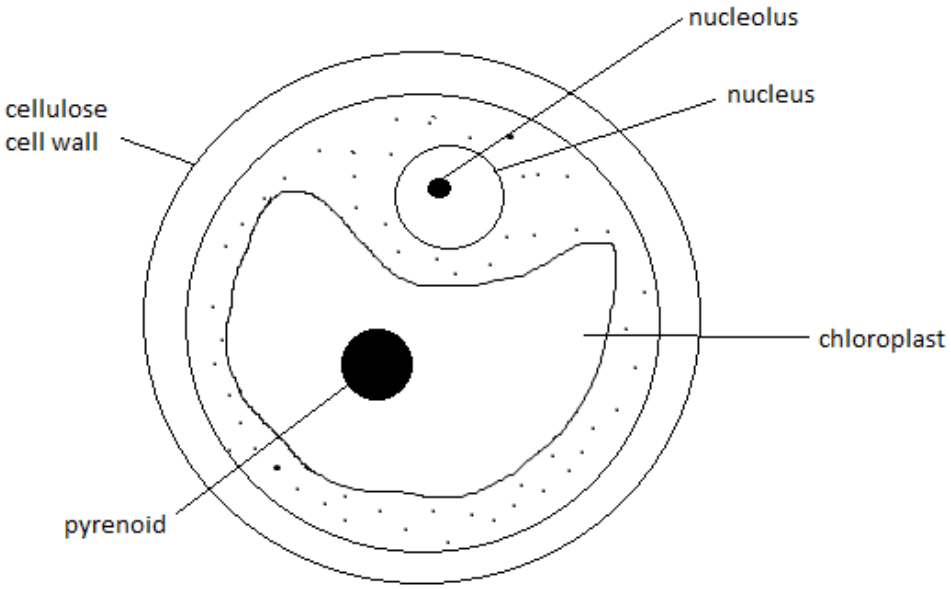
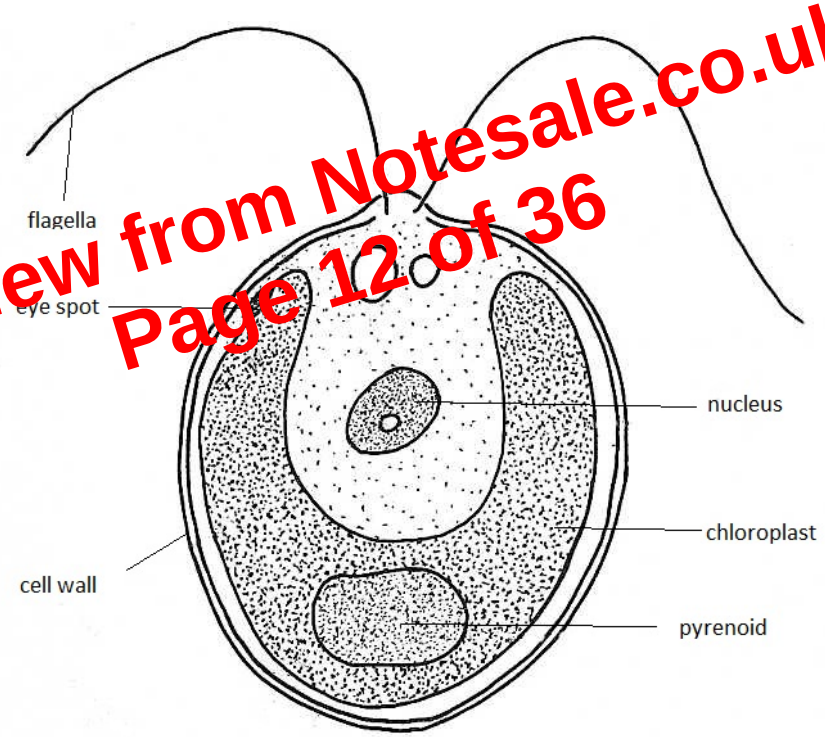


ii. Chlamydomonas: unicellular, motile: two flagella, single cup-shaped chloroplast



iii. Spirogyra: filamentous, cell division by mitosis, new filaments are formed by fragmentation, conjugation occurs when haploid filaments of opposite mating types come in contact:

- A bridge forms

Nutrition

Absorptive heterotrophic: they secrete enzymes outside its body on its food and digestion takes place outside the body, the nutrients are then absorbed into the fungal hyphae.

They can also be parasites, saprotrophs or mutualists.

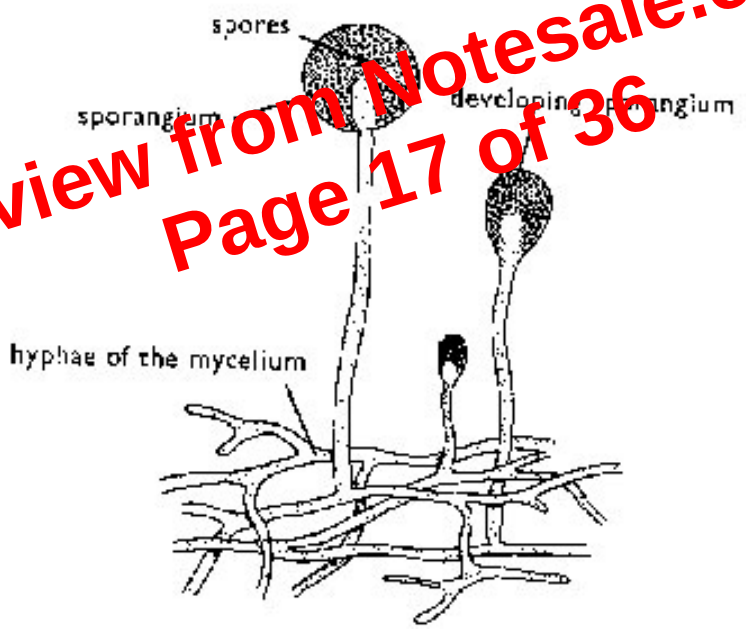
Carbohydrates are stored as glycogen.

Reproduction

This is asexual by means of spores produced by mitosis in spherical sporangia. The spores are dispersed by wind or water.

Sexual reproduction can occur when hyphae of two different mycelia come in contact and exchange genetic material.

Yeast cells reproduce asexually by budding.



Lichens

Symbiotic associations between fungi and green algae or blue-green bacteria. The fungus protects the alga from dessication and high light intensities while also contributing to water and mineral salts. In turn, it obtains photosynthetic products.

- Inner endoderm facing the enteron, the mouth through which both ingestion and egestion occurs.
- Mesoglea which may contain cells that have migrates from other layers

Cnidarians rely on their victims ending by chance into the reach of their tentacles, they prey is forced into the mouth where it is digested by enzymes secreted into the cavity. Undigested material is expelled through the mouth.
With only two layers of cells, nutrients can diffuse rapidly. All cells are in direct contact with the water so gaseous exchange can take place efficiently. They have a large SA:V.

- ✓ *Radial symmetry*: body parts are arranged in a circle.

- ✓ *Tissue level of organisation:* there is some specialisation of cells e.g. stinging cells known as cnidocytes occur on the tentacles. Within these cells are nematocysts – capsules containing long spirally coiled hollow threads. When the triggers of cnidocytes are touched, nematocysts are discharged and can cling to or penetrate and kill the prey with their toxins. They also serve as a defense.
In the endoderm cells are specialised for various aspects of digestions and absorption.

Acoelomate and coelomate body plans

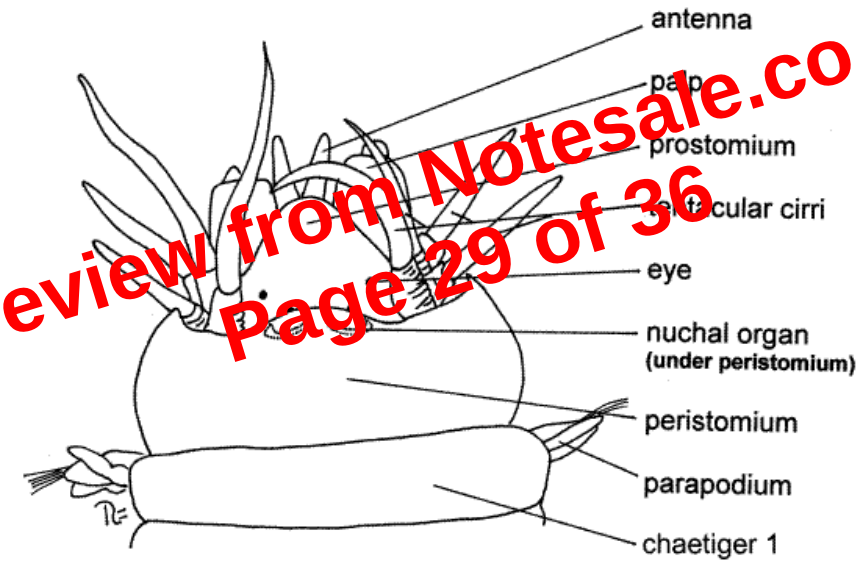
A coelem is a fluid-filled cavity between the alimentary canal (gut) and the body wall which arises as a split in the mesoderm during development of the embryo.

- ✓ ***Acoelomate***: no coelomic cavity exists – the mesoderm completely fills the space between the ectoderm and endoderm and forms a solid middle layer (flatworms).
- ✓ ***Pseudocoelomate***: a cavity exists buy it is lined by mesoderm only on the inside of the body wall but not on the gut side.
- ✓ ***Coelomate***: completely lined, the lining is called the peritoneum – portions of the peritoneum which connect with gut wall to the body wall across the coelom are called mesenteries and these suspend organs within the coelom.

- Closed circulatory system
- Hydrostatic skeleton: provides support, protection and assisting in locomotion
- Metameric segmentation: segments are separated by septa extending across the coelom.
- Definite cuticle
- Chaetae: hair-like structures made of chitin which are inserted into the dirt allowing the body to be pulled forward

Class Polychaeta

Marine, segmented, no clitellum, cuticle, distinct head (cephalisation).
The head consists of prostomium (1st segment), peristomium (2nd segment), sensory tentacles which are sensitive to touch, 2 pairs of eyes and a pair of flesh palp (sensitive to touch), 4 pairs of cirri (flexible hairs).



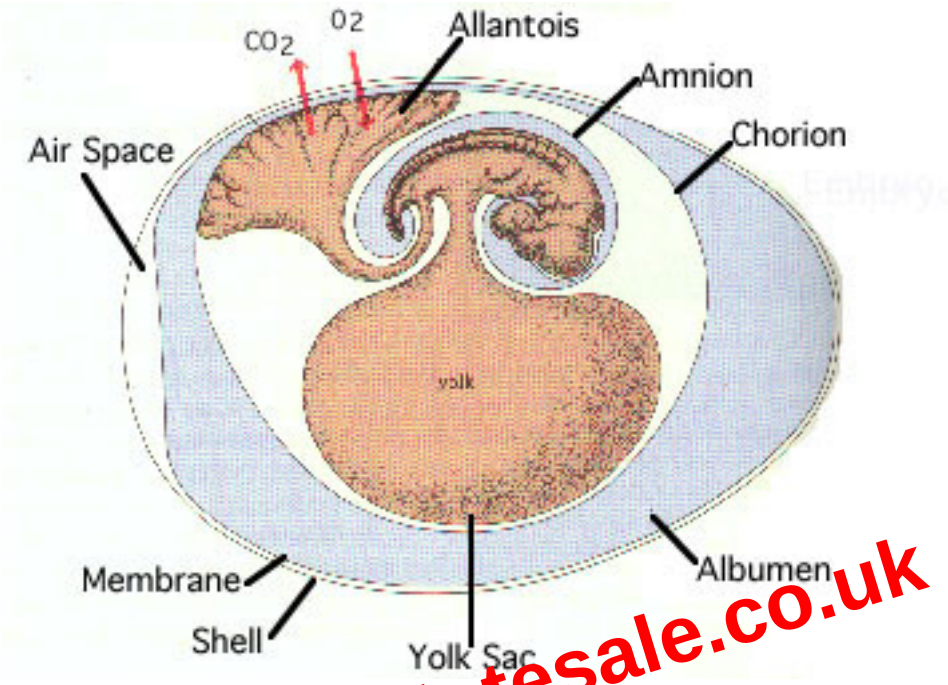
Chaetae numerous on lateral extensions of the body called parapodia – the parapodia have a good blood supply and function as the animal's gaseous exchange surface.

Class Oligochaeta (earthworms)

Freshwater/soil, secretes coelomic fluid from pores and mucus to prevent desiccation and improve gaseous exchange by diffusion. It has no distinct head. Few chaetae

The cleidoic egg

Reptiles adapted to a terrestrial mode of life through the development of the cleidoic egg (amniote). This provides the embryo with a fluid-filled cavity, in which it can develop on land.



Outer shell: provides protection from mechanical damage and surrounds four membranes which develop from the embryo (reptile – leathery, birds – calcareous).

Yolk sac: develops an outgrowth and encloses the yolk, a food supply which is gradually absorbed by blood vessels of the yolk sac (protein food source).

Amnion: completely encloses the embryo in the amniotic cavity which becomes filled with amniotic fluid secreted by the cells of the amnion. This provides the embryo with a fluid environment. (reptiles, birds and mammals have an amniote). As the embryo grows, the amnion is pushed outwards until it fuses with the chorion.

Chrion: prevents excessive water loss from the amnion

Allantois: functions as a bladder, for storing excretory products and as a gaseous exchange organ.

Mammalia

- Endothermic
- High metabolic rates