

# FUNDAMENTALS OF BIOLOGY

## TISSUES

Chapters 4 and 5

Class 9<sup>th</sup>

Tissues is a group of similar cells performing a specific function

- Tissue cells are located side by side and work as a team.
- Most plants have tissue systems in buds, and stems, called 'Meristematic' tissues that multiply to produce new cells. The older tissues are 'Permanent tissues' as they perform specialized functions and do not multiply.

# Tissue , Organ, Organ system, and Organism

Organ has nerve cells, muscle cells, epithelial cells etc.

Is for one specialized function

Brain, Heart, Lungs, Spinal cord,  
tongue, eyes, ears, skin,  
arms, hands, legs, feet

Organ system coordinates the functions of many organs for a specific Life process

Digestive system links up mouth, stomach, intestines etc.

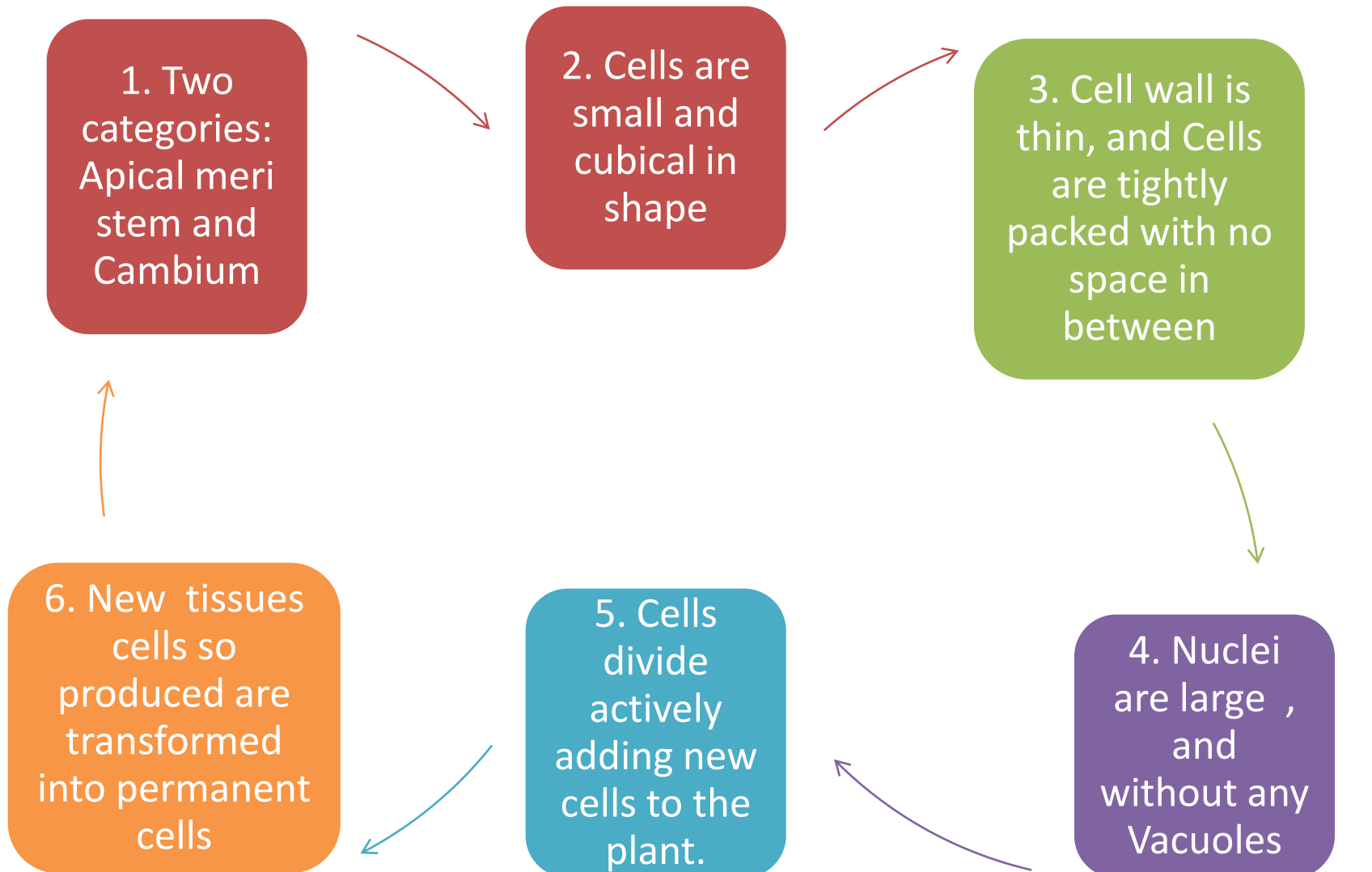
Animal and Human Tissues in nerves are neural tissues. Others include muscular tissues, connective tissues, and epithelial tissues

All organ systems together constitute a Living Organism

Plants, birds, animals, humans

(a) Plant tissues are Permanent that have stabilized and do not grow, and Meristematic that grow by multiplying to make the plant grow branches, buds, flowers, fruits, seeds.

# Characteristic of Meristematic Tissues in Plants



Vacuoles – clear space with water or other substance

# Classification of Plant tissues on basis of functions . These are **simple tissues** as they are made of **one type of cells**

(2) **Supportive tissues** are several types

(1) **Protective Tissues**

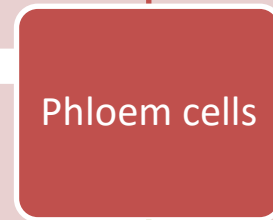
**2.1 Parenchyma: (soft)** Large but thin wall and **one large vacuole**. Exists in **softer parts** of the plant such as **the pith** : the central region of a stem. May store food, and provide temporary support. **In the leaf** they contain chloroplasts and are called **chloren chyma (green)**

**2.2 Collenchyma** (collen = glue) tissues are elongated and thick at the corners.  
Exist **in leaf stalks** below the epidermis of stems.  
Their function is **to support** parts of the plant stalk to stand tall.

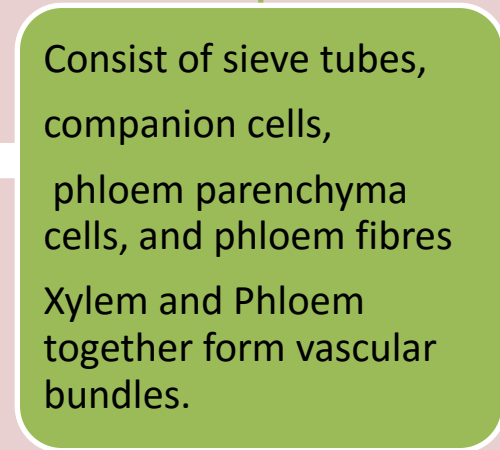
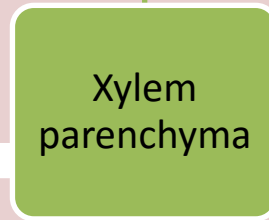
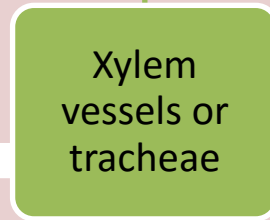
**2.3 Sclerenchyma** ( hard) tissues have long , narrow cells, that have become dead. They have very thick walls due to gum deposits of lignin.  
This tissue provides strength to the plant

### 3. Conducting Tissues that transport water, sap, food

Conducting Tissues , called **Vascular tissues** as they transport water and sap throughout the plant



(a) Xylem cell tissues are **thick walled and tubular in shape**. Older xylem tissues form wood and the annual rings in the tree trunk .

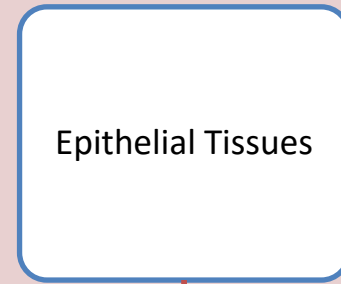


(b) Phloem cell tissues provide **passage for movement of food** from the leaves to various parts of the plant, and to the new leaves growing at the upper tip of the plant

# Tissues in Animals and Human

1) Epithelial Tissues: Thin, flat, cuboidal or tubular shape spread like a **continuous sheets of cells**, that form a protective layer, similar to the skin.

- (a) Squamous epithelium
- (b) Stratified epithelium
- (c) Cuboidal
- (d) Columnar



2) Muscle tissues contract and relax . (a) Straited voluntary muscles (b) unstriated , smooth and involuntary muscles, (c) heart and lung muscles.

(3) Connective Tissues proper as in skin, Supportive connective tissues, as in bones , and Fluid connective tissues as in blood and lymph

4) Neural Tissues are in the Nervous System only. They are made up of elongated cells called **neurons**. Each cell has a body 'perikaryon' that contains the nucleus, and one or more hair like extension called dendron..

The longest extension is called 'Axon'. Many Axons are bundled together to form one nerve