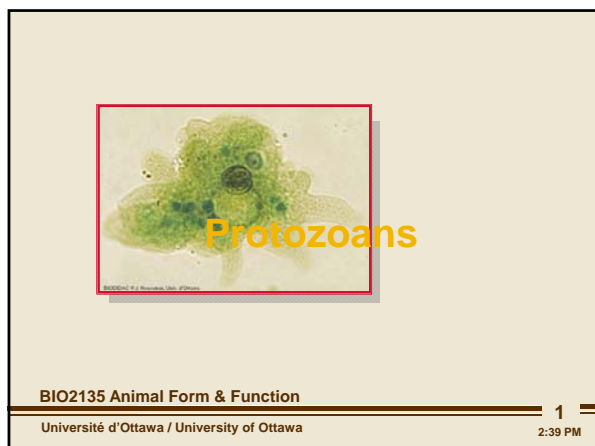
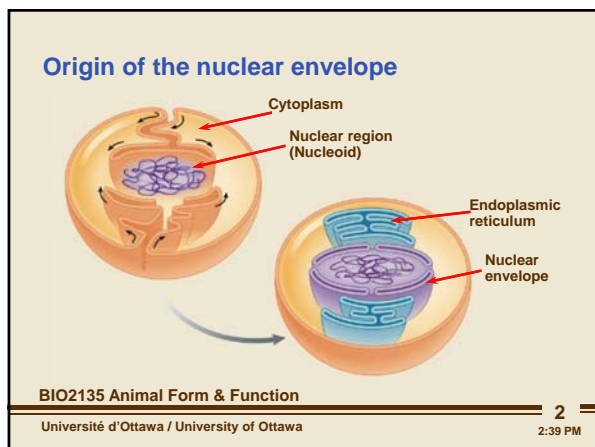


Protozoans

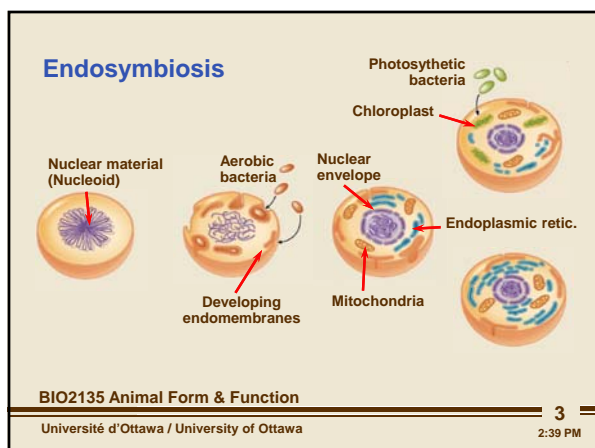


protists aren't only just ancestors to animals, but some actually act like animals, this is to say that they are heterotrophs (need to consume food)



one of the most important events in the evolution of the eukaryotes is the formation of the nuclear envelope (that invaginated the nuclear material and formed the nuclear membrane (this now created a separate internal environment) what is important about it is that what is inside the membrane now could specialize and develop (such as replication transcription..)

in this environment transcription and such goes down



Endosymbiont theory: The theory of Endosymbiosis explains the origin of chloroplasts and mitochondria and their double membranes. This concept postulates that chloroplasts and mitochondria are the result of years of evolution initiated by the endocytosis of bacteria and blue-green algae. According to this theory, blue-green algae and bacteria were not digested; they became symbiotic instead. Endocytosis is when a substance gains entry into a cell without passing through its cell membrane. A cell's plasma membrane invaginates and fuses to lock foreign material inside. An intracellular vesicle is formed as a result. The ribosomes of the inner structure (in chloroplasts and mitochondria) resemble prokaryotic ribosomes.

Endosymbiosis is when aerobic / photosynthetic bacteria, is when a cell consumes these bacteria but instead of converting it into food, it finds that it is useful to the cell and the cell incorporates it into the actual cell and as an effect they get their own membranes and dna / rna

Protozoans

Protist origins: Endosymbiont theory

- Endosymbiont theory accounts for
 - Nuclear membranes
 - Intracellular membranes and spaces
 - Mitochondria (chloroplasts)

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Traditional classification of Protozoa

- Sarcostomastigophora
 - Sarcodines – amoeboid movement
 - Mastigophorans – flagellar movement
- Ciliophora
 - Ciliary movement
- Sporozoa (Apicomplexa)
 - No movement, endoparasites of animals

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these are traditional classifications of the protozoa --> named based on how they moved

the problem with the locomotion is that when you look at flagella in a organism, and there are lots of variatos expl algal protists have 2, more animal like have 1, and even the morphologies can be different

but the reality of this is that this way of naming is artificial is that it does not properly explain thier builds

Deciphering protozoan evolution

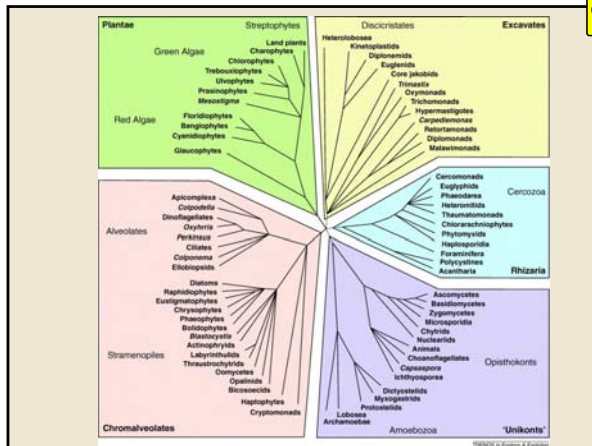
- Locomotion
- Mitochondrial structure
 - Discs, tubes (most common), or none
- Flagellar numbers, morphology and position
 - One (monokont, opisthokont) or two (bikont), both the same (homokont) different (heterokont), also opisthokont (behind)
- Gene fusions
- Molecular sequences

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instead in order to better define them we now use thier mitochondria (some are flat some are circles, disks, tubes lotsa different shapes) and some even dont have mitochondria because they have incorporated the mitochondian structure into the cell itself (means that the mitochondria in and of itself is not present but the cell performs theses functions itself

Protozoans



this is the evolutionary sequence (cladogram for the protozoan)

what we are going to do is that we are going to look at what animals do and how the protozoa do --> these things are on the left in the slide

Things that animals do

- Obtain food
- Be able to move
- Obtain oxygen
- Remove metabolic wastes
- Maintain water and salt balance
- Sense and react to the environment
- Reproduce and perpetuate the species

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METABOLIC WASTE (IS NOT FECAL WASTE) IT IS ABOUT 3 THINGS

- 1) NITROGEN THAT THE LIBERATE AS AMONIA
- 2) CO₂
- 3) WATER

** the big problem is the nitrogen**
 and the water is used as a water source in some protozoa and sometimes this comes into play when they want to be isotonic to the environment
 ** whenever u use hypo and hypertonic make sure what is being compared

most important thing for a protozoan is being able to orient itself towards food (light less) --> beginsins of a censory system

Things animals do – Obtain food
Phagocytosis and pinocytosis

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Pinocytosis: Uptake of fluid, rather than particulate material, by endocytosis; surrounds the fluid with cytoplasm to form a vesicle or vacuole. (Gr. pinein, to drink + kytos, cavity or cell)

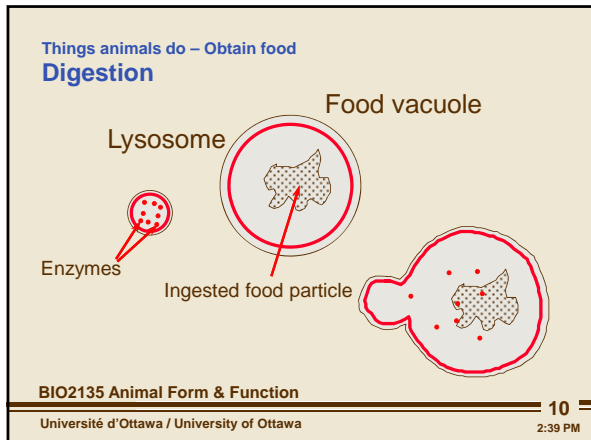
Phagosome: A membrane-bound vesicle formed in a cell by an inward folding of the cell membrane to hold foreign matter taken into the cell by phagocytosis.

engulfing = phagocytosis.

phagocytosis : Everything that is absorbed is in chunks and those chunks need to be broken down inside the cell after the vesicle brings them in (absorbing solids)
 pinocytosis : Everything that is absorbed is in liquid form, so no need to break down the chunks since everything is dissolved in the exterior liquid (dissolving liquids)

Protozoans

Food vacuole: a membrane-enclosed cell vacuole with a digestive function, containing material taken up in by the process of phagocytosis.



the big problem for digestion is that we need to break it down into smaller parts like if a protein is absorbed itll get broken down into its amino acid

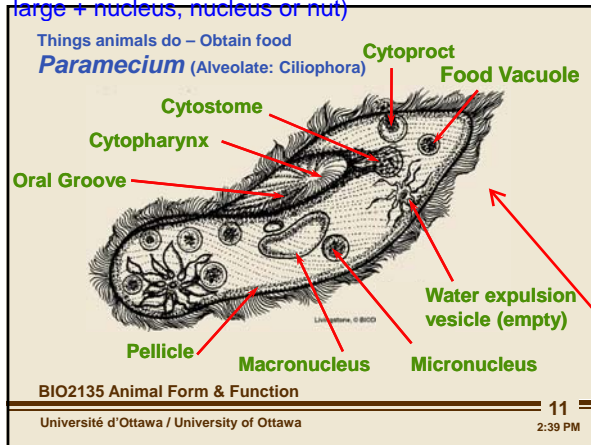
-- ex polymer is abosrbed then broken down into its components (monomers)

lysosome contains the digestive enzymes that are produced in the golgi aparatus and is in vesicle so that the cell does not digest itself (then the lysosome fuses with the food vacuole and dissolves (the food)

how you go about digestion is going to depend on thier structure and appearance.

Micronucleus: One of two types of dimorphic nuclei found in ciliate protozoans. The single micronucleus contains only one copy of the genome and is used during the reproductive cell divisions. The other nuclear type is the macronucleus. (Gr. mikros, small + nucleus, nucleus or nut)

Macronucleus: One of two types of dimorphic nuclei found in ciliate protozoans. The macronucleus contains multiple copies of the genome (polyploid) and is responsible for general protozoan cell function. The other type of nucleus is the micronucleus. (Gr. makros, large + nucleus, nucleus or nut)

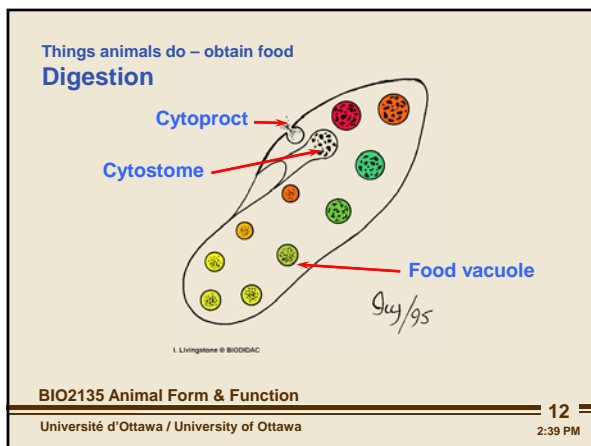


Cytostome: The cell "mouth" of certain complex protozoa, usually with a short gullet or cytopharynx leading food into the organism, where it is collected into food vacuoles, then circulated inside the body, eventually to be excreted through the cytopyge.

Origin: cyto+ G. Stoma, mouth

Cytopyge: Cell anus: region at posterior of a ciliate where exhausted food vacuoles are expelled

Pellicle: The network of semirigid cell membrane thickenings found on the surface of some protozoans. These are used to anchor either the locomotory flagella or cilia into the surrounding plasma membrane. (L. pellicula, skin)



the paramecium has a cytoplasmic streaming (movement of cytoplasm in a loop (across the paramecium)) kinda like a circulatory system that distributes food across the cell so it gets evenly nutrieted

what is interesting is if pH dye is added it can be seen that the digestion goes from acidic to alkaline digestion (a set of enzymes acidic -- then use alkaline enzymes)

some protists are able to process lots of water and as a result process lots of food

Things animals do - locomotion

Types of protozoan movement

- **Pseudopods**
- **Undulipods**
 - Cilia
 - Flagella
- **No movement**
 - Parasitic forms

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Pseudopod: A cytoplasmic extension that extends from the surface of either a protozoan or any amoeboid cell. These structures are temporary and are used for locomotion and feeding. (Gr. pseudes, false + podos, foot)

Undulipod: Generic term for cilia and flagella. Singular, undulipodium.

parasite :An organism that obtains nourishment and shelter on another organism.


pseudopods = amoeba fake foot

undulipods = consists of both cilia and flagella they are aranged with 9+2 organization

Molecular motors

- **Amoeboid - myosin**
- **Undulipods - dyenin**

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 Myosins comprise a family of ATP-dependent motor proteins and are best known for their role in muscle contraction and their involvement in a wide range of other eukaryotic motility processes. They are responsible for actin-based motility.

Make sure you Isn carfully to both of theses

psuedopods and undulipods move with molecular motors

the most important motors are the myosin motor (amoebas -- psuedopods) this motors filament acts with actin

-dyenin motors are for the undulipods, they use the 9+2 organization

Things animals do - locomotion

Amoeba (Sarcomastigota: Amebozoa)

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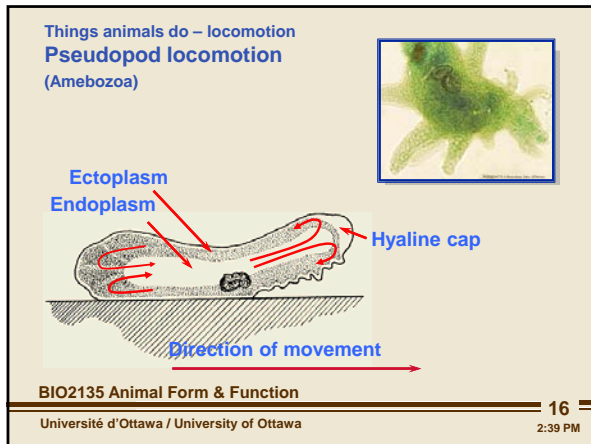
Ectoplasm: The outer cytoplasm of a cell or protozoan that has no organelles and is usually less fluid than the inner endoplasm. (Gr. ektos, outside + plasma, form)

Endoplasm: The inner cytoplasm of a cell or protozoan with organelles; usually more fluid than the outer ectoplasm. (Gr. endon, within + plasma, form)

Difference between both: Ectoplasm is a thin, watery cytoplasm near the plasma membrane of some cells and Endoplasm is a dense cytoplasm found in the interior of many cells

Protozoans

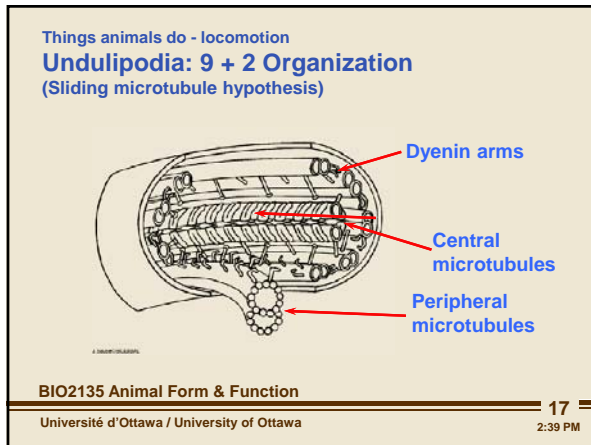
Hyaline cap when the fluid hits the cap it becomes solid and makes filament that is able to push forward



Hyaline cap: appears inside the amoeba, which looks like an area with no gel or sol inside of it. The hyaline cap soon disappears, because gel and sol flow into it. If you view a picture of an amoeba, you would see that it is blurry. This is not because it's so small that it looks weird. It is because the sol and gel are moving so fast throughout the amoeba's body.

actin is a globular protein (it can create fillaments)
the amoeba can control wether the actin is acting with the single actin monomers , to actin filaments

as the myosin "walks on the actin filaments" it drags with it some cytoplasm and stuff
pretty much the myosin pulls on the actin filaments (like a tube of toothpaste)
and at the back the myosin dissolves the actin filaments back into monomers
basic muscle biochemistry is present in this single celled organism



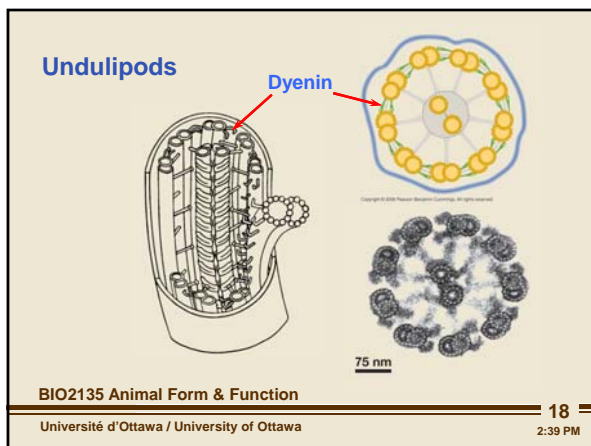
Undulipod: Generic term for cilia and flagella. Singular, undulipodium.

Dyein arm: A family of microtubule motor proteins that derive energy from ATP (adenosine triphosphatase) activity. The dyneins also form arms on the outer tubules of cilia and flagella.

if there are lots of these sliding microtubules = cilia

and if there are few then its called = flagella

Sliding microtubule hypothesis: Cilia and flagella are composed of microtubules arranged in nine pairs around a central pair. This arrangement allows the energy from ATP to be used for changing the shape of the cilium or flagellum to accomplish movement. This is known as the sliding microtubule hypothesis.




9+2 organization: (9+2 arrangement) in cilia and eukaryotic flagella, Referring to the arrangement of 9 microtubules (motor proteins flagellin & dynein) surrounding 2 microtubules in the middle.

Protozoans

Things animals do - locomotion
Flagellar beat

Planar beat
Helicoid beat



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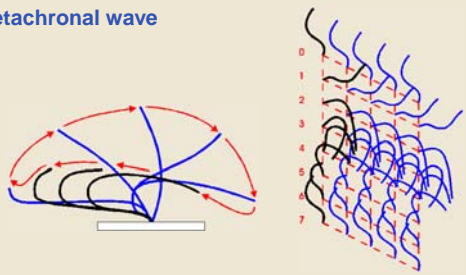
so pretty much the planar beat is that you beat and bring back gently (while trailing) = breast stroke

Helicoid beat = it beats and bores itself through the medium = sculling in swimming

the helicoid beat is important because in the world that these animals live they are quite small.. so for very small organisms they have large/ lots of interactions with liquid medium this interaction is called RHEOLDS rule

small organisms live in viscous environments (the planar beat is not usefull (theyd get stuck) so they use the helicoid beat cuz they can drill through the viscous medium

Things animals do - locomotion
**Ciliar movement:
Metachronal wave**



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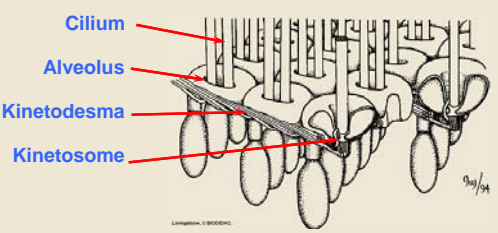
Cilia: plural form of cilium, Microscopic, hair-like projection on the surfaces of some cells and of certain organisms. Cilia are generally of two kinds: motile cilia (for locomotion) and non-motile cilia (for sensory). Example of tissue cells with cilia are the epithelia lining the lungs that sweep away fluids or particles. Examples of organisms that have cilia are protozoans that use them for movement.

ciliates have beat called the METACHRONAL WAVE they do not all beat in unison (some are doing powerstroke, others are recovering some are in the middle ect and when doinf the recovery stroke (they do it at different angles)

since the cilia beat through thick and viscous mediums they have anchors in the 9+2 organization. they are not only attached to the plasma membrane but also have reinforcing peicles and microtubules

Things animals do - locomotion
Pellicle structure (Alveolate: Ciliophora)

Cilium
Alveolus
Kinetodesma
Kinetosome




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Ciliophora: Ciliates, as their name implies, are covered with cilia with the typical 9+2 organization of microtubules and a kinetosome "root" embedded in the plasmalemma. Kinetosomes are connected to each other by a complex infraciliature that forms the pellicle, its function isn't fully understood but it may be important in reinforcing the cell against forces generated by the beating cilia. Because of their pellicle and infraciliature, ciliates have fairly uniform shapes, often species specific. Complex ciliature, such as cirri and membranelles, are involved in locomotion and feeding.

Kinetosome: Structure that forms and anchors the axoneme of a cilium or flagellum in the plasma membrane; also called a basal body. (Gr. kinein, to move + soma, body)

Protozoans

Things animals do - locomotion
Pellicle structure



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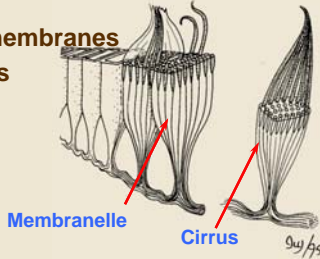
Because of their pellicle and infracilature, ciliates have fairly uniform shapes, often species specific. Complex ciliature, such as cirri and membranelles, are involved in locomotion and feeding.

Pellicle: The network of semirigid cell membrane thickenings found on the surface of some protozoans. These are used to anchor either the locomotory flagella or cilia into the surrounding plasma membrane.

it makes the thing more rigid

Things animals do - locomotion
Compound ciliature

- Undulating membranes
- Membranelles
- Cirrus



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Cirrus: A bundle or tuft of cilia serving as foot or tentacle in certain ciliate protozoa.

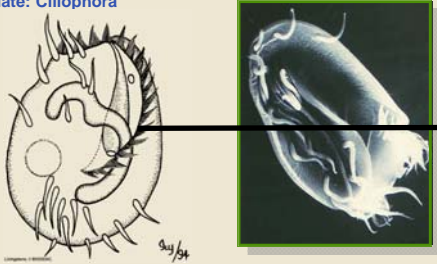
Cirri:

Slender filamentous structures: fused cilia in protozoa, attachment appendages in sessile echinoderms, or a copulatory organ found in some invertebrates. (L. cirri, curl)

cilia can be fused together and even make undulating membranes and even paddle like structures called membranelles

cirrus = when they get fused and become little pointy things

Things animals do - locomotion
Euplotes
 Alveolate: Ciliophora



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covered with a cirrus
 it has a different type of motion

these pointy like things are cirrus (in plural called cirri --pronounced siri -- like iphone thing

Protozoans

Vorticella: Myonemes
Alveolate: Ciliophora

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you can actually get actin and myosin filaments to be contractile in the same cell (kinda like muscles)
and what vorticella does it makes like a push membrane (kinda like squid) run all way down base

test -- is a reference to the mineralized non living type of skeletal like structure they are made of calcium or silica.
there are 2 groups that have this type of skeleton, they are the Granuloreticulosae (Ca), and Rhizopods (Si)
there is a problem with trying to make a calcium skeleton in the ocean (especially in the deep ocean) the pressure is so large that it makes it the mineralized calcium dissolved in these areas they instead (organisms) use silica since it doesnt dissolve under the pressure.
silica also happens in other areas of the oceans

Protozoan skeletons: Tests

- **Calcium Carbonate**
– Granuloreticulosae
- **Silica**
– Rhizopods

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They do NOT have a skeleton
some kind of non living mineralized casing that protozoans use for protection
mineralization occurs with calcium or silica
calcium salts gives a rise to calcium carbonate skeleton.
silica salts gives crystalline silica

-granuloreticulose and rhizopods
biochemistry of skeleton (ability to pull out minerals out of environment and turn it into rigid stuff)

one place in the ocean where you cant use mineralised calcium deep down in the ocean , the pressure of the water calcium make it dissolve , they use instead silica , such as sponges with skeletons of glass

Protozoan skeletons
(Granuloreticulosea)

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shells of single called protozoans that were deposited millions of yrs ago (picture on the left)
these white cliffs are shells of protozoans that were deposited millions of years ago. and deposited == lots and lots of minerals

participation of calcium
all protozoans use (O)

Protozoans

Things animals do – gas and nitrogenous waste
Advantages of small size
Protozoans are 0.005–0.3 mm in size.

Size	Surface	Area	Surface/volume
0.5 mm	0.000007854	0000000001636	480,000
0.6 mm	0.1256	0.0004189	299
2.0 mm	12.57	4.189	3
5.0 mm	78.53	163.6	0.5

Reynod's #

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- surface to volum , is a bag of biochem , cell membrane, inside is cytoplas carrying out life processes

in order for the small things (protozoa) they get thier Oxygen through surface contact with the oxygenated environment

there is a magical number that limits the size of some of the small organisms (is REYNOLD'S #)

as you increase size sthe surface/volume ration then decreases.

Things animals do – metabolic wastes
Nitrogenous wastes

- Ammonia
- Urea
- Uric acid
- Guanine

less toxic ↓

NH3

NC(=O)N

C1=NC2=C(N1)C(=O)N(C(=O)N2)C

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this surface to volume ratio also plays a role in the excretion of metabolic waste

if there is too much amonia it can shut down the krebs cycle this then causes them to die

these small organism (with large surface to volume ratio) the huge change in concetration (like ones in ocean and fresh water) then they difuse across the membrane and away into the ocean

then cap oppens a nd water escapes

Things animals do – salt and water balance
Water expulsion vesicle
 (Contractile vacuoles)

fill on this end **Full**

Endoplasmic reticulum

Excretory pore

Ampulla

Feeder canal

storage area that swells

Empty

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things are a little differnt for a fresh water protist (btw their major

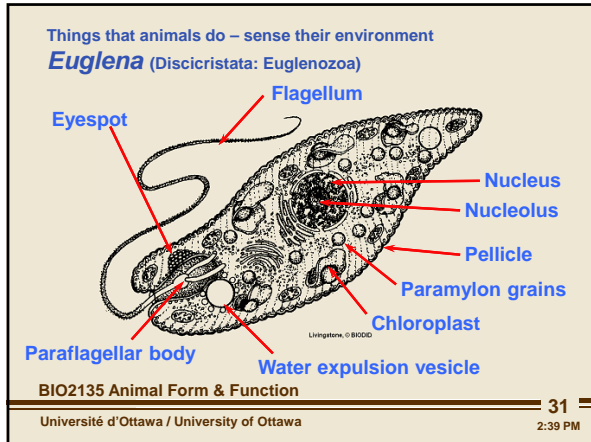
challenge is not exploding from having to much water into them) -->

secret for algae is the cell wall but animal cells dont have this. so what

they do is they develop an extra organelle that deals with the excess

water and what this pump does is that it pumps the water out of the cell. (ATP pumps)

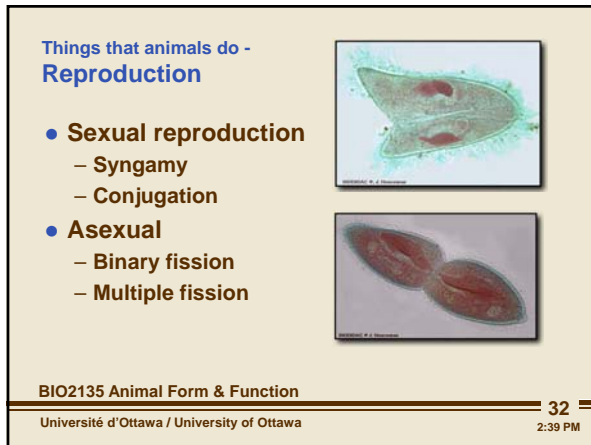
Protozoans



the other things is to sense and react to their environment that is to say they have behaviors (euglena) does have a chloroplast and it can also absorb nutrients from its environment (kinda plant/ kinda animal) their interesting behavior is that they have an eye spot that orients it towards light

if there is too much light then there can be overheating in which case it then orients away.

what is interesting is that the karatenoids in this eye spot are present in all light detecting organism (even upto us as humans)



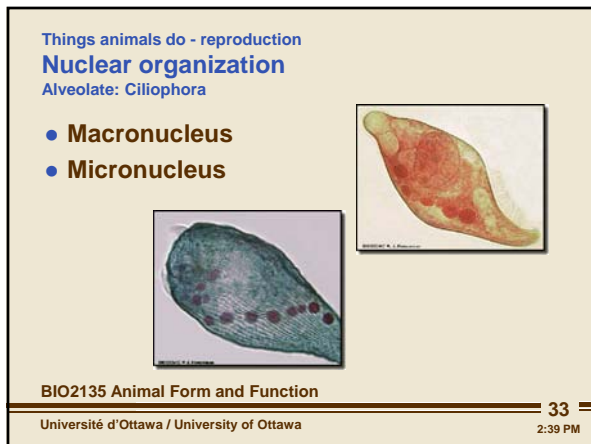
binary fission = simple mitotic division that leads to 2 individuals multiple fission = is like binary fission keeps on mitotic-ing and then once lots of some random number formed they then package they it all up and have new indivis

gamete production is rara but does occur

Multiple fission: Form of cell division where a single parent cell divides and produces more than two daughter cells. When only two daughter cells are produced, the process is referred to as binary fission.

Syngamy: The fusion of gametes resulting in the formation of a zygote, which develops into a new organism. Synonym: fertilization, fecundation.

Conjugation: A form of sexual reproduction in ciliates (Ciliophora). During conjugation two ciliate protozoans join and the macronuclei disappear. After meiotic divisions of the micronucleus, the resulting genetic material is exchanged. (L. con, together + jugare, to join)



ciliates have 2 nuclei
 1- macronucleus (big 1)
 2-micronucleus (small 1)

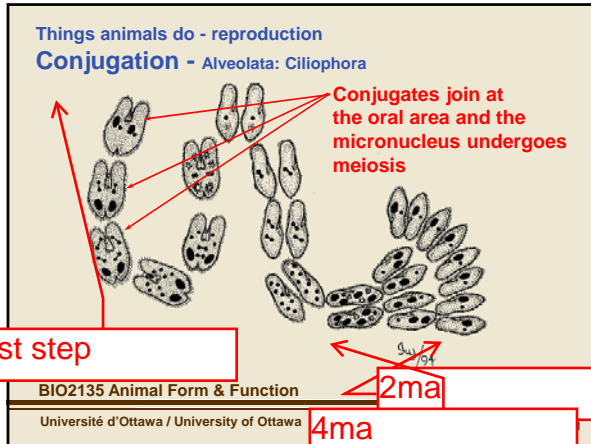
they have 2 polpoidy and this is an advantage because when they do transcription and translation means that the more ploidy u have the more transcription products they can have (then this means that they then enhance the production of this ciliate)

the macronucleus is the house keeping nucleus makes everything run properly in the cell the micronucleus does not housework only replicates when its undergoing binary fission (called conjugation)

Macronucleus: One of two types of dimorphic nuclei found in ciliate protozoans. The macronucleus contains multiple copies of the genome (polyploid) and is responsible for general protozoan cell function. The other type of nucleus is the micronucleus. (Gr. makros, large + nucleus, nucleus or nut)

Micronucleus: One of two types of dimorphic nuclei found in ciliate protozoans. The single micronucleus contains only one copy of the genome and is used during the reproductive cell divisions. The other nuclear type is the macronucleus. (Gr. mikros, small + nucleus, nucleus or nut)

Protozoans



http://www.youtube.com/watch?v=xNclnY_OHfM&feature=related

Ciliophora reproduces in two different ways:

- 1) asexually
- 2) sexually

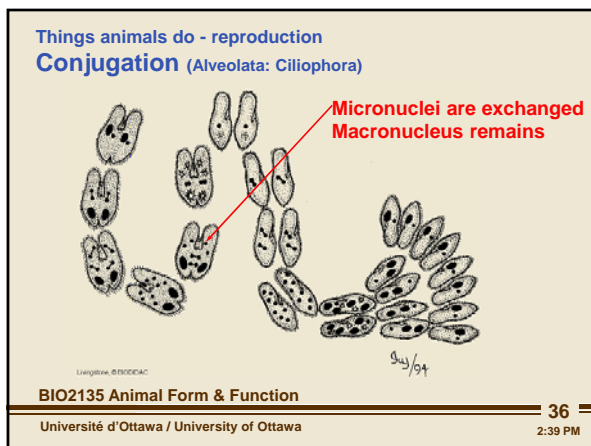
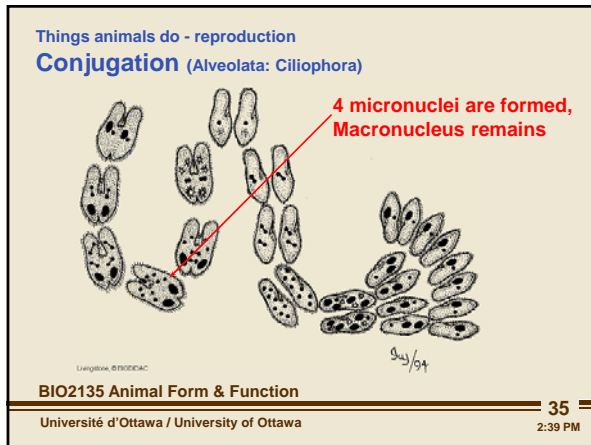
1) asexually: through out double divisions where the macronucleus divides indirectly and after that the micronucleus go through the same exact thing and it divides through mitosis (however without showing the lines) next the Ciliophora cell divides into two , in each we would see one macnuclus and one micronucleus.

2) Sexually: Through a process called conjugation. It happens randomly while swimming where two Ciliophora get close to each other and they connect from the oral groove side making a tube in order to exchange the cytoplasm. Now the micronucleus divides through meiosis giving 4 nucleuses. Then after that step we see the macronucleus dissolve with two of the 4 of the nucleuses. We remain with two connected ciliophora cells with 2 nucleuses in each of the cells. One of the nucleuses is stable and it would be the female nucleus the other is motile and it is the male nucleus.

Next the two ciliphora cells exchange the male nucleuses and each of the exchanged male nucleuses fertilizes the female nucleus in the cell. Producing one nucleus in each called Synkaryon. So we could say that the Synkaryon forms from the fusion of micronuceli in each conjugant. In the next step each Synkaryon undergoes many divisions giving 8 different nucleuses. Some of those nucleuses turns into macronucleus and the others turn into the micronucleus. The final step each ciliphora cell goes through divisions giving 4 different ciliphore cells.

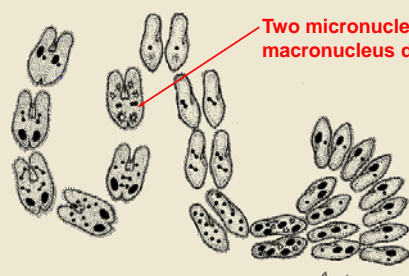
- we started with 2 different cells ending up with 8 different cells.

in the first step: the micronucleus divid durin miosis



Protozoans

Things animals do - reproduction
Conjugation (Alveolata: Ciliophora)

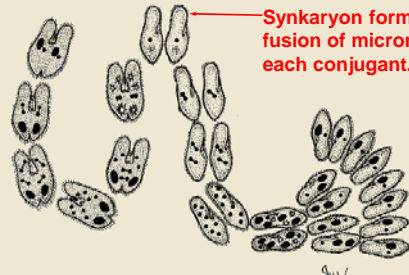


Two micronuclei and macronucleus disappear

Largely © BIOEDUC

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Things animals do - reproduction
Conjugation Alveolata: Ciliophora

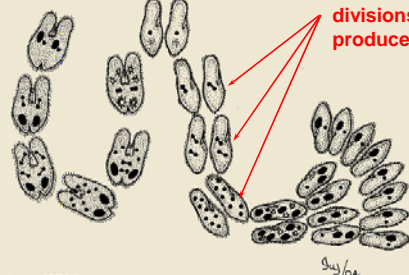


Synkaryon forms from the fusion of micronuclei in each conjugant.

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Things that animals do - reproduction
Conjugation (Alveolata: Ciliophora)



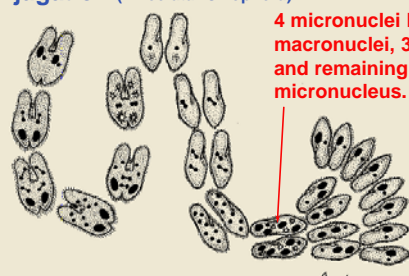
Three mitotic divisions produce 8 nuclei

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Protozoans


Things that animals do - reproduction
Conjugation (Alveolata: Ciliophora)



4 micronuclei become macronuclei, 3 disappear, and remaining become micronucleus.

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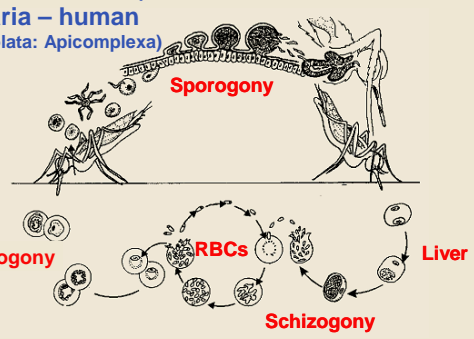
Things animals do - reproduction
Conjugation (Alveolata: Ciliophora)



Mitotic divisions of micronuclei and macronucleus

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Things animals do - reproduction
Malaria – human
 (Alveolata: Apicomplexa)



Sporogony

Gametogony

RBCs

Liver

Schizogony

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The most important thing to do is to get in between the hosts.

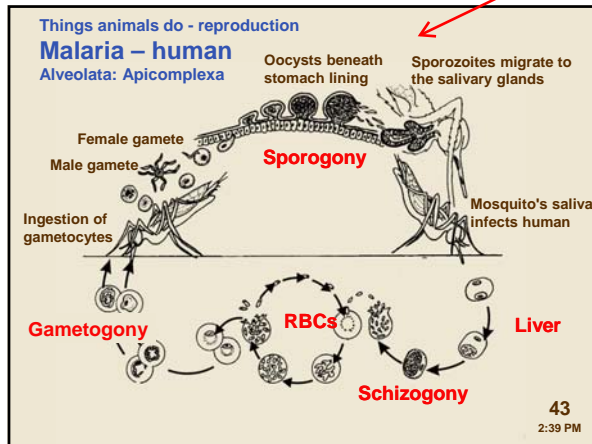
The definitive host : where the parasite reproduces and return to the diploid state (the mosquitoes)
 The intermediate host : ends up with an asexual and cloning many many individuals

the most important part is getting into the host and they get around that by making many of them. because if they dont then there is a prty low chance that it would get and develop inside the host. This is done in both the humans and the mosquitoes.

there is two types of hosts the definit and the intermediate hosts . the definitive host the parasite reproduces (get a zygot) get and sperm combin and return to the diploid state that is in the mesqeto in the intermediate we get cloning and increasment in the number of the parasite and that is in tthe humans this part **they are motile**.

The fusion product of the zygot doesnt produce the indivgdual that will make a whole gamet (sporophit) doesnt make a gamete ... animal like spores sporozoits motile they get out the stomach tissue and gets to the gland (sprogny).....

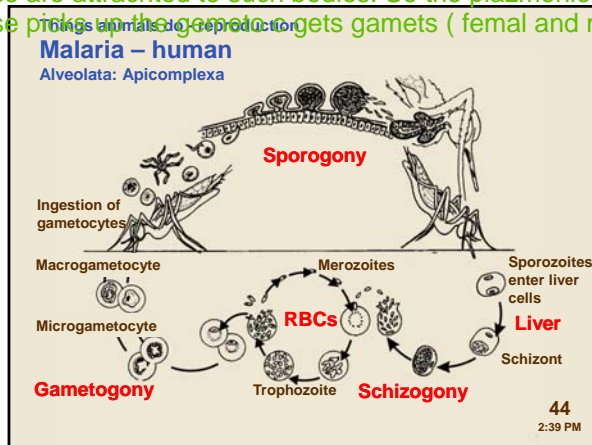
Protozoans



when the mosq feed on the blood it sucks up saliva the saliva liquids up the blood that was sucked and through this process it gets in the cycle

when it find the liver cell , it goes throughdivision and they become a very large number and they finish the food up so they have to undergo merephlogical changes so they find a red blood cell pentrate and get in which make a very good environmet. The red blood cells burst all at once and therfore they cause enima ! they causing the paistion to be hot and swety, so this had set the patints body to be a great attraction to the mosqeto to come to it. the mosq would get gameto ches after they suck the blood of the patient

finds a liver cells and they multiply in here and they eat the cytoplasm in the liver and they run out of food and the change and thye get into the red cells they have protein and (o) and they feed on the cell (trophozoits) and the attraction to the mosqeto to come to it. the mosqetose are attracted to such bodies. So the plazmonium had set signals for the mosqeto to come back and bite . the mesqetose picks up the gametocytes gets gamets (femal and male)



How did this start up ?

all known is that the human body and the mesq are both need to creat malaria.

very complex life cycle that insues that the plasmeniyoum and the mesqeto and the human are all need it for it ,

DDt is one of the things to be used against malaria

But after the mesqeto became resistance to the DDT however after they made a vaccin that would stop the attk of protozon to the red cells .

<http://www.youtube.com/watch?v=szlfndj0TFE>

First The human body as a host:

Mosquitoes belong to a group of insects that requires blood to develop fertile eggs. Males do not lay eggs, thus, male mosquitoes do not bite. The females are the egg producers and "host-see" for a blood meal. Female mosquitoes lay multiple batches of eggs and require a blood meal for every batch they lay. Blood is reserved for egg production and is imbibed less frequently. the Malaria is a disease that is swiping back and forth between humans and mosquitoes. When an infected pregnant mosquitoes bit a human body for the previous reason. When a female mosquito pierces the skin with her mouthparts, she injects a small amount of saliva into the wound before drawing blood. The saliva makes penetration easier and prevents the blood from clotting in the narrow channel of her food canal. The infected Saliva also carries Malaria Parasite (sporozoites). The parasite rides the blood stream (which is like a network of roads) toward the first target (The Liver). The Malaria Parasite as merozoite it infects the liver cells.Over the next few days the Parasite under goes many cells nuclear divisions copying its DNA over and over. A sinle infected liver cell could make thousands and thousands of Malaria Parasites. The next generation of the parasite infect a new target The red blood cells (Parasite as trophozoite infects the new target " the red blood cells"). Inside a red blood cell the parasite could hide from The body's immune system and inside the infected red cell the parasite makes more and more parasites. The infected cell become stiky and it stiks on the blood vessules walls. Once it becomes muture the infected cell purses spreding more parasites in the blood stream. The malaria victumes suffere from fever, sweting and losing blood (anemia).

Second, The mosquitoes as a host:

Usually mosquitos (Both male and female mosquitoes) feed on plant nectar, fruit juices and liquids that ooze from plants. The pregnant females are the egg producers and the only "host-see" for a blood meal= nutrients from blood for eggs. Since the humans who are infected with malaria, they get shills and high fever (warm) with sweating those patients would be the best source of blood for the female mosquitos. When the mosquito bits the infected humans it also gets infected with malaria and it would be digested with the rest of its meal. The parasite enters sexual reproduction as gametocytes.Malaria sex becomes triggered when the human blood warms inside the insects stomach.The female parasite turns into an egg while the male turns into a sperm (the male sperms takes longer time to form than the female eggs). when the sperm is ready it fertilizes the egg and becomes an ookinete. Then it goes to the outer lining of the stomach forming oocysts. The oocyst releases thousands of sporozoites (parasites) which all go to the mosquitoes salivary glands. The next time the mesqites bite. The Malaria parasite will go through the same steps all over again.