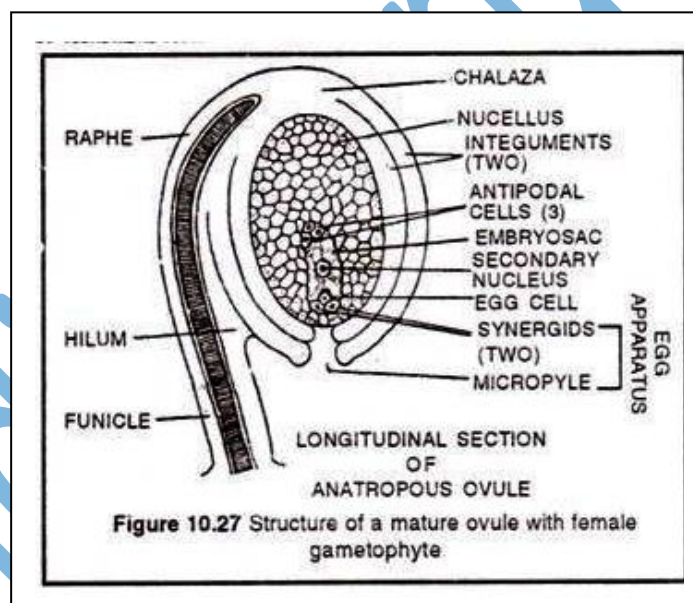


# Megasporangium (ovule)

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Ovule arises as a small mound of homogenous tissue on the inner wall of the ovary. This mound develops to form the inner central part of the ovule, called nucellus. Each ovule is attached to the inner wall of the ovary (placenta), by a slender stalk, called funicle. The point of attachment of ovule to its funicle is called hilum. Each ovule has two distinct ends-**a**) micropyle end (it also called opening of ovule during fertilisation) and **b**) Chalaza end (the posterior end, opposite to micropylar end). Externally the nucellus is covered by one or two protective covers, called integuments. These integuments arise from the chalazal end. In mature ovules, the female gametophyte or embryo sac is present in the centre. The embryo sac consists of egg cell, synergid cells, antipodal cells and polar nuclei.

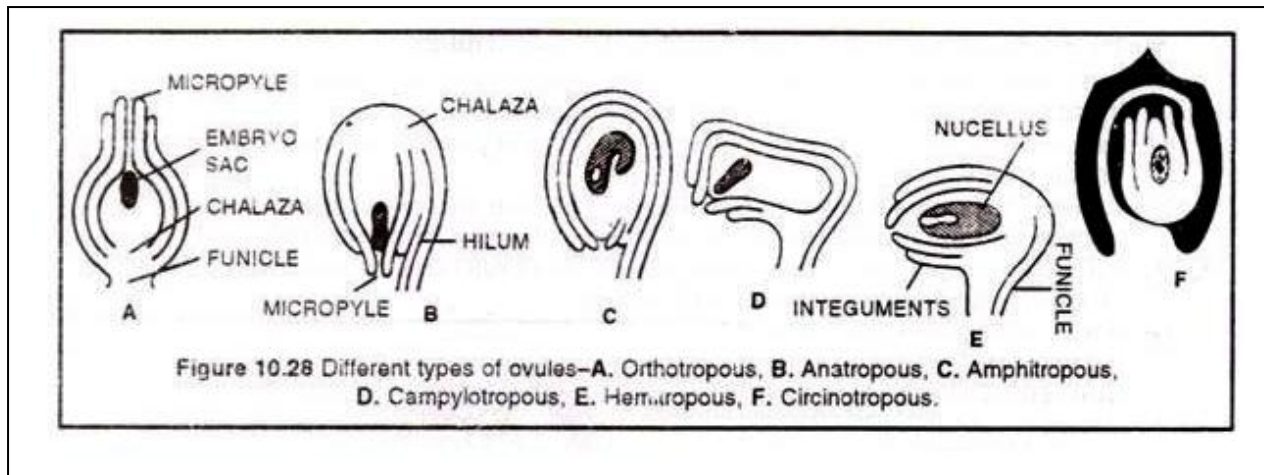


## Types of Ovules

On the basis of position of micropyle, with respect to the funiculus, ovules are of 6 types.

### 1. Orthotropous ovule:

It is atropous or straight, where the micropyle, chalaza and the funiculus, all are in the same line. Example- Cycas, common in case of Polygonaceae and Piperaceae family.



## 2. Anatropous ovule:

It is the most common type of ovule, more than 80% of angiosperm family shows this type of ovule. In this ovule, the funicle is long whole body of the ovule is inverted, through  $180^\circ$ . As a result the micropyle comes close to the funicle. Example-Most common in dicots and monocots, Asteraceae, Solanaceae.

## 3. Hemianatropous or hemitropous ovule:

In this case the body of the ovule is inverted only through  $90^\circ$ . As a result the funicle comes to lie at right angle to the nucellus. Micropyle and chalaza, lie in the same plane E.g-Ranunculus.

## 4. Campylotropous ovule:

When body of the ovule is not completely inverted, but is it bent like 'horse shoe'. The micropyle and chalaza do not lie in the same plane (however the nucellus/ embryo-sac remain straight). E.g- Family Capparidaceae, Brassicaceae, Caryophyllaceae, Fabaceae

## 5. Amphitropous ovule:

It is similar to campylotropous, but in the case the nucellus/embryo-sac is also bent like 'horse shoe' E.g - Family Alismaceae,

## 6. Circinotropous ovule:

It is of a very rare occurrence. Here the body of the ovule is bent through  $360^\circ$ , so that it takes a one complete turn. (Micropyle, chalaza and the nucellus are all in same plane). E.g-Opuntia.