### LIFE SCIENCE 03/19

The material herein was just being started when we broke for the priest's meeting in February. A miniscule part of this may have been covered but it has been six weeks.

## **READ page 148 - 151**

## Flatworms

Specialized tissues and organ systems that are more complex in free-living than in parasitic species

#### FEEDING

- ≻Carnivores
- ➤Scavengers
- ➢Parasitic flatworms
  - Have simplified or lost many organ systems
  - Pharynx sucks food into . . .
  - Digestive cavity
  - Intracellular digestion



Tapeworms have no digestive system





## Flatworms (cont'd)



RESPIRATION and CIRCULATION
No gills, lungs heart, blood
Diffusion sufficient since they are so thin

 EXCRETION – first specialized tissues!
 ➢ Free-living flatworms use flame cells to filter and remove urea, ammonia and excess H₂O



<u>Planarian</u>

**\*TINY FRESH WATER FLATWORMS** 

\*FOOD INGESTED THROUGH <u>VENTRAL</u> MOUTH (PHARYNX) AND DIGESTED BY GASTRODERM CELLS LINING INTESTINE

\* FOOD BROKEN DOWN BY DIGESTIVE ENZYMES

NO DIGESTIVE SYSTEM OR GAS EXCHANGE SYSTEM SINCE TINY SIZE MEANS THAT ANY GIVEN CELL IS NOT FAR FROM EXTERNAL ENVIRONMENT

Grasshopper – A member of the largest animal phylum - Arthropeda

## \*INDIVIDUAL CELLS MUCH FARTHER AWAY FROM EXTERNAL ENVIROMENT THAN THOSE OF THE PLANARIAN. -> REQUIRES CIRCULATORY SYSTEM TO DISTRIBUTE NUTRIENTS AND COLLECT CELLULAR WASTE

\*CIRCULATORY SYSTEM IS <u>OPEN</u> -> BLOOD LEAVES DORSAL ARTERY AND BATHES ORGANS BEFORE RETURNING

\*ALSO HAS A SYSTEM FOR GAS EXCHANGE (O<sub>2</sub> -> CO<sub>2</sub>) OXYGEN (O<sub>2</sub>) ENTERS THROUGH PORES (SPIRICLES) IN EXOSKELETON AND REACHES INDIVIDUAL CELLS THROUGH TUBULAR TRACHEA



#### CIRCULATION



 Closed circulatory system
 Two major blood vessels, dorsal and ventral
 Lateral "hearts"
 RESPIRATION
 Aquatic = gills
 Terrestrial = diffusion through skin (must stay moist)

#### EXCRETION

>Nitrogenous wastes eliminated by nephridia which filter fluid (think kidney) in the coelom



## Annelida First organ systems!

#### FEEDING

≻Filter feeders

- ➢Predators
  - Pharynx which may have teeth
- Detritovores/deposit feeders
  - Muscular pharynx pumps food into
  - Esophogus to crop (storage) and
  - Gizzard (grinds) to the
  - Intestine (nutrients are absorbed)







#### Earth worm - A terrestrial annelid

## \*UNLIKE THE GRASSHOPPER THE EARTH WORM HAS A CLOSED CIRCULATORY SYSTEM

#### \*BLOOD FROM DORSAL BLOOD VESSEL PASSES THROUGH THE HEART-LIKE AORTIC ARCHES, PASSES THROUGH ARTERIES AND REACHES INDIVIDUAL CELLS VIA TINY THIN WALLED CAPILLARIES AND RETURNS TO "HEART" BY MEANS OF VEINS

This is very roughly the sequence of blood flow in vertebrates such as us!

# \*GAS EXCHANGE ACCOMPLISHED AS $O_2$ ENTERS BY DIFFUSION THROUGH THE SKIN (MUST BE MOIST) AND $CO_2$ LEAVES THROUGH THE SKIN

\*NO SPECIAL RESPIRATORY STRUCTURES SUCH AS LUNGS OR GILLS

Some things to think about:

What is the difference between dorsal and ventral?

What are enzymes?

Interestingly, both the planarian and the microscopic protist, *Euglena*, have eyespots which sense light but do not form images. *Euglena* spends a part of its life cycle as an autotroph, the planarian does not. Why then would the planarian find eyespots useful?

We will try to continue the practice of Review Sheets from time to time and some sort of measurements (Quiz/Test), but these will have to be developed as we proceed.