



TOPIC

# TYPES OF CLEAVAGE

By:

Dr. J. S. Maske

Dept. of Zoology

# CONTENTS

- Cleavage
- Characteristic features of cleavage
- Plane of cleavage
- Patterns of cleavage
- Kinds of cleavage

# CLEAVAGE

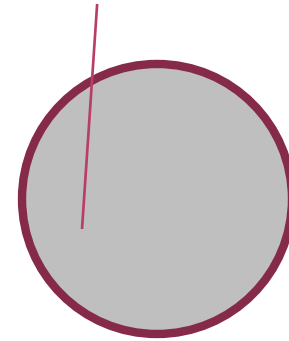
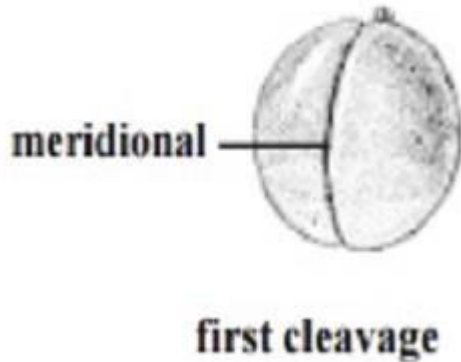
## Cleavage :

- Cleavage can be defined as the process of progressive subdivision of the zygote of mitotic cell divisions into an increasing number of cells of progressively decreasing size.

# CHARACTERISTIC FEATURES OF CLEAVAGE

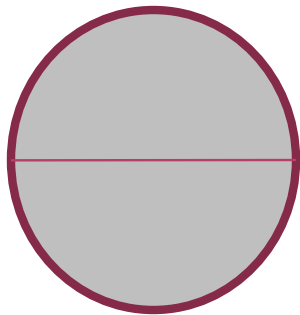
- ◉ Cleavage begins immediately after the nuclear fusion of the sperm and ovum.
- ◉ The egg provide sufficient energy itself within needed for cell division.
- ◉ The resultant cell are called blastomeres.
- ◉ The unicellular fertilized egg is transformed by consecutive division into help of cells called morula.

# PLANE OF CLEAVAGE

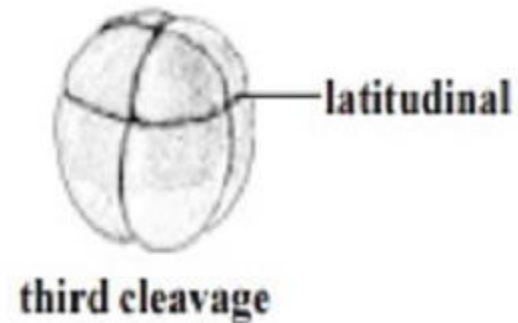


• Meridional Plane:

• Vertical Plane:



• Equatorial Plane:



• Latitudinal Plane:

# KINDS OF CLEAVAGE

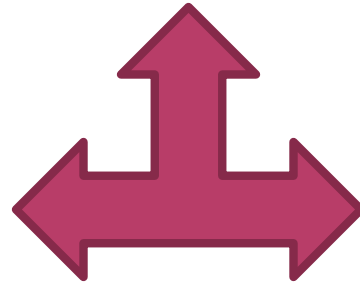
Depending the amount and distribution of yolk in the egg cleavage can be of two main types:

- ◉ Holoblastic Or Total or Complete Cleavage
- ◉ Meroblastic Or Partial Or Incomplete Cleavage

# Holoblastic Cleavage:

## Holoblastic Cleavage

Equal holoblastic cleavage

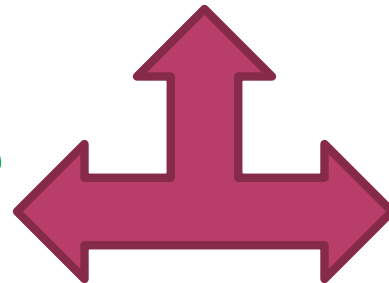


Unequal holoblastic cleavage

# Meroblastic Cleavage:

## Meroblastic Cleavage

Discoidal cleavage



Superficial meroblastic cleavage

# PATTERNS OF CLEAVAGE

- ◉ Radial Cleavage
- ◉ Spiral Cleavage
- ◉ Bilateral Cleavage
- ◉ Rotational Cleavage

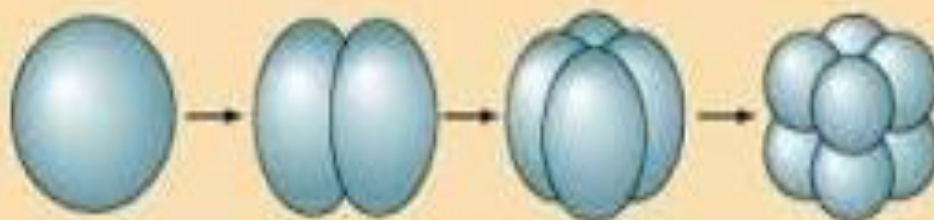


# I. HOLOBLASTIC

## A. Isolecithal

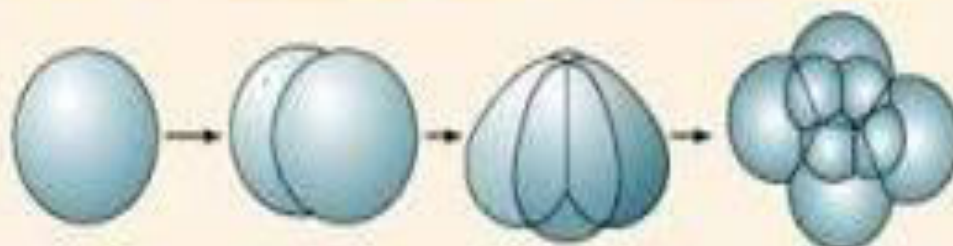
### 1. Radial

Echinoderms, amphioxus



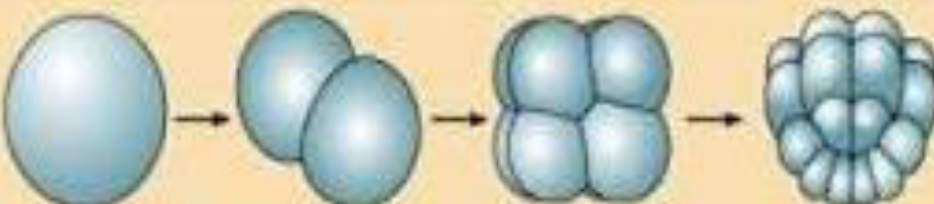
### 2. Spiral

Annelids, molluscs,  
flatworms



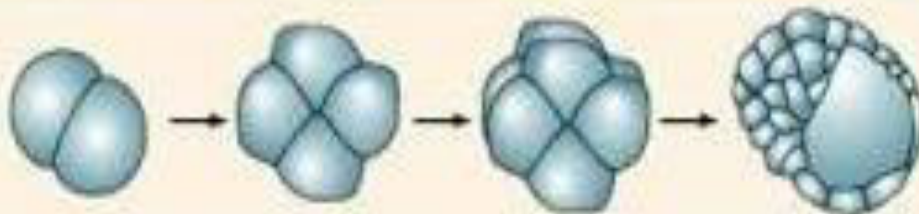
### 3. Bilateral

Tunicates

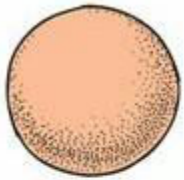


### 4. Rotational

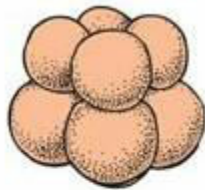
Mammals, nematodes



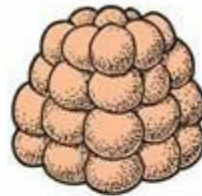
Zygote



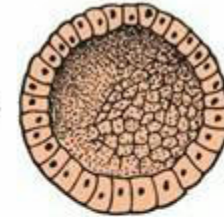
Morula



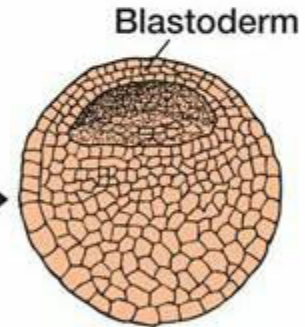
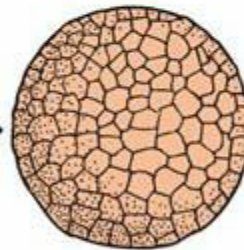
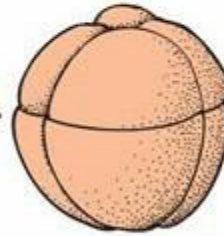
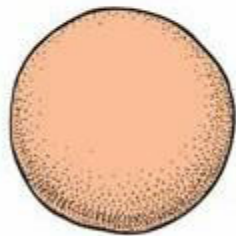
Blastula



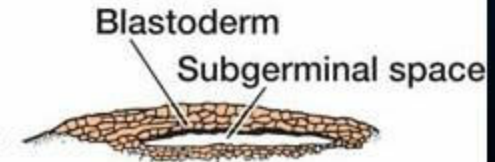
Sagittal section of blastula



(a) Amphioxus = holoblastic equal



(b) Amphibians = holoblastic unequal



➤ **Meroblastic cleavage:** In meroblastic cleavage only a portion of the eggs divides. It is otherwise called partial or **incomplete cleavage**. They are two types;

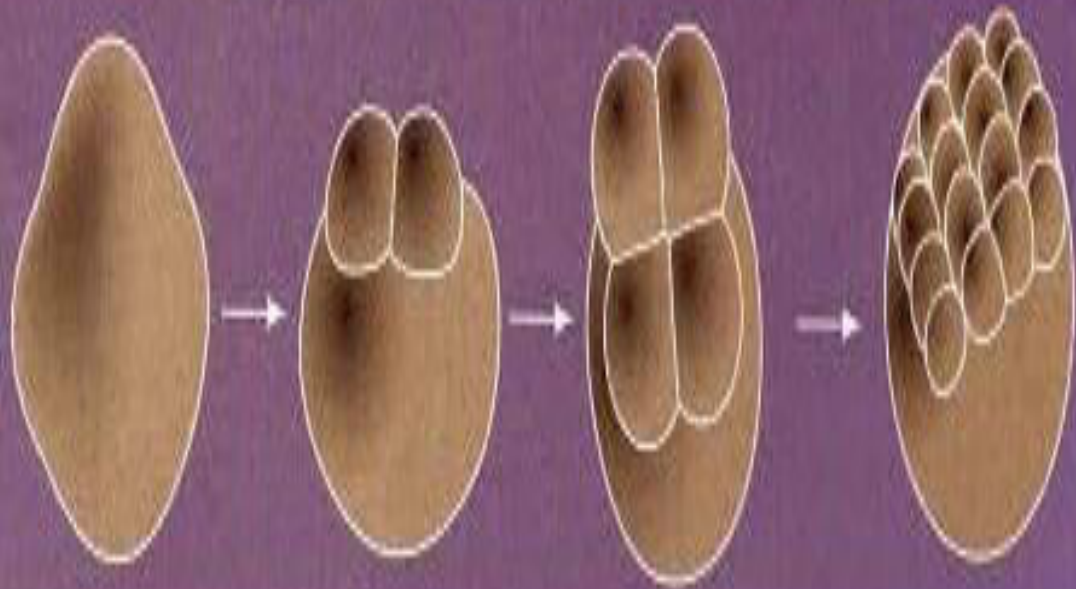
➤ **Discoidal cleavage:**

➤ It occurs in fishes, reptiles, and birds. Here the cytoplasm is placed at the animal pole as a disc called blastodisc.

➤ **Superficial meroblastic cleavage:**

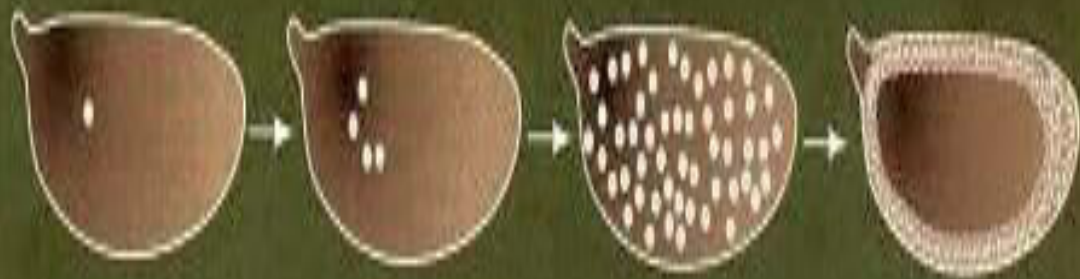
➤ This cleavage occurs in centrolecithal eggs. & the zygote nucleus lies in the centre of the egg. eg; Egg of insects

2. Discoidal  
Fish, reptiles, birds



B. Centrolecithal  
(Yolk in center of egg)

Superficial  
Most insects





# Depending on fate of blastomeres

- Determinant  
Eg. Protostomes
  
- Indeterminant  
Eg. Deuterostomes

Thank

you

