

## Lecture 26

### Introduction to Animal Biology

#### Characteristics of Animals

##### 1. Eukaryotic

A eukaryote is any organism whose cells contain a nucleus and other organelles enclosed within membranes.

##### 2. Multicellular

Composed of several or many cells.

##### 3. Heterotrophic

An organism that cannot manufacture its own food and instead obtains its food and energy by taking in organic substances, usually plant or animal matter.

##### 4. Move at some point in life

Migrate from one place to another when risk to their survival

##### 5. Digest food to get nutrients

Proper digestive system is present to break down food

##### 6. Lack cell walls

Their cell contains only plasma membrane and cell wall is not present in them.

#### Animal Development

##### 1. Cell specialization

With the passage of time cells are later on specialized to perform their specific functions according to cellular requirements.

##### 2. Cephalization

Development of complex brain to respond body signals.

##### 3. Early development

Development of main body parts in the beginning e.g. brain, heart etc.

##### 4. Body symmetry

Proper body shapes are developed during developmental processes.

##### 5. Body cavity formation

Coelom formation begins in the gastrula stage. The developing digestive tube of an embryo.

## Tissue Development

### Cells form tissues

- **Epithelial**  
Skin, lining of cavities
- **Connective**  
Bone, blood
- **Muscular**  
Heart, biceps
- **Nervous**  
Brain, nerves

### Nervous System

The nervous system is the part of an animal's body that coordinates its voluntary and involuntary actions and transmits signals to and from different parts of body. Concentration of sense organs and nerve cells lie at front end of body.

### Development at Early Stages

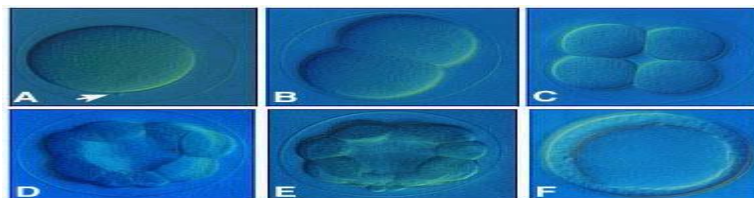
Fertilization leads to a zygote formation

#### 1. Blastula

The early developmental stage of an animal, following the morula stage and consisting of a single, spherical layer of cells enclosing a hollow, central cavity.

#### 2. Gastrula

An embryo at the stage following the blastula, after the movement of cells results in the formation of the three germ layers, ectoderm, mesoderm, and endoderm.



**Germ Layers**

#### 1. Ectoderm

The ectoderm generates the outer layer of the embryo, and it forms from the embryo's epiblast. The ectoderm develops into the surface ectoderm, neural crest, and the neural tube.

#### 2. Endoderm

The endoderm is one of the germ layers formed during animal embryogenesis. Cells migrating inward along the archenteron form the inner layer of the gastrula, which develops into the endoderm.

### **3. Mesoderm**

The mesoderm germ layer forms in the embryos of triploblastic animals. During gastrulation, some of the cells migrating inward contribute to the mesoderm, an additional layer between the endoderm and the ectoderm.

## **Developmental Types**

### **1. Deuterostomes**

Any animal in which the initial pore formed during gastrulation becomes the anus, and the second pore becomes the mouth.

### **2. Protostomes**

Any of numerous invertebrate animals of the group Protostomia, in which the mouth develops from the first opening in the embryo and the anus develops later, and including the mollusks, annelids, and arthropods.

## **Symmetry of Body**

Symmetry of animal body is divided into three types

### **1. Asymmetry**

Sponges are very simple animals. They are sessile, which means they do not move on their own, and live in ocean environments. Sponges are unique from all other animals and have no true tissues or organs. Most sponges have a type of symmetry referred to as asymmetry.



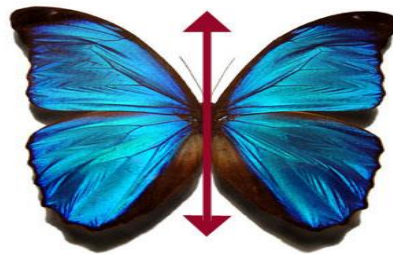
### **2. Radial Symmetry**

An animal with radial symmetry has a body shape that radiates outward from a center point. If you think about a bike wheel, it has a center point from which all of the spokes radiate outward. Animals with this type of symmetry have a similar form.



### 3. Bilateral Symmetry

As animals evolved over time they developed bilateral symmetry. Animals with this type of symmetry have a left side, right side, top, and bottom, as well as a head and rear end. Over time, the head end developed more complex sensory processing abilities.



### 1. Acoelomatic Body Plans

Any organism that lacks a cavity between the body wall and the digestive tract, including the flatworms, nemertines, and sea anemones.

### 2. Pseudocoelomatic Body Plans

Pseudocoelomate animals have a “false cavity”, which is a fully functional body cavity. Tissue derived from mesoderm only partly lines the fluid filled body cavity of these animals. Thus, although organs are held in place loosely, they are not as well organized as in a coelomate.

### 3. Coelomatic Plans

Coelomates (also known as eucoelomates—“true coelom”) have a fluid-filled body cavity called a coelom with a complete lining called peritoneum derived from mesoderm (one of the three primary tissue layers).

### 1. Feeding of Herbivores

#### Herbivores

A herbivore is an animal anatomically and physiologically adapted to eating plant material.

#### Examples

Cow, Goat, sheep etc.

## **2. Feeding of Carnivores**

### **Carnivores**

A carnivore derives its energy and nutrient requirements from animal tissue. It may be through predation or scavenging.

### **Examples**

Cat, Dog

## **3. Feeding of Omnivores**

### **Omnivores**

An omnivore is an animal that can derive its energy and nutrients from different sources. These sources may be plants, animals, algae, fungi and bacteria.

### **Example**

Crow

## **4. Feeding of Filter Feeders**

### **Filter Feeders**

Filter feeders are animals that feed by straining suspended matter and food particles from water. For this purpose they pass through the water over a specialized filtering structure.

### **Examples**

Baleen whales

## **5. Feeding of Parasites**

### **Parasites**

Feed on living organisms usually harmful the host organism.

### **Example: Lice**

<https://en.wikipedia.org/wiki/Eukaryote>

[https://en.wikipedia.org/wiki/Nervous\\_system](https://en.wikipedia.org/wiki/Nervous_system)

<http://www.dictionary.com/browse/blastula>

[https://en.wikipedia.org/wiki/Germ\\_layer](https://en.wikipedia.org/wiki/Germ_layer)

<https://en.wiktionary.org/wiki/deuterostome>

<http://study.com/academy/lesson/types-of-symmetry-in-animals.html>

[http://www.newworldencyclopedia.org/entry/Body\\_cavity](http://www.newworldencyclopedia.org/entry/Body_cavity)