Lecture 6- Animals Arise and Rejoice Cheat Sheet

by Morghay123 via cheatography.com/53154/cs/14521/

Sponges are the Most Ancient Animals

- No true symmetry

- No true tissue

- Sessile =*filter feeders...dont actually move*

- Have differentiated cells

- Not tissue because cells don't work together doing just one function

Individual Choanoflagellate = almost identical to the protists

Some Features Common to Animals

Chemoorganoheterotrophs: all animals obtain energy and carbon by ingesting other organisms

Multicellular: All animals are multicellular

No cell walls: no animal cells contain cell walls

Active Movement: Every sessile and sedentary animals possess active movement

Embryonic Development: All animals have a developmental precursor (embryonic/larval...) stage

Tissues: *all animals except sponges* have differentiated tissues

Sexual Reproduction: *most animals* reproduce sexually

Cambrian Explosion

Leading to the Cambrian Explosion

Oxygen Levels
--> Slowly accumulating in atmosphere

Predator/prey interactions
--> Force for evolution. Force for change
--> Only those with certain traits survive

Changes in expression of *Master regulator genes* that control the body plan of an embryo during development

Hox Genes
--> Transcription Factors
--> When expressed, they will lead to the expression of tons of other genes
----> Lead to things like limbs

Variation in Body-Plan

1. Bilateral Symmetry

2. 3-tissue layers

3. Body Cavity

Also, first predator/prey adaptations arose; caused an influx in evolution

Animals Evolved 700mya

Unique parts of molecules to animals = chemical evidence 700mya

First animal fossils 560mya

1st Animal: Porifera (sponges) --No true tissues — **Metazoa**

2nd Animals: Cnidarians — **Eumetazoa**

Specialized Tissue and Radial Symmetry Evolved

CNIDARIANS

Jellyfish

2 Layers of Tissue
1. Ectoderm
2. Endoderm

- Have muscle and nervous tissue

- Endoderm: Gastrovascular cavity, No circulatory System

- Not a dense pack of cells

- Nidano cists --> Stinging Cells

- Some are sessile
---> Usual just floating, not moving towards anything

- Symmetry evolved (radial symmetry)

By **Morghay123**
cheatography.com/morghay123/

Not published yet.
Last updated 29th January, 2018.

Body Plan - Bilateral Symmetry

Bilaterally symmetric organisms have left and right sides that are superficially mirror images of each other

Evolution of the anterior end (head end)...Not same as bottom (feet)
--> advantage for predator because you can just go get it

Three Germ Layers

Tissues are groups of cells that are similar and function

Increased complexity
--> during embryonic development

Ectoderm

- Outside of embryo
- Sin and nervous system
- Outer Brain
- Cornea and lens of eye
- Sensory receptors

Mesoderm

- Skeletal System
- Muscular System
- Excretory System
- Organs
- Reproductive system (except germ cells)
- Lining of Body Cavity

Endoderm

- Epithelial lining of digestive tract
- Liver
- Epithelial lining of respiratory system
- Glands

Arthropods-Most Successful Animal Group

Most Successful

- Most number of animals
- Most diverse body please
- Jointed *exoskeleton* (armor can move
- Jointed appendages

Examples of Arthropods

- Mosquito
- Dragonfly
- Scorpion
- Lobster
- Shrimp

Others

- most animals have the same body parts, just in different numbers, slightly different locations, and of different sizes

Just different number of building blocks --> master regulator genes trigger number of blocks per part

- The key to different body types is changing where,if, and when *master regulator genes* are expressed in the embryo

HOX GENES

The changing of number of hox genes can be done in a lab.

Body Plan - Body Cavity

Acoelomates

- The beginning of cephalization
- 3 layers of solid tissue and a digestive tube
- Nervous system is starting

Biletartians Increase Cephalization Levels

Radial= no cephalization
--> Equal distribution of nervous system

Increase of Cephalization
--> Concentrations of nervous system to head

Pseudpcoelomates

- Pseudo because no mesodurm on outside and inside
--> Body cavity is present for waste removal
- Increase in flexability and movement
- Hydrostatic Skeleton

Coelomates

The coelom is lined on both sides by mesoderm derived tissue

- Allow organs to be independent of outside body
--> like the folds and movement of the intestines seperate from the skin
- Also have Segmentation (like worms)
--> vertebre, 6 pack...

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