cr_dev/i_09_cr_dev.html&docid=VFfSJw8W8BJ4dM&imgurl=http://thebrain.mcgill.ca/flash/i/i_09/i_09_cr/i_09_cr_dev/i_09_cr_dev_1c.jpg&w=550&h=160&ei=MGqcT47uH8nYgQebp4CJDw&zoom=1&iact=hc&vpx=100&vpy=187&dur=20434&hovh=121&hovw=417&tx=272&ty=45&sig=106529015298774878259&page=1&tbnh=52&tbnw=180&start=0&ndsp=18&ved=1t:429,r:0,s:0,i:68
- http://www.google.com/imgres?um=1&hl=en&biw=1366&bih=649&tbm=isch&tbnid=xYTrnyJD0vffrM:&imgrefurl=http://www.anatomyblue.com/illus_09.html&docid=Oq5eM2XwS2xLAM&imgurl=http://www.anatomyblue.com/images/illus_morula.jpg&w=374&h=484&ei=h2ucT_WlEYT0ggf6_cyRDw&zoom=1&iact=hc&vpx=315&vpy=296&dur=994&hovh=255&hovw=197&tx=128&ty=151&sig=106529015298774878259&page=1&tbnh=135&tbnw=117&start=0&ndsp=21&ved=1t:429,r:8,s:0,i:125
- http://www.mayoclinic.com/health/infertility/DS00310
- http://www.mayoclinic.com/health/endometriosis/DS00289
- http://www.google.com/imgres?um=1&hl=en&sa=N&biw=1366&bih=649&tbm=isch&tbnid=DkfJjVfGROrV5M:&imgrefurl=http://www.nlm.nih.gov/medlineplus/ency/imagepages/17074.htm&docid=y9Pr-zmGh8afaM&imgurl=http://www.nlm.nih.gov/medlineplus/ency/images/ency/fullsize/17074.jpg&w=400&h=320&ei=-W2cT6zVA4nqgQeqmsjyDg&zoom=1&iact=hc&vpx=353&vpy=176&dur=8245&hovh=201&hovw=251&tx=134&ty=79&sig=106529015298774878259&page=1&tbnh=127&tbnw=159&start=0&ndsp=21&ved=1t:429,r:1,s:0,i:151
- http://www.google.com/imgres?um=1&hl=en&biw=1366&bih=649&tbm=isch&tbnid=3VC_KKzfo5hsPM:&imgrefurl=http://www.whathealth.com/awareness/event/endometriosis.html&docid=Exza7CjCklZyZM&imgurl=http://www.whathealth.com/awareness/images/endometriosis.jpg&w=295&h=265&ei=1nCcT8asKtHOgAfn8_DnDg&zoom=1&iact=hc&vpx=516&vpy=144&dur=7900&hovh=212&hovw=236&tx=88&ty=94&sig=106529015298774878259&page=1&tbnh=146&tbnw=163&start=0&ndsp=18&ved=1t:429,r:2,s:0,i:72
- http://www.google.com/imgres?um=1&hl=en&sa=N&biw=1366&bih=649&tbm=isch&tbnid=UdA1nzgEW3cGPM:&imgrefurl=http://click4biology.info/c4b/11/hum11.4.htm&docid=iFSX_c0lHVXO2M&imgurl=http://click4biology.info/c4b/11/11.4/OOgenesis.gif&w=300&h=323&ei=BIacT7WFGMbOgAeU4rmkDw&zoom=1&iact=hc&vpx=380&vpy=133&dur=2142&hovh=233&hovw=216&tx=129&ty=87&sig=106529015298774878259&page=1&tbnh=144&tbnw=133&start=0&ndsp=20&ved=1t:429,r:2,s:0,i:74