
Taxonomy

The sorting of living organisms into groups

Nomenclature

- The scientific naming of organisms using the binomial system
- This means giving each organism two names
- The genus name and the species name

Example

Maple genus - Acer

Genus

Species

Acer pseudoplatanus
(sycamore)

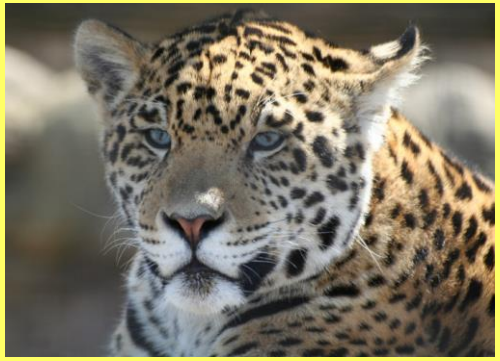
Acer rubrus
(red maple)

Example

Big cat genus - Panthera

Panthera leo

Panthera pardus

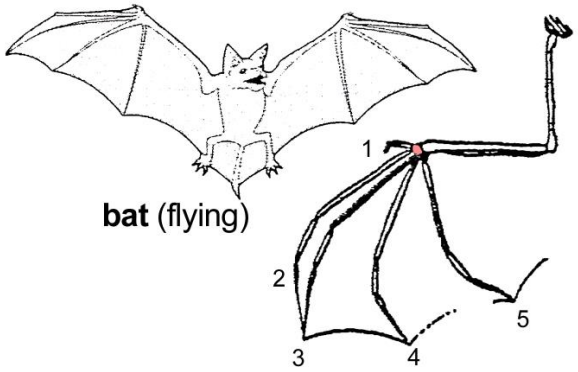


Panthera onca

Panthera tigris

systematics

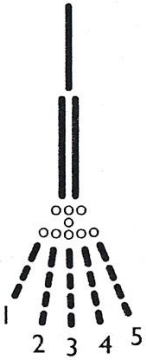
- Placing organisms in groups based on their similarities and differences
- Similarities between organisms may occur because they have evolved along the same lines eg the pentadactyl limb
  - All have the same basic structure but different functions



bat (flying)

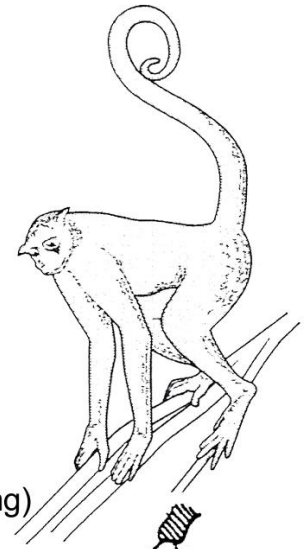
The **pentadactyl limb** as the 'ancestral' terrestrial vertebrates limb plan, subsequently adapted by modification for different uses/habitats.

lay-out of a 'five-fingered' (pentadactyl) limb



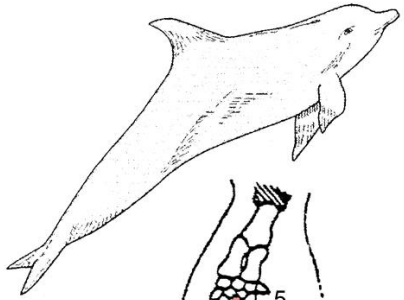
forelimb		hindlimb	
upper arm →	humerus	femur ←	thigh
forearm →	radius + ulna	tibia + fibula ←	lower leg
wrist →	carpals	tarsals ←	ankle
hand/foot →	metacarpals + phalanges	metatarsals + phalanges ←	foot

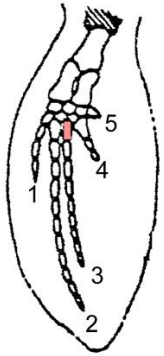
digits



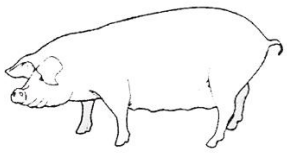
monkey (grasping)

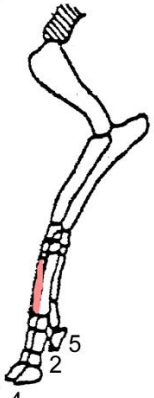
pig (walking)



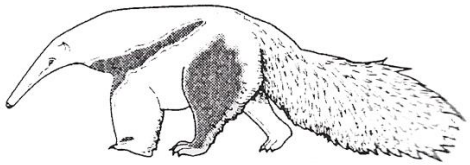


dolphin (swimming)

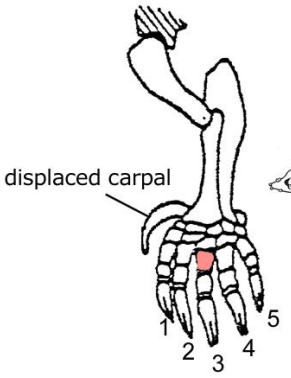


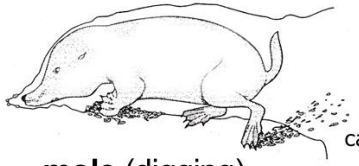


horse (running)

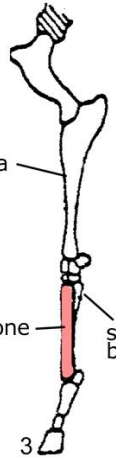


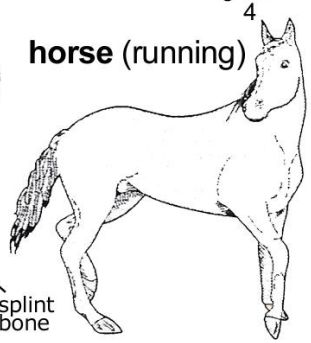
anteater (tearing)



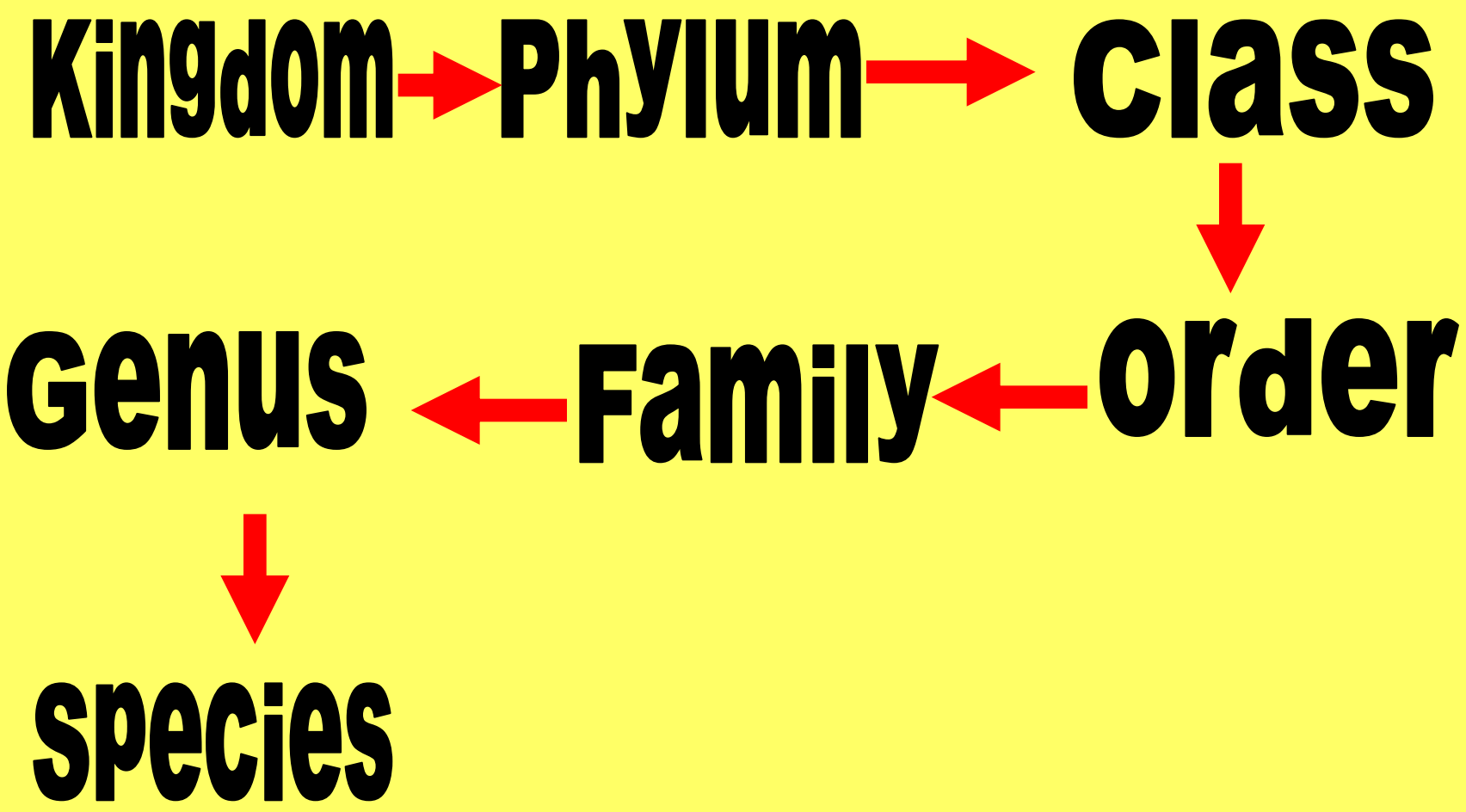


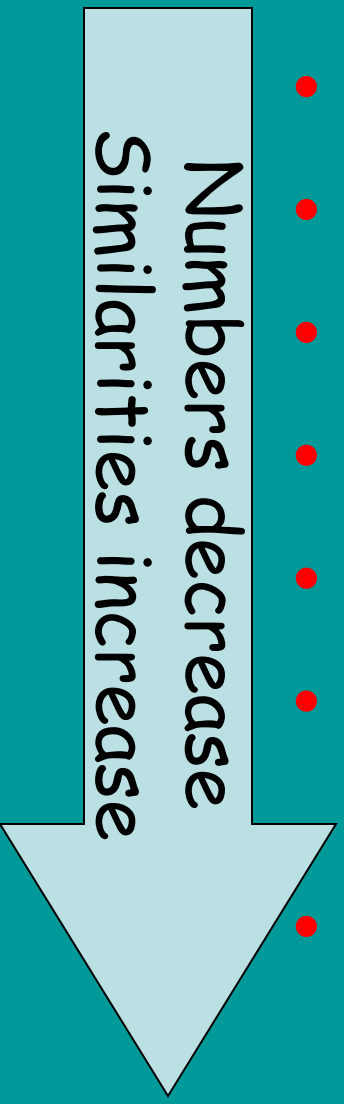
mole (digging)





- Larger groups of organisms are divided into successively smaller groups





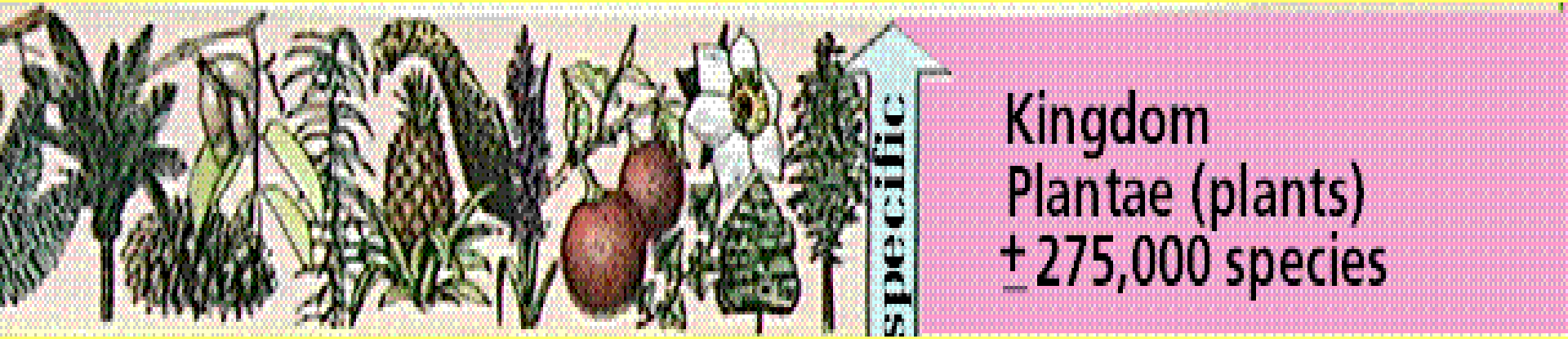
- Kingdom – the broadest classification
- Phyla – contain many sub groups called
- Classes – which are broken down into
- Orders – formed from
- Families – groups consisting of similar
- Genera (plural of genus) – containing groups of similar
- Species.

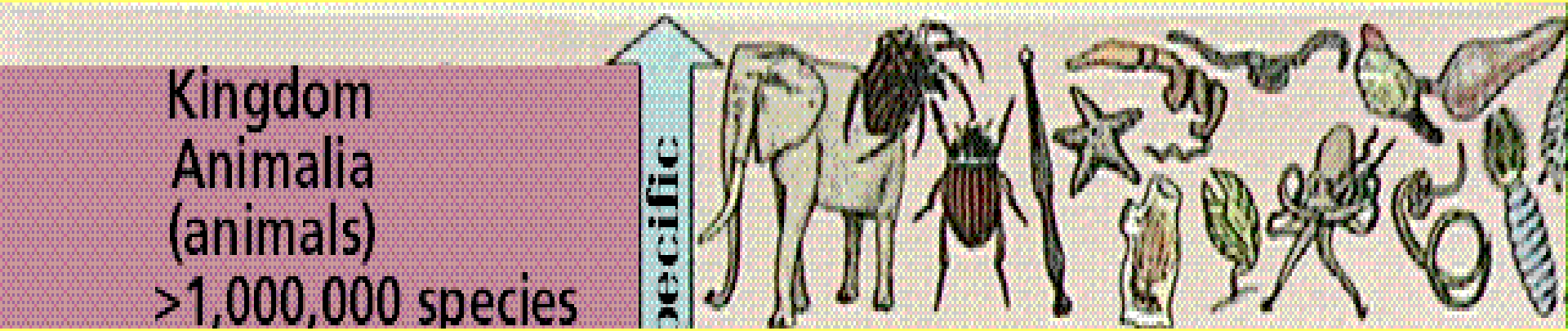
- We can remember this as:-

King	Keep
Potatoes	Ponds
Come	Clean
Only	Or
From	Frogs
Good	Get
Spuds!	Sick

Kingdom

The largest and most inclusive grouping





Phylum

A group of organisms constructed on a similar plan

Arthropoda

class

A grouping of similar orders

Class Pisces

Order

A group of related families

Order pelecaniformes

Family

A group of similar genera

Family Bovidae

Genus

A group of species that are very closely related

Canis – (wolves and dogs)

species

A group of similar individuals that can breed freely to produce fertile offspring

Homo sapiens

TAXON	HUMAN	HONEYBEE	MUSHROOM
Kingdom	Animalia	Animalia	Fungi
Phylum	Chordata	Arthropoda	Basidiomycota
Class	Mammalia	Insecta	Basidiomycetes
Order	Primate	Hymneoptera	Agricales
Family	Hominidae	Apidae	Agaricaceae
Genus	*Homo*	*Apis*	*Agaricus*
Species	*sapiens*	*mellifera*	*campestris*

- Taxonomy classifies sets of species according to ancestral relationships
- Relationships between organisms are established according to a number of measurable features
  - » Morphology and anatomy –internal and external features
  - » Cell structure – are they prokaryotic or eukaryotic
  - » Biochemistry – comparisons of DNA, RNA and the amino acid sequences in proteins

- Closely related organisms possess a high degree of agreement in the molecular structure of DNA, RNA and protein structure
- These molecules in distantly related organisms usually show a pattern of dissimilarity

5 KINGDOMS

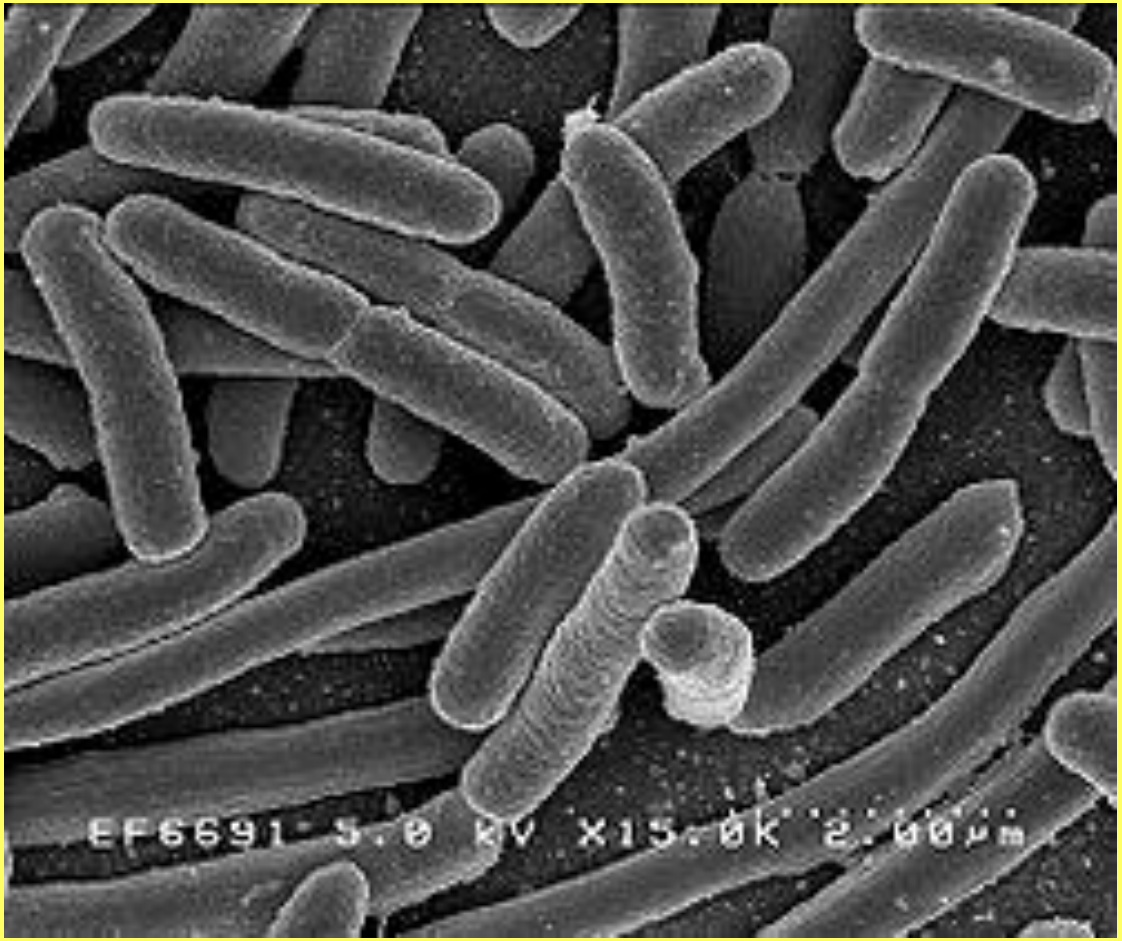
- Prokaryotae – single-celled prokaryotic organisms (bacteria).
- Protoctistae – single-celled eukaryotic organisms (protozoa and some algae).
- Fungi – eukaryotic organisms with non-cellulose cell walls (from yeast to toadstool).
- Plantae – eukaryotic photosynthetic organisms (including multicellular algae and plants)
- Animalia – non-photosynthetic, mulitcellular organisms with nervous co-ordination.

Prokaryotae

- See prokaryotic cell structure
- Bacteria reproduce by asexual reproduction (division)
- The cell increases in size.
- A double wall develops across the midline of the enlarged cell.
- The cell separates into two cells at the midline wall.

Prokaryotae

- They feed in a number of ways
- Some are lysotrophs (decomposers)
- Some are parasitic
- Some are photosynthetic (autotrophs)



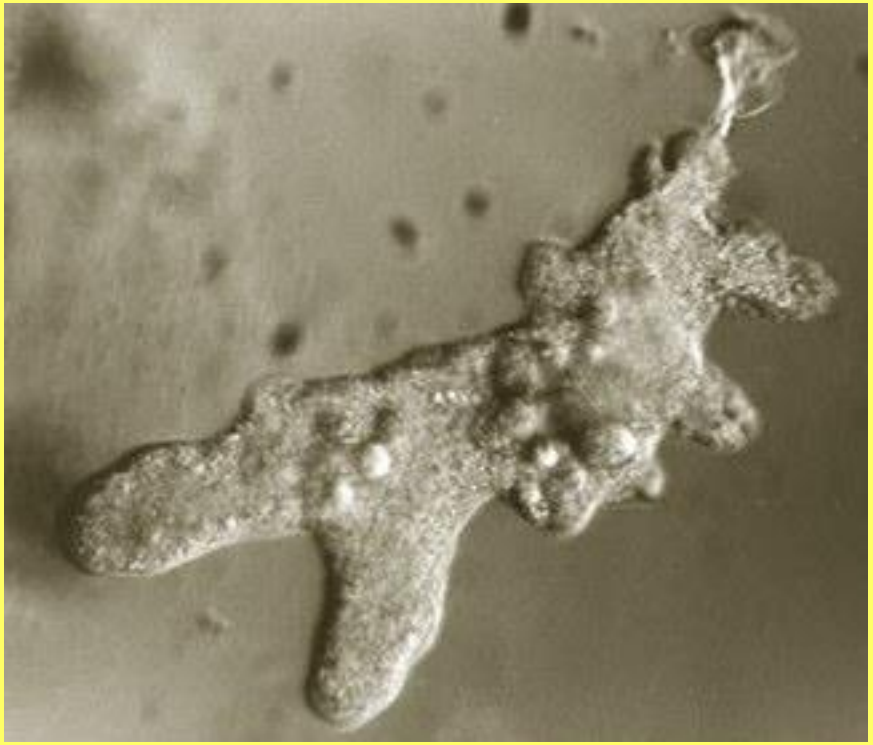
E Coli

Rod shaped bacterium

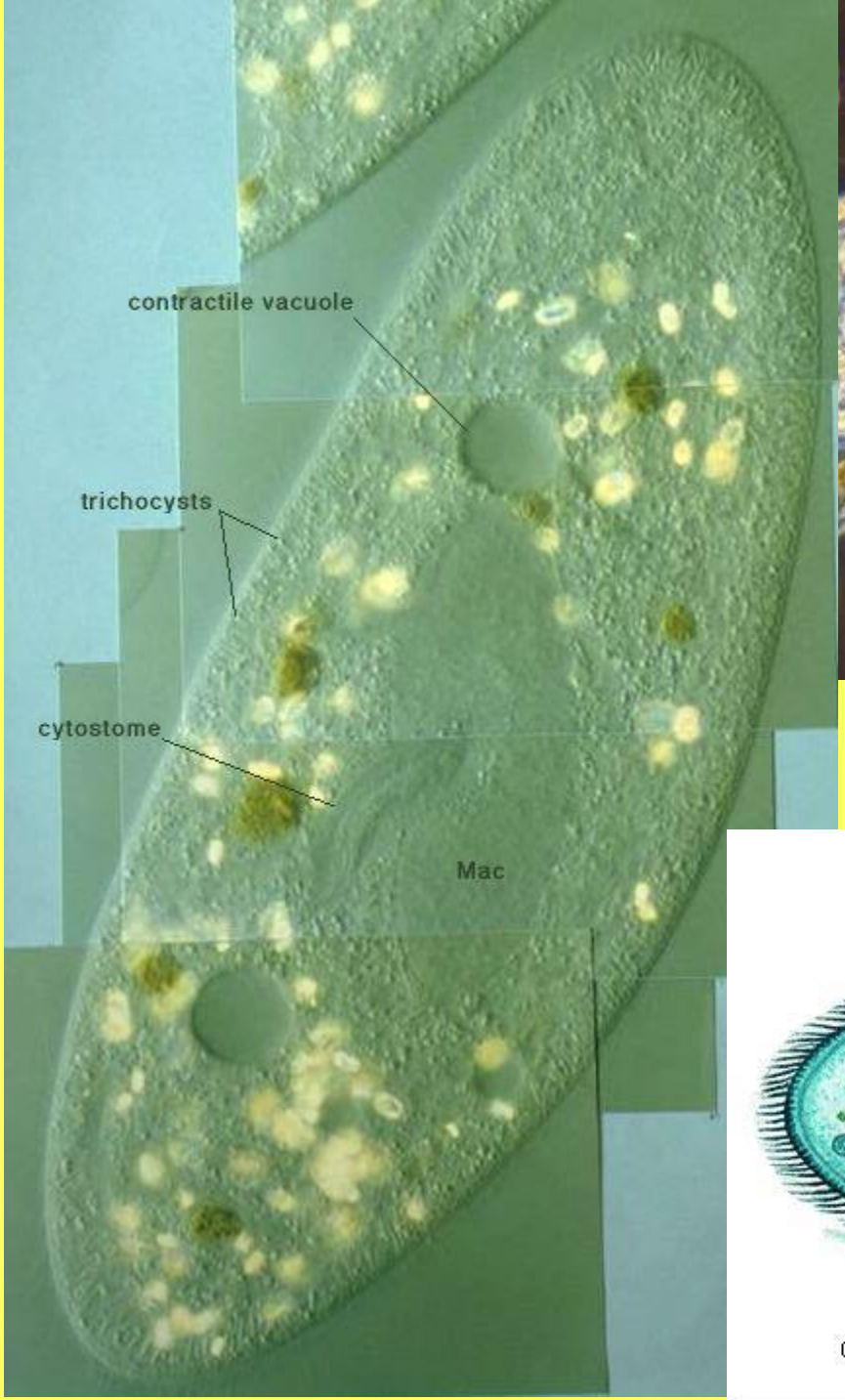
Protoctistae

- They are eukaryotic
- They are unicellular
- Some are heterotrophs – Phlyum Protozoa -
- Some are autotrophs (photosynthesize) – Phylum Chlorophyta

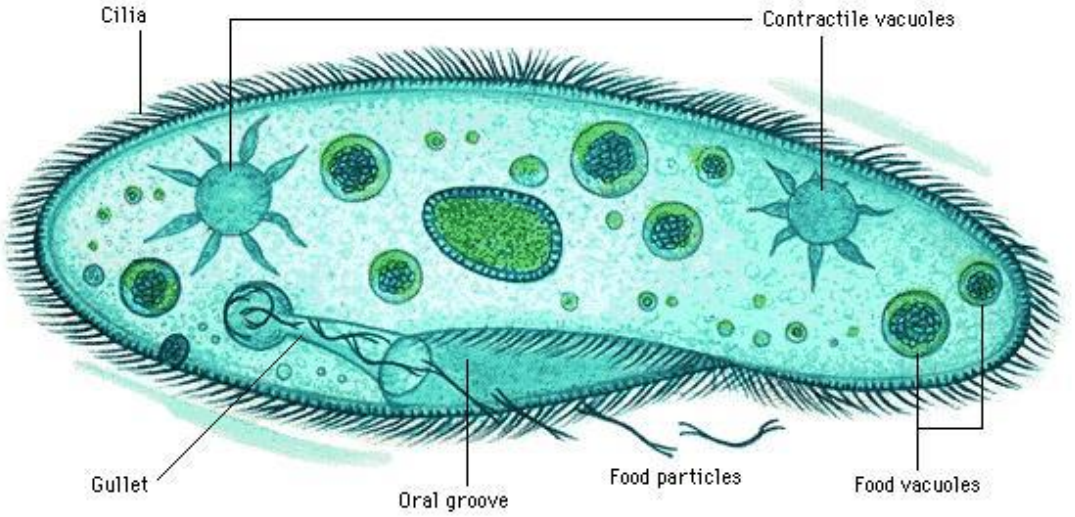
Phlyum Protozoa



Amoeba spp.

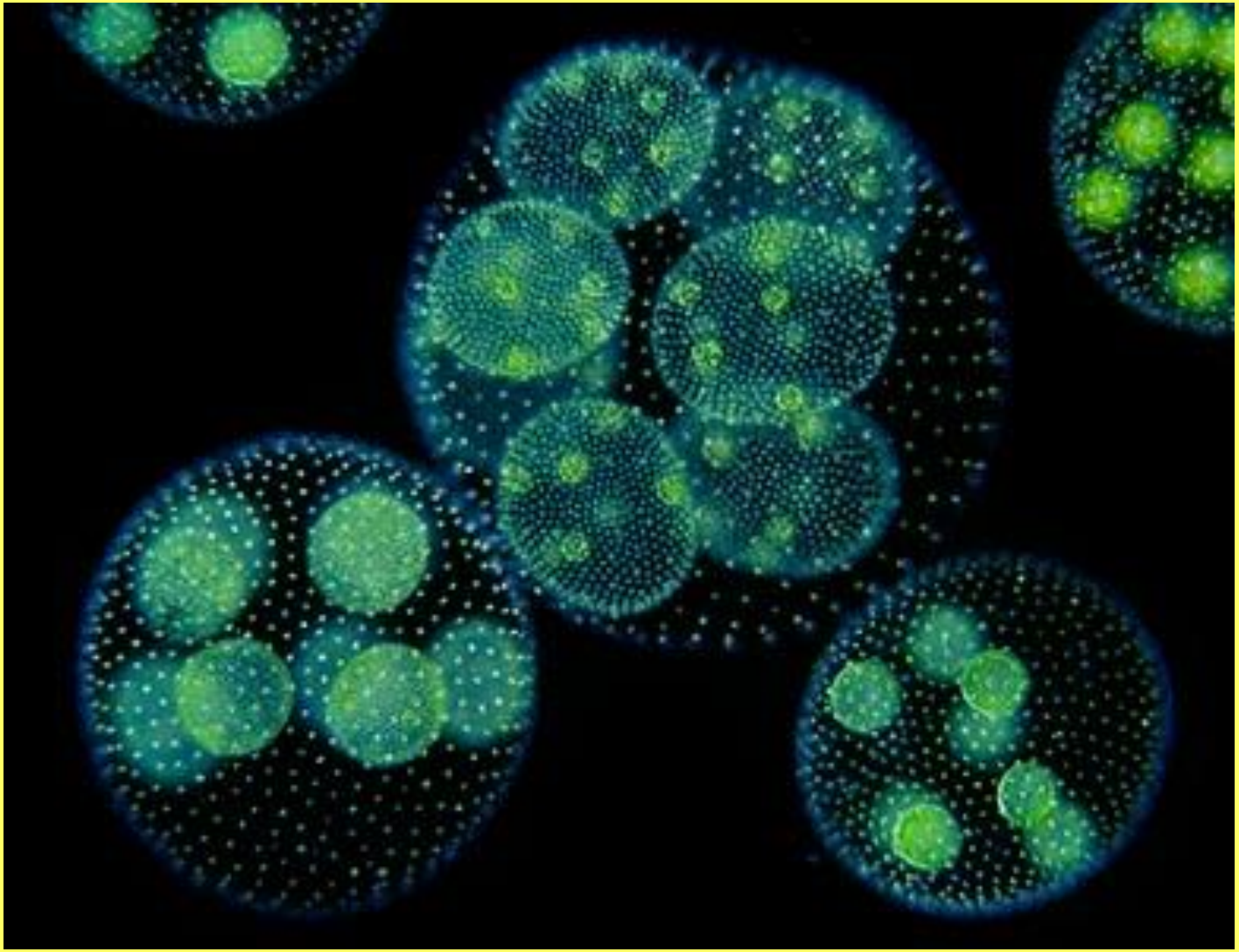

contractile vacuole
trichocysts
cytostome
Mac

Paramecium

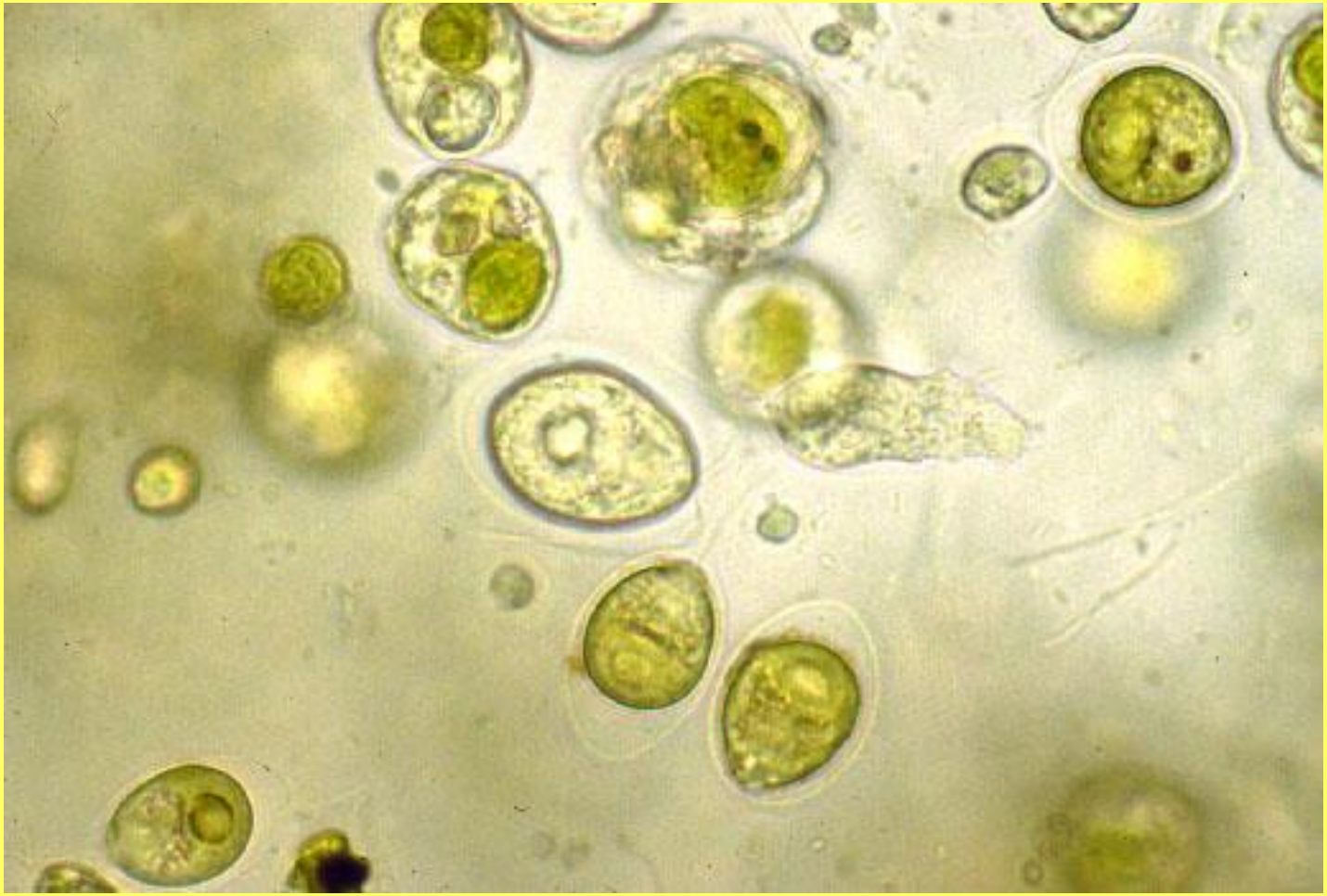

Cilia
Contractile vacuoles
Gullet
Oral groove
Food particles
Food vacuoles

Phylum Chlorophyta

Volvox

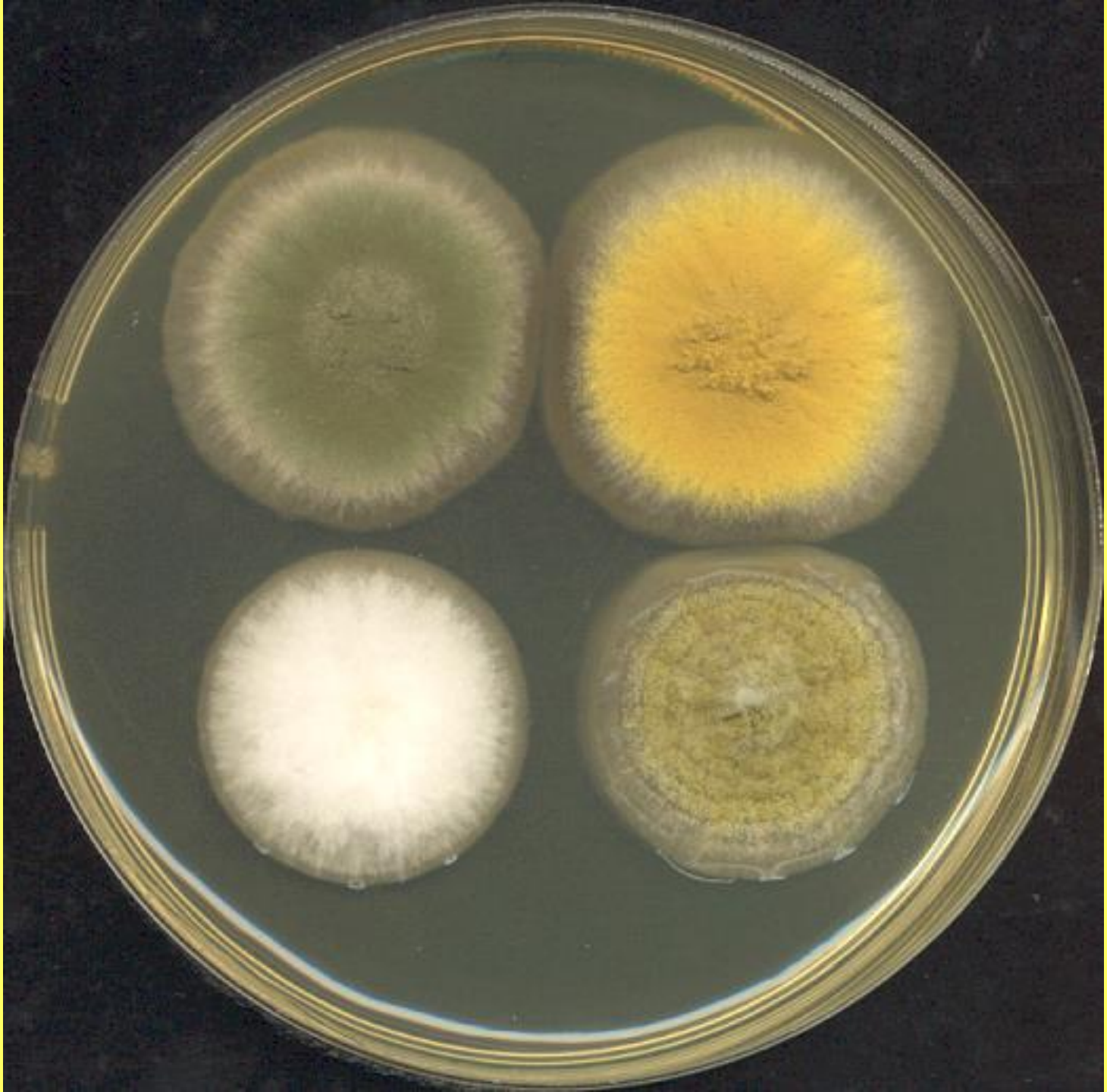


Chlamydomonas



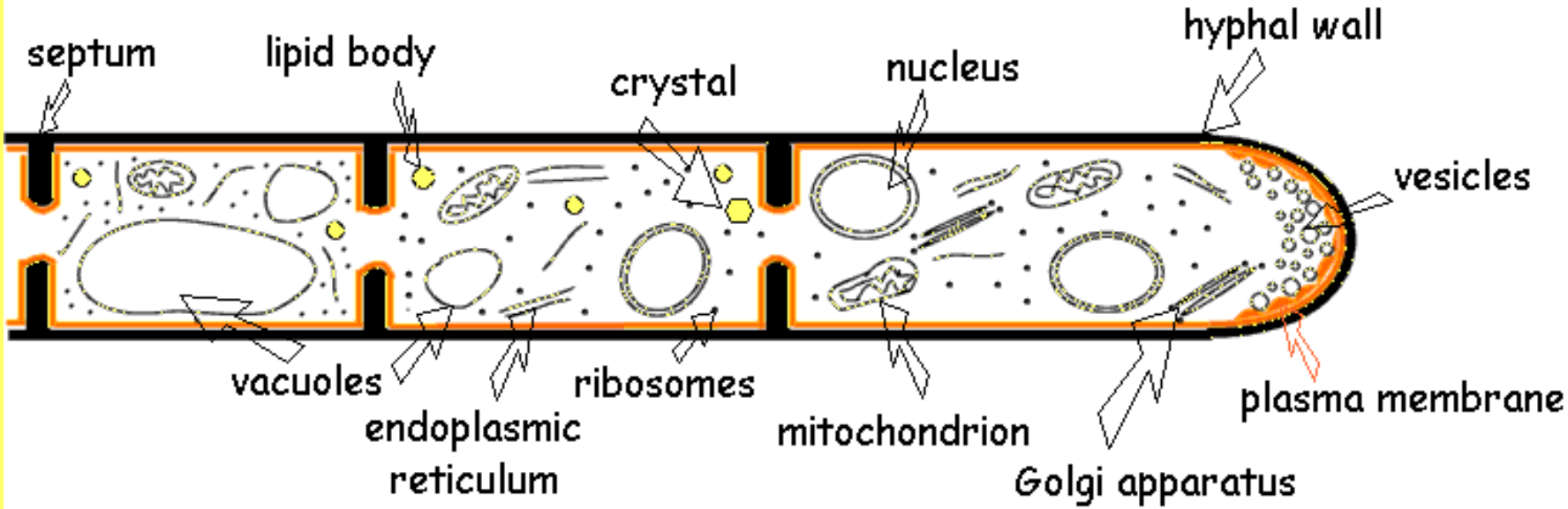
Fungi

- eukaryotic
- lysotrophs (decomposers/saprotrophs)
- Cell walls made of chitin
- Bodies composed of masses of filaments called hyphae which are not divided into separate cells
- extracellular digestion (secrete enzymes onto organic matter to digest the food and then absorb the soluble products back inside)

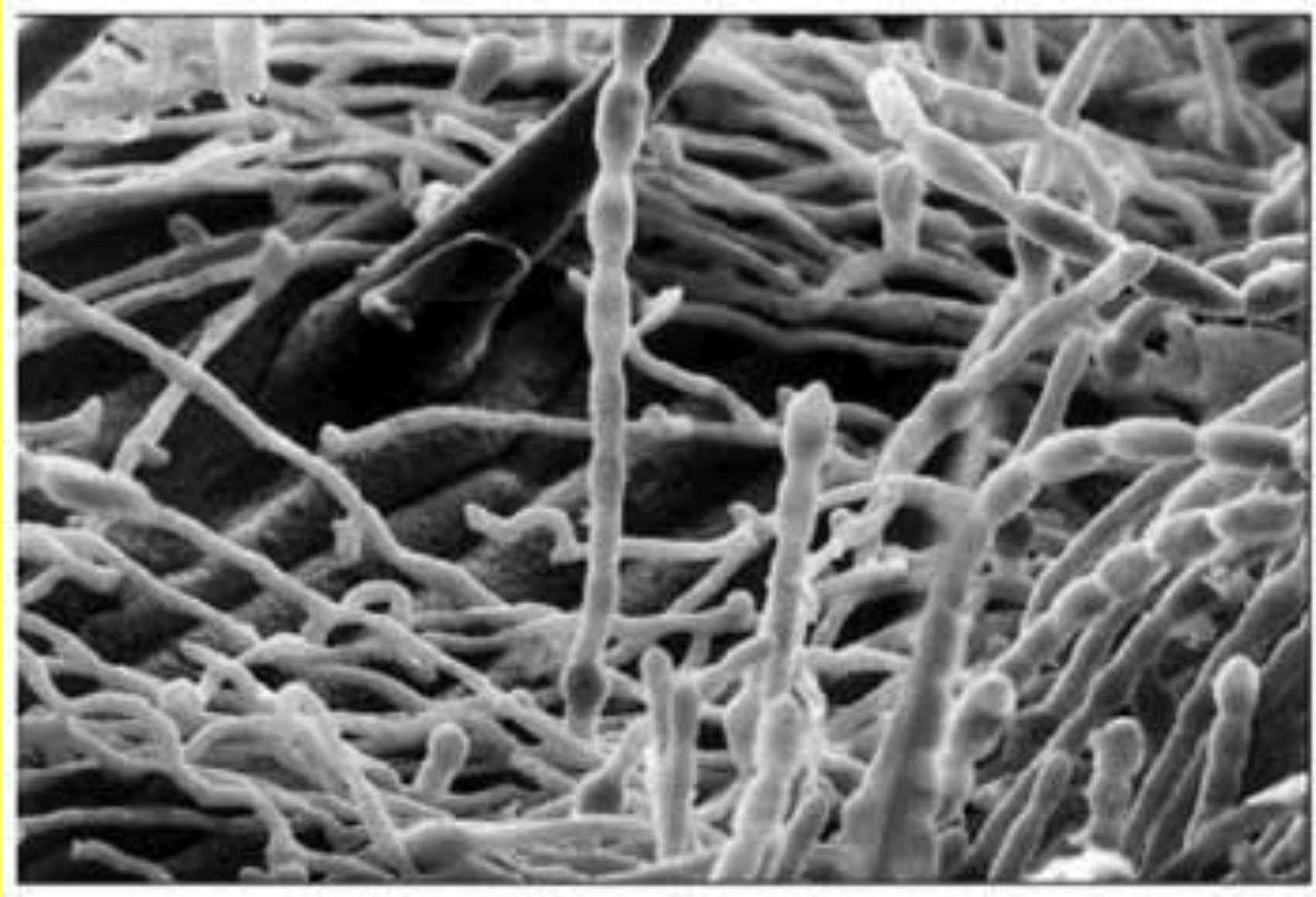


MOUld

a fungal hypha



the network of hyphae is called a mycellium



HOW FUNGI FEED

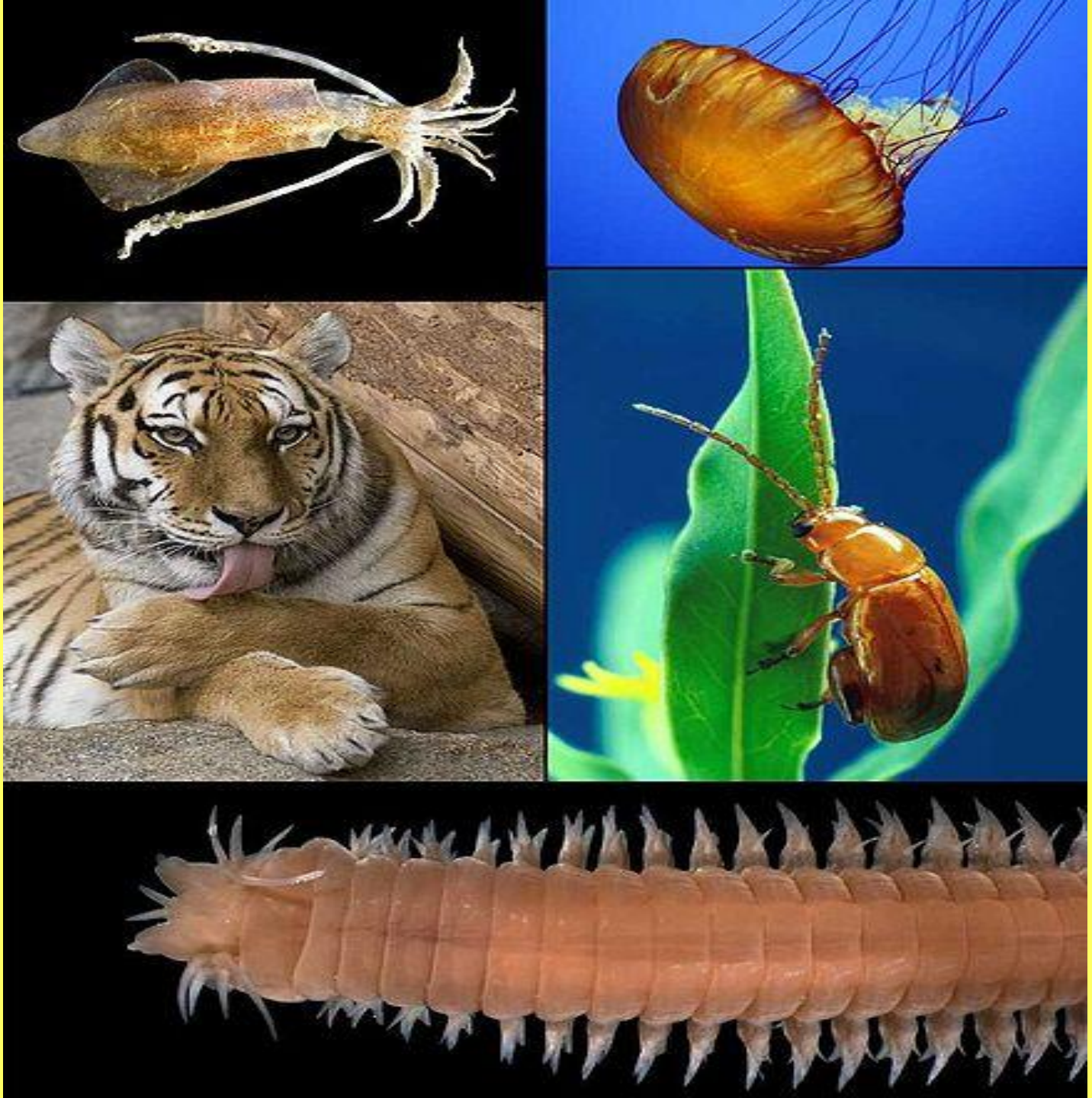
1. secretion of enzymes
2. extracellular digestion
3. absorption

Plantae

- eukaryotic
- autotrophic (producers)
- They possess chlorophyll in chloroplasts in which glucose is synthesised by process of photosynthesis
- cell wall made of cellulose

Animalia

- They are eukaryotic
- They are heterotrophs – cant make own food
- Food is ingested into the gut cavity
- Digestion is extracellular
- Animals are capable of locomotion



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Phylum	Chordata	Arthropoda	Basidiomycota
Class	Mammalia	Insecta	Basidiomycetes
Order	Primate	Hymneoptera	Agricales
Family	Hominidae	Apidae	Agaricaceae
Genus	*Homo*	*Apis*	*Agaricus*
Species	*sapiens*	*mellifera*	*campestris*

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