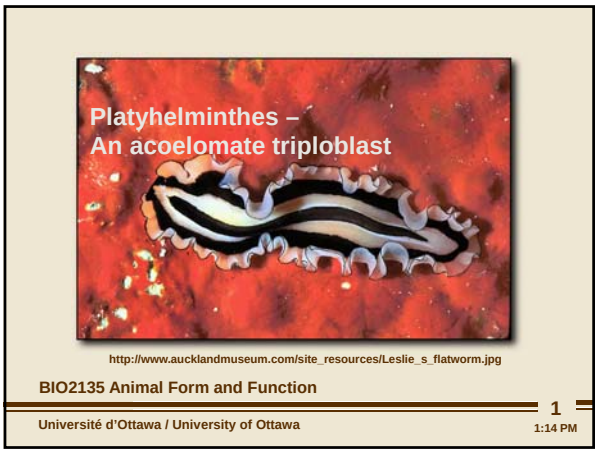
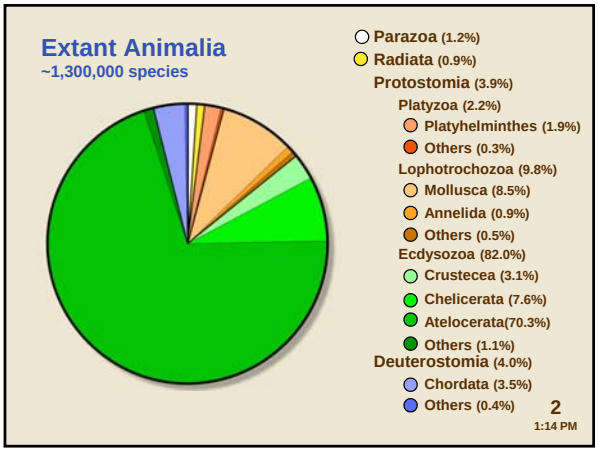
Platyhelminthes

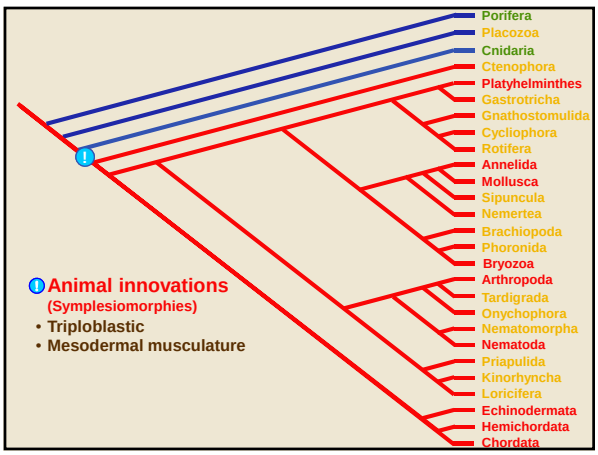


-series of organisms that are referred to as acoelomate triploblasts



-became experts at parasitism

-the vast majority have invaded other organisms - liver/lung flukes, tapeworms.



-got tissues, true epithelial layers - nutritive and outer coating, all the junctions (Cnidarians)

-move up and get triploblasty and mesodermal muscles

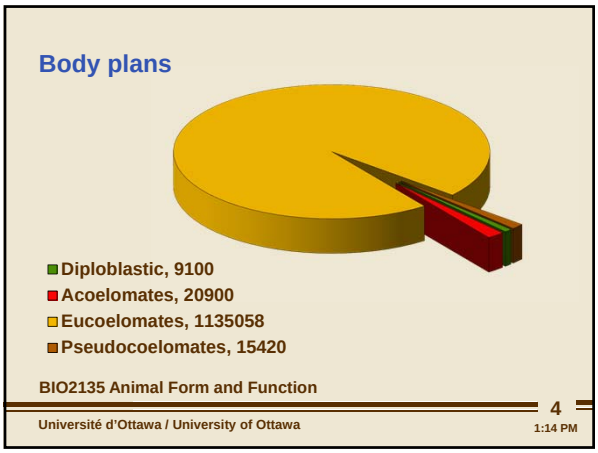
-ctenophora are radially symmetric triploblast animals, have mesoderm,

-tripoblasty and mesoderm are not the hallmark of bilateral symmetric organisms

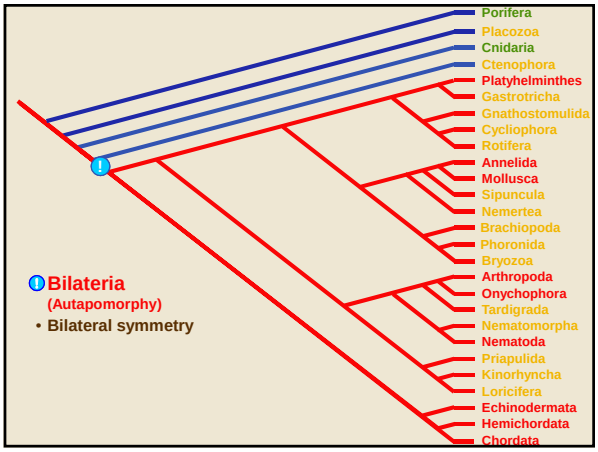
-typically

-diploblasts that are all radial

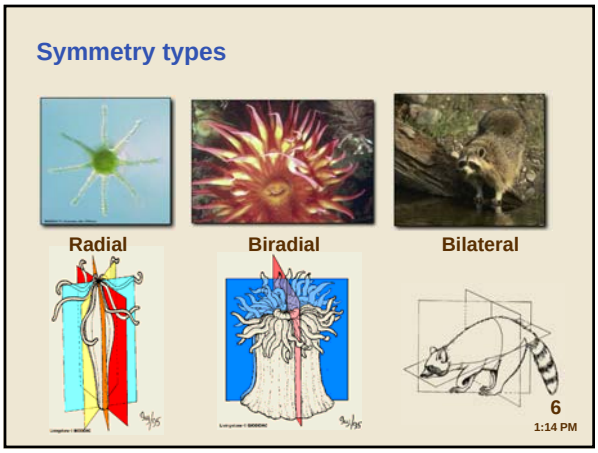
-triploblasts are all bilateral

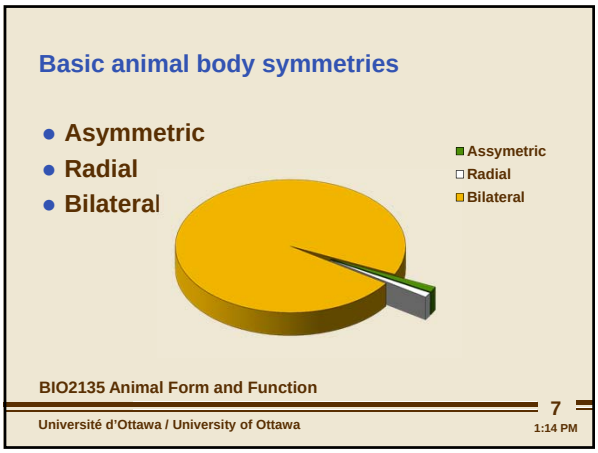


bilateral is the most dominant group

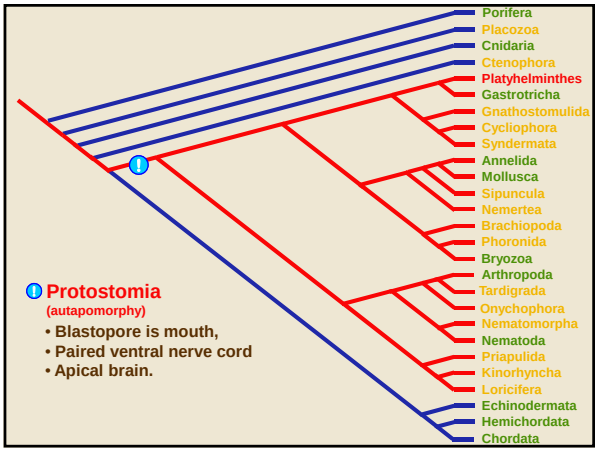


-mesoderm and bilateral symmetry are not linked to each other
-one did not develop from the other
-end up with bilateria
-protostomes and deuterostomes

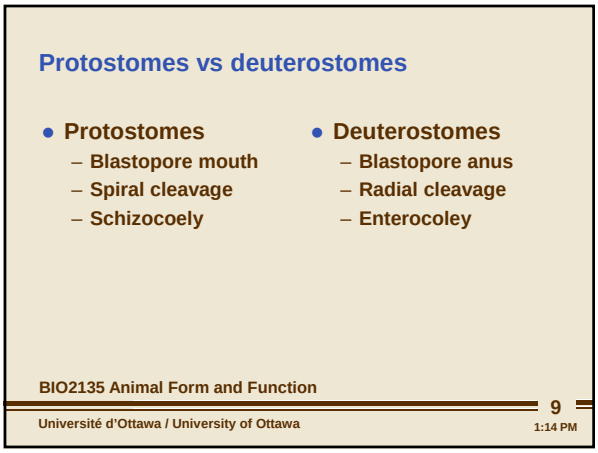




-bilateral symmetry is the most successful out of all of them

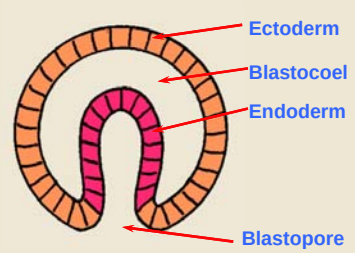


-protostomes- have characteristic that is associated with their development
-the blastopore becomes the mouth
-all these animals will have complete guts - invagination is going to meet at the other side to make an anus (tube within the body)
-in body plan-the brain sits on top of the digestive tract
-digestive tract is going to come in, and the brain will be on top
-nerve chord that is on the ventral surface (ventral nerve chord) -dorsal brain
-when mesoderm occurred, there was always a ceolum in it
-platyhelminthes dont have coelom - eventually found out that when a mesoderm formed there was always coelom in it



-how cells divide - spiral cleavage vs radial cleavage
-how we make the coelom
-the bottom two characteristics do not define protostomes and deuterostomes
-blastopore is the only thing that defines them

Blastopore (Gastrulation)



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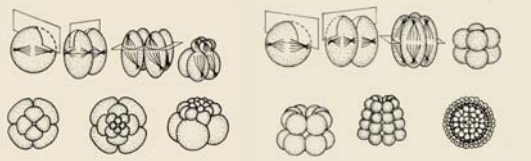
-gastrulation - when we take an epithelial ball and we invaginate to make an inner layer of tissue, the endoderm - development of two layers
-cnidarian is a sac with an outer ectoderm and an inner endoderm with tentacles around it
-now have an opening with a digestive tract where we get symmetry statement from oral to aboral opening

Types of cleavage



Spiral cleavage Radial cleavage

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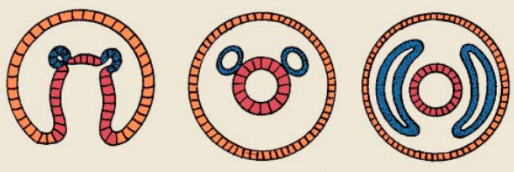
-used to think that there were only 2 types of cleavage that were seen
-cleavage at the 4 cell stage, and equitorial division goes through the middle and the 4 cell are going to do
  -either sit on top in the exact same way - radial
  -or twist and sit in the groove of the ones underneath them -creates the spiral
-in reality there are a dozen of different types of cleavage patterns

Enterocoelous coelom



Ectoderm Endoderm Mesoderm

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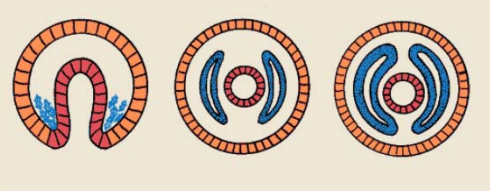
-how the body cavity forms - two processes
-enterocoelous - mesoderm bled off from the gut filling the space between the endo and ectoderm layers with the cavity already in it - and we end up with a body cavity

Schizocoelous coelom



Ectoderm Endoderm Mesoderm

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-schizocoelous - shape got filled with mesodermal cells- and then they split end up getting the body cavity

Some advantages of a body cavity

- Space for organ system to enlarge
- Fluid that can be used for transport
- Acts as a hydrostatic skeleton
- Gut can move independent of body wall

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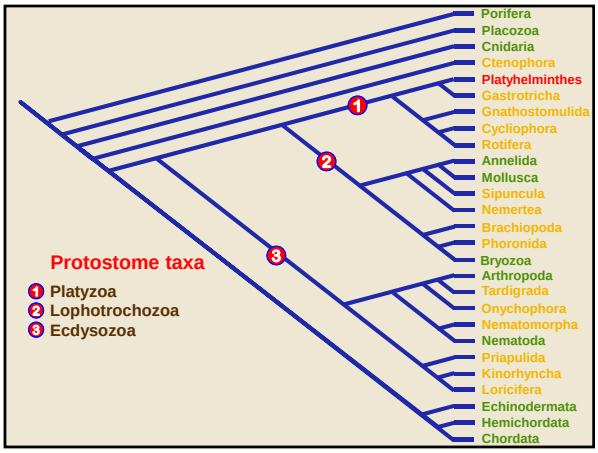
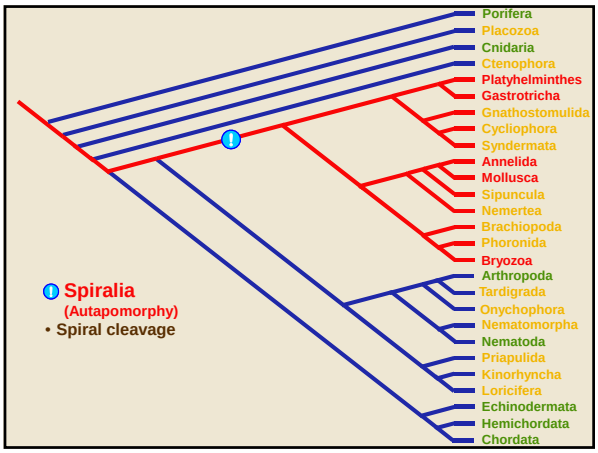
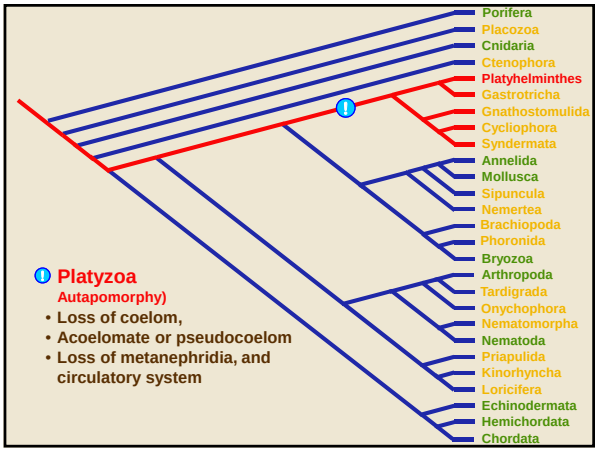
-coelom was a huge innovation - created a space for organs to develop -ie reproductive organs
-used to transport
-act as a skeleton
-gut end up moving by itsefl



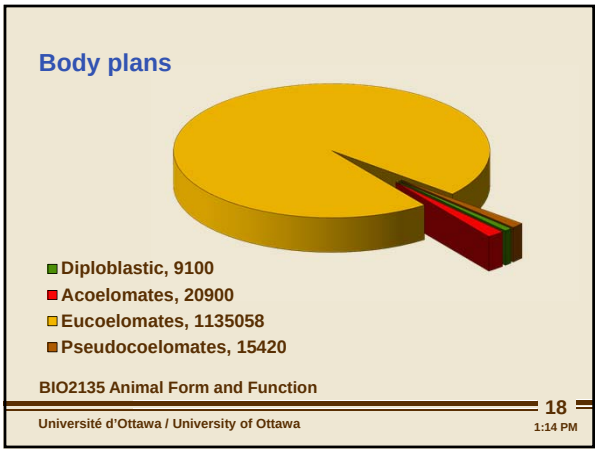
-platyzoa - group that lost their coelom/body cavity - why??



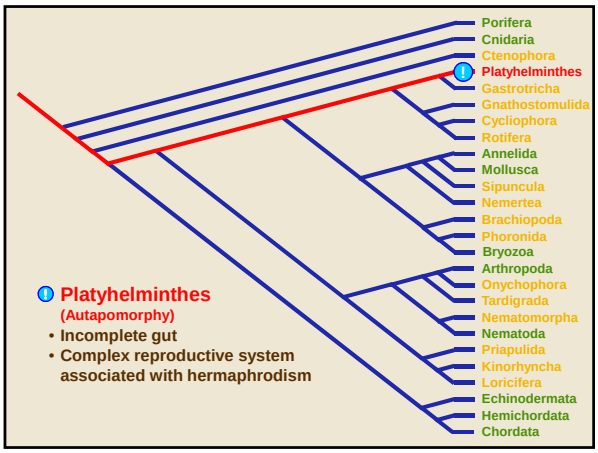
-where spiral cleavage happens
-the eccdysozoa - produce yolky eggs - embryo develops on the surface of the nutrient yolk
-they dont have spiral or radial cleavage - proof that it doesnt define protostomes
-dont have body cavity - have hemocyl



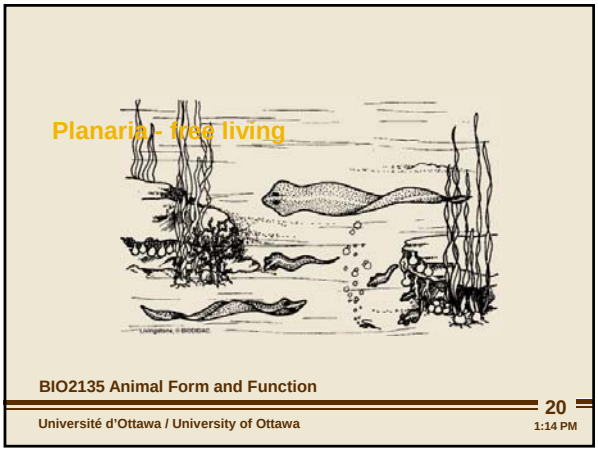
-here have the loss of the coelom - why did they get rid of something that is advantageous
-lost them because they are very small - specialize in miniaturization
-being really small allows them to have optimal surface to volume ratio
-so no reasons to have coelom because they simplify
-become a flatten organism - specialist at lying and adhering to surfaces on the substrate
-has a whole set of gluey glands on its ventral surface - cement it into place
-mouth is also on ventral surface - so it can pick up organic matter
-has a digestive tract that branches through the entire organism - so all cells are in contact with the digestive tract - will be able to get all of the important nutrients
-gastric diffusion and diffuse out metabolic waste
-platyhelmintehes- acoelomate group- lost the coelom
-when ceoloms arise - have an internal structure that is used to filter coelomic fluid- called a metanephridium - a funnel shape structure that reaches in the coelomic space and exits the animal
-cilia on the surface that pulls in the coelomic fluid - extract and remove things
-no coelom=no metaniphridia - need some other osmoregulatory system in there - diffusion is all that is needed



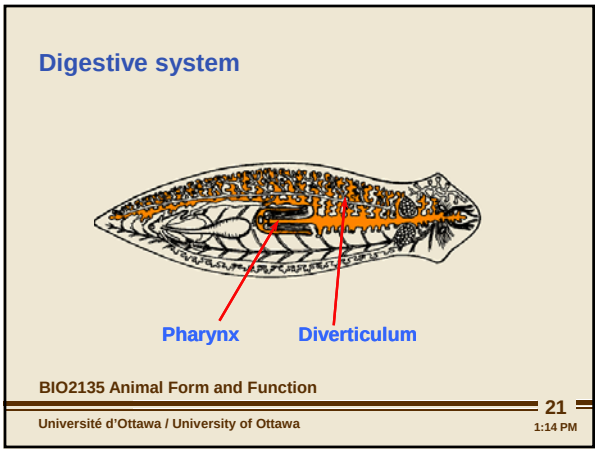
-acoelomates - use their body type to invade fluids of other organisms - become parasitic



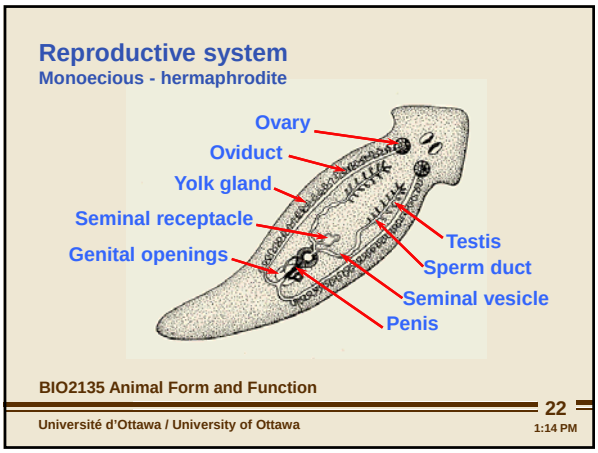
-add an incomplete gut - associated with the fact that the food that they eat is in high nutritional quality
-ciirculates in that closed digestive system - little residue that is regurgitated
- dont have good mobility so there are hermaphrodite - carry both sexual systems



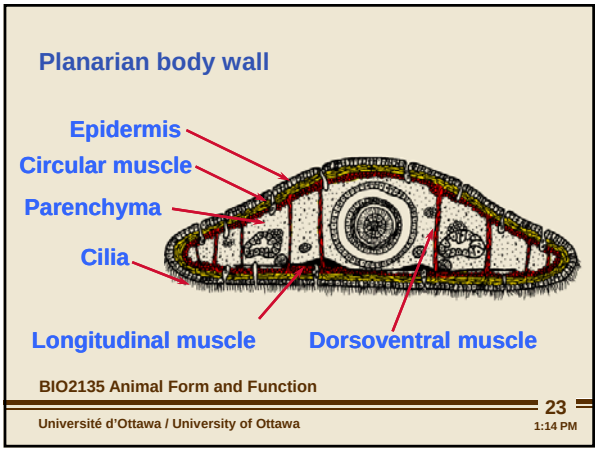
-easy to catch - animal that is highly specialized in being flat and adhering to surfaces



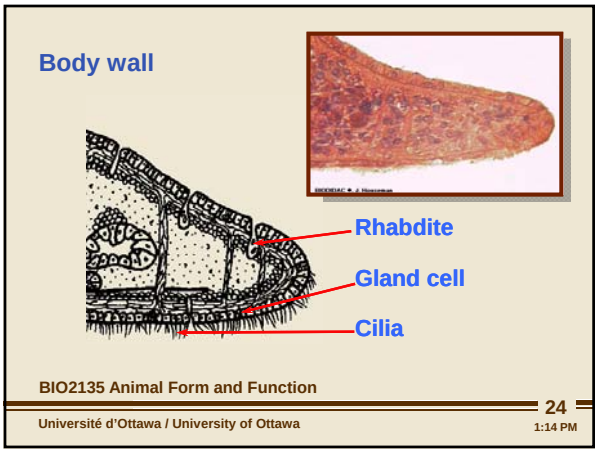
-major system - gut is extremely branched - 3 branches
-anterior branch and 2 posterior branches
-has a versatile pharynx on the underside - used to scrap up organic materials
-branching ensures that all of the cells and tissues are adjacent to digestive nutrients to be absorbed



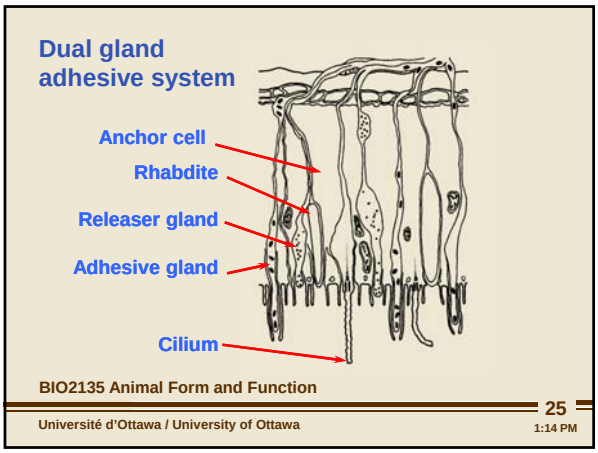
-have a complex reproductive system - hermaphordite or monoecious
-advantage to having both sexual reproductive systems
-in mating event- both organism will produced fertilized eggs
-no chance of self fertilization
-penis goes into general atrium of the female -releases sperm into the seminal receptacle of the other individual
-prior to mating, testes produce sperm - sends down the sperm duct, which is then stored in the seminal vesicle - transferred to the other individual in the seminal receptacle
-sperm transfer then gets completed, planaria separates from each other and then gets fertilization
-only when they separate- they will produce ovaries that will move down the oviduct (gets their nutrients from the yolk/vitelline gland) - move right infront of the seminal receptacle, which will release a small amount of sperm to fertilize the egg - then gets placed to the outside
-in diomecious organisms - only one is going to fertilize and produce new offspring



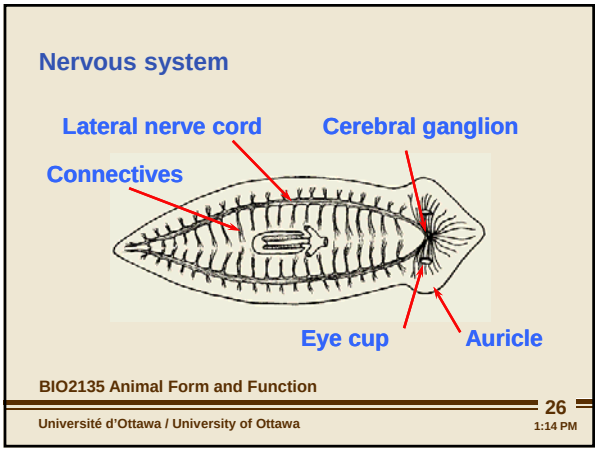
-cross section of the planaria
-flat and solid ball of tissue - parenchyma - it is spongy and compressible
-organisms with hydrostatic skeleton will have a layer of circular muscles on the outside and layer of longitudinal muscles on the inside so they can change their shape
-have long cilia on the ventral side - so it can move



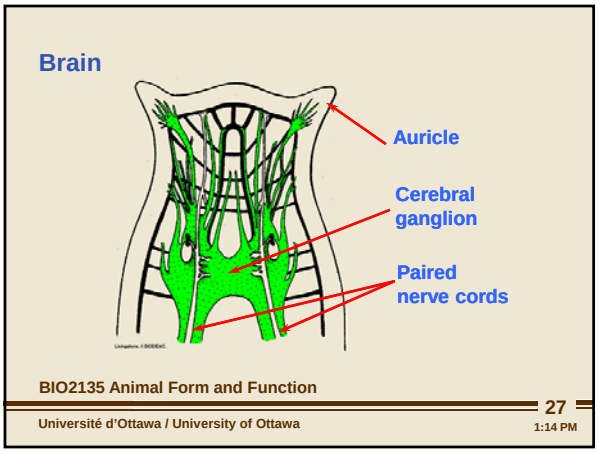
-sticking and pushing - have a special set of glands at the perimeter of the body
-allow them to stick to the substrate - hard to dislodge them
-need to be able to dissolve the glue



-whole of platyhelminthes - have a dual gland adhesive system
-epidermis had adhesive gland that secretes a very sticky substance and when it needs to move there is a releaser gland that has the chemicals to dissolve the glue
-contract circular muscles to bring head forward -stick head down, remove glue from behind it, contract muscles and bring the back forward - use of hydrostatic skeleton to move forward
-have rhabdite to defend themselves
-cells that contain high concentrated mixture of carbohydrate and proteins that are almost dehydrated
-when rhabdite releases - swell with contact of water - hydrate very quickly and become mucilaginous and gooey
-so if something tries to eat it - it is very distasteful, gets spit back out and allows them to settle back down on the substrate
-this is one of the groups that feed on cnidarians - dont trigger the cnidocyts
-cnitocyst get passed through the gut wall through the perichyma and lie the body
-they will use the cnidocyts to protect themselves

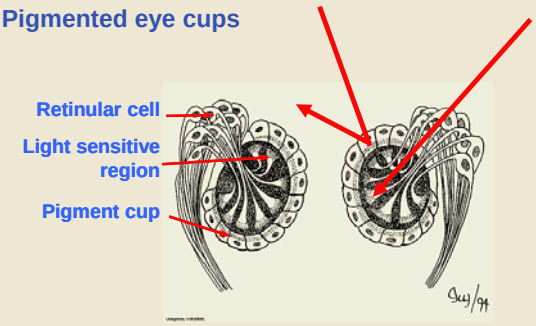


-nervous system is different because it is lateral like
-two nerve cords that separated from eat other and run laterally down the sides
-still have cephalization - they have eye cups and auricles that will be use to sense chemical signals in the water
-auricles are paired and chemosensory



-large brain mass associated with the auricles

Pigmented eye cups



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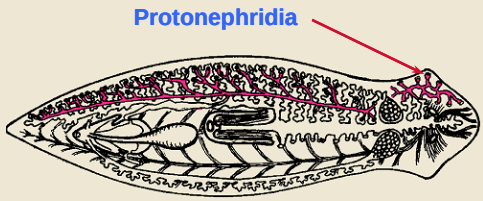
-eye cups -visual system
-forms itself - epithelial cells that were light sensitive - once placed into the cup, giving it a structure and put pigments in it
-receptor in the cup, depending on orientation can tell was area is stimulated by the light
-no image

Excretory system



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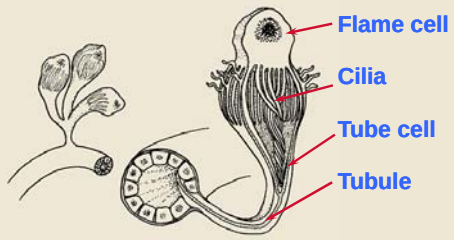
-excretory system - protonephridia - funnel
-protonephridia not to be confused with metanephridia ****
-there is no coelomic space - nowhere to collect large amount of liquid
-parenchyma is spongy and flexible - cells are not tightly adhered to each other
-intercellular space - space has fluid in it - filter that fluid

Excretory system - protonephridia
(Flame cell)



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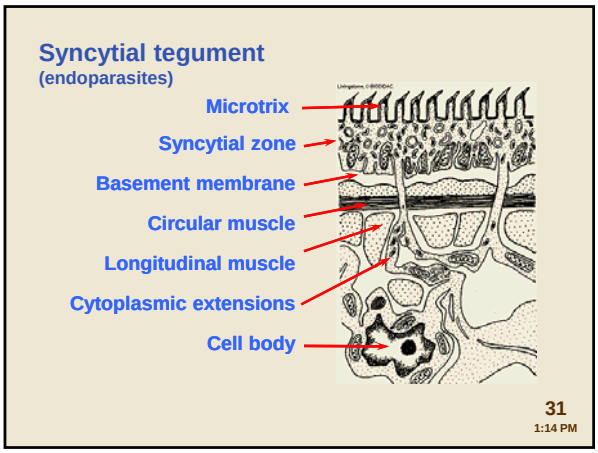
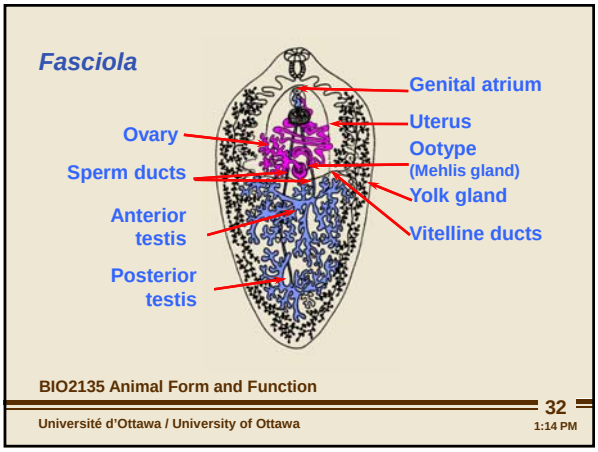
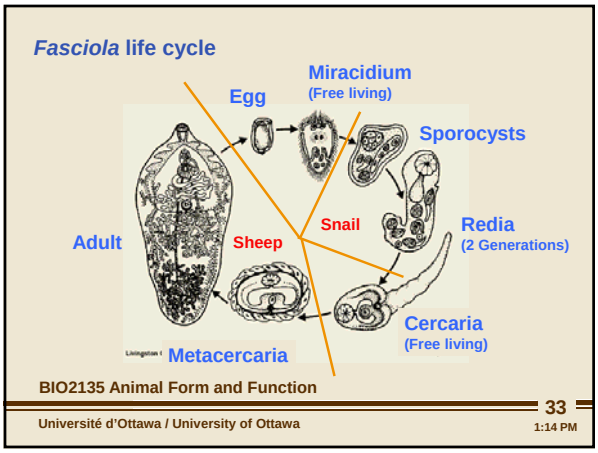
-is is a closed system - not like an open funnel
-have a flame cell connected to a tube cell
-flame cell has cilia that is attached to it that beat inside the hollow of the tube
-cilia propel the water inside the protonephridia down the tube
-when propelled down- get negative pressure - makes a suction
-membrane that separates tube cell and flame cell is very thin - negative pressure force water through the plasma membrane to fill it up again
-proteins, nucleic acid, sugars wont go through- only water and salt - give structure to osmoregulation - this give solution to innundation in freshwater systems
-(mollusc) metanephridia has coelomic structure that has a funnel that is covered in cilia that reaches to the outside
-cilia beat and take coelomic fluid down the tube - as it moves down, energy is dispense so that organism can retrieve the needed things



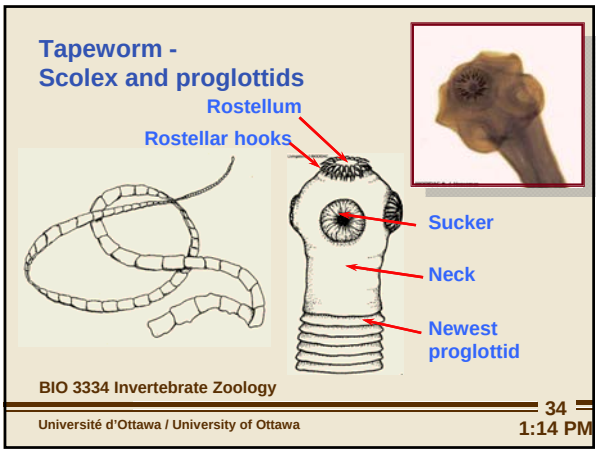
-unique exterior wall -tegument has syncytial area - mass of cytoplasm that is not separated into individual cells
****dont confuse tegument with integument (just a layered surface)
-basement membrane that lies underneath is what the cells are cemented to
-have cytoplasmic extentions that extends down through everything to the cell body
-when syncytial layer is damaged - genetic material is not attacked because it is protected on the inside of the organism
-genetic material can then fix it from the inside and send it up through the cytoplasmic extention
-epidermal layer will be able to protect themselves from host - ie tapeworm



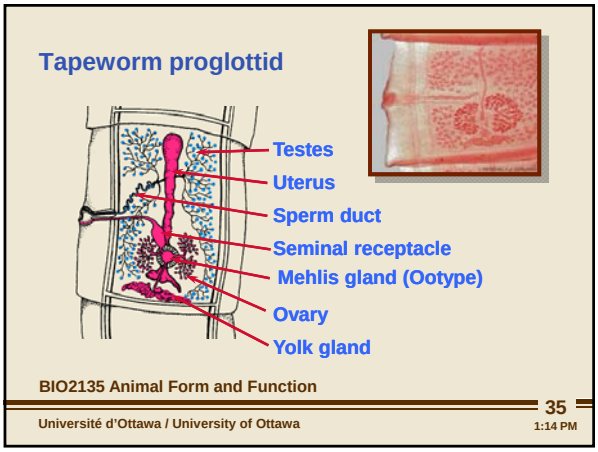
-egg producing machine
-simple organism that can live underneath usual circumstances
-have two host that they reproduce inside of it
-increase there numbers when it is inside the host
-ootype - stage where egg can develop - and then thousands of eggs will get released



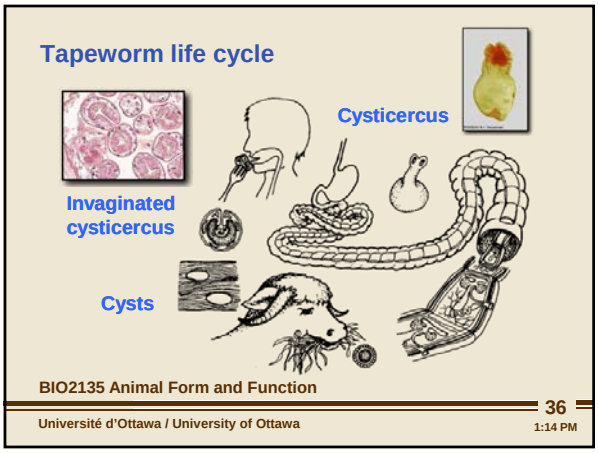
-free swimming ciliated larva - miracidium
-for sheep flukes - when the eggs are defecated - rely on rain and surface water to move it into a large body of water - when in water cilia will start to swim and erupt from the egg
-motile swimming stage, will look for the next host to invade - will be a snail - get morphological change to become a sporocyst -larva amplification, make new organisms - burst into redia
-redia increase it nutrients and become bigger - burst to becomes cercaria
-increase parasite number within each host
-intent is to bring up their numbers
-cercaria can swim and break through the body wall of the cell and into the water
-might invade another host
-or try to find vegetation and go into dormant stage - metacercaria- and wait for sheep to eat on the vegetation
- will open up, mature into adult and cycle repeats



-different type of organism - has an attachment site of the head with the rostellum and the rostellar hooks- and barbs that are embedded into the wall of the intestine of the host
-suckers to attach have dual gland adhesive where they glue themselves in place
-tapeworm problem - they are easily dislodged
-anchors itself with set of hooks and suckers
-at the base of the neck -grow units -proglottid - tied to itself - hang inside the host
-see no digestive tract just absorb nutrients from the host digestive tract - flexibility of the organism, gets rid of gut and still functions



-get a series of proglottid that range in maturity depending on how close they are to the neck (just germ mass when close to the neck)
-each section gets pushed down and they increase in numbers
-germs differentiates into a female and male reproductive tract
-tape worms are hermaphrodite
-there is an excretory duct that run down the length of the animal
-when and if it break off- the excretory liquid is lost
-inside there is a giant testis that creates sperm and the ovary that makes the eggs
-tape worms when mate - males place sperm into the gland
-if need to will self fertilized-bend the proglottid forward and put it in the seminal recepticle if a proglottid up the body
-sperm will be stored
-mehlish gland/ootype - where egg is stage so it can get nutrients because it is so close to the yolk -gets fertilized, shell gets put on in it, put then in the uterus so it can be stored
- eventually proglitid gets broken off- and shell protected eggs are release and deposited into the fecal matter



-tape worm life cycle
-egg is deposited to the outside
-consumed by intermediate host where egg will develop
-eggs develop to intermediate cysticercus in the sheep (or any intermidiate host) -embed into muscle of the meat
-egg hatch, migrate into the muscle tissue - lie dormant as a cysticercus (which is a scolex and a neck ready to attach and start growing)
-when meat isnt cooked - get to digestive tract and cysticercus gets signal to unfold and the scolex will attach to the digestive tract and starts to grow proglotids