

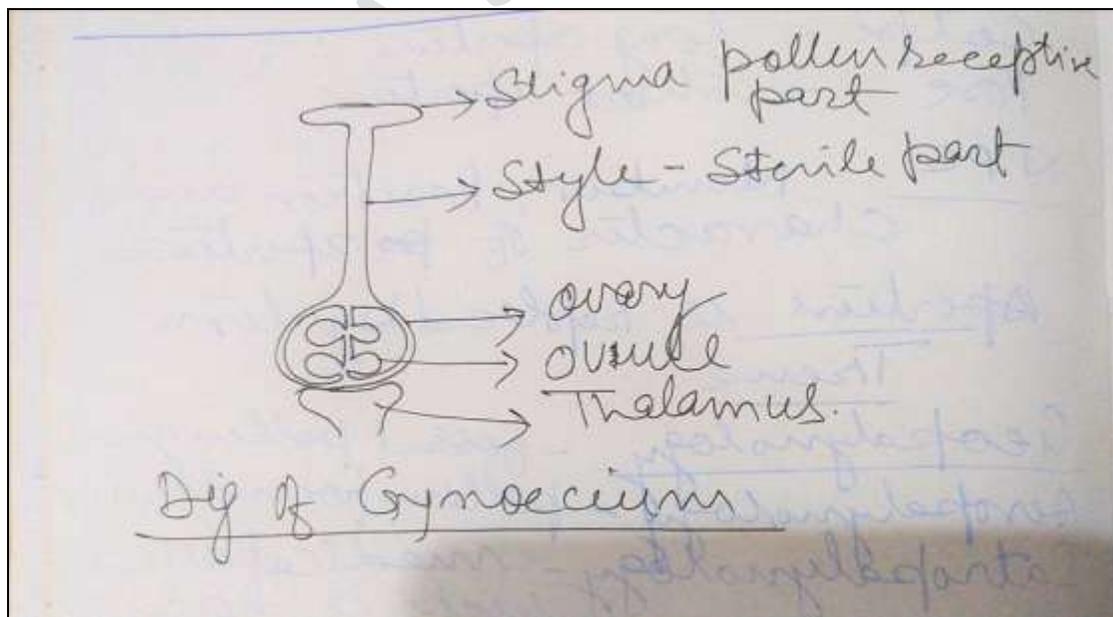


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**Topic: Megasporangium and Megasporogenesis**

**MEGASPORANGIUM (Gynoecium)**

The gynoecium is made up of one to many carpels or pistil consisting of stigma, style, and ovary.



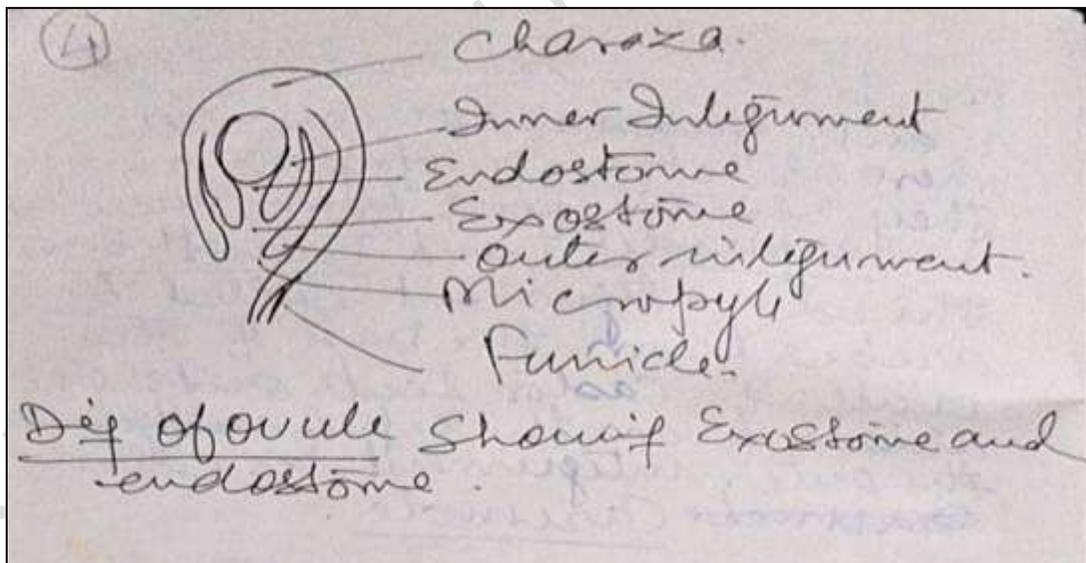
## Ovary :

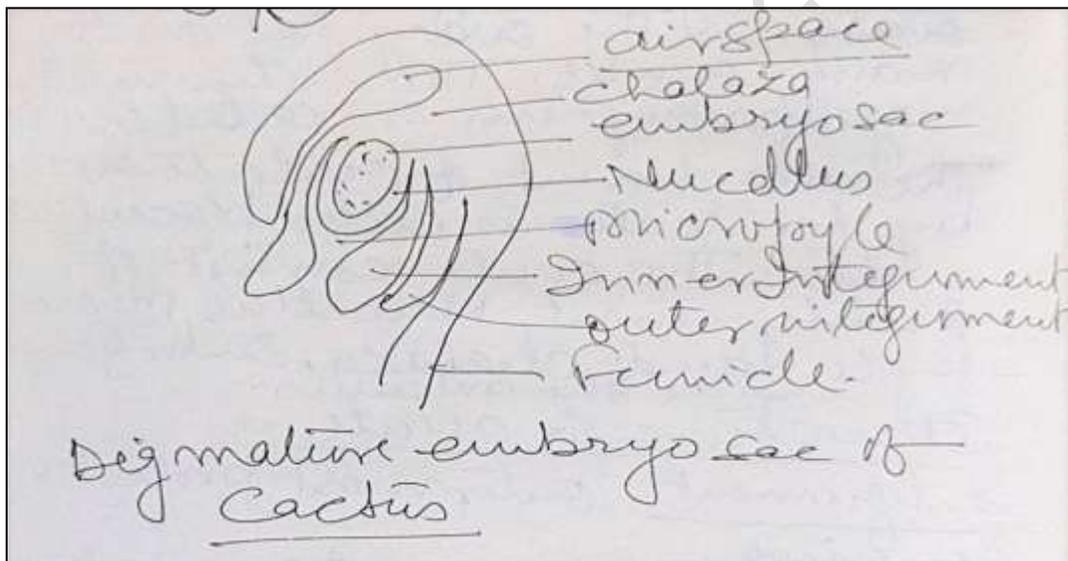
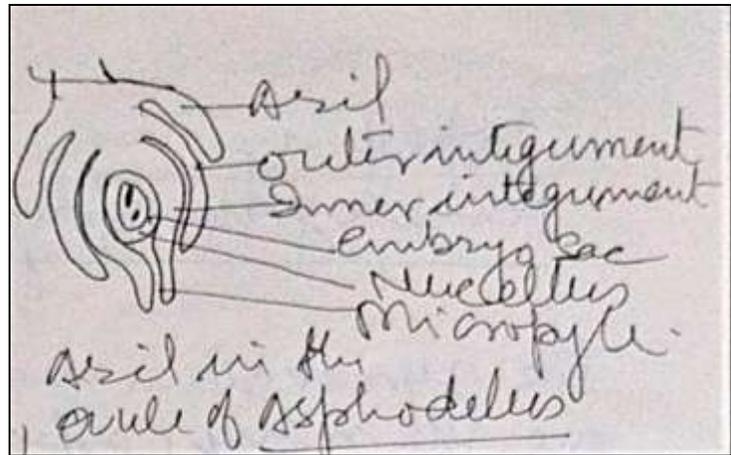
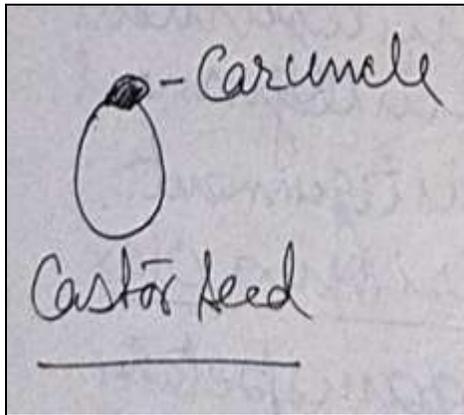
The ovary has one to many ovules. The integumented megasporangium is called ovule. Ovules remain attached to ovary by funicle. Ovules consist of integument, nucellus, micropyle, chalaza, and embryo sac inside nucellus.

## Structure of Ovule :

### Integument :

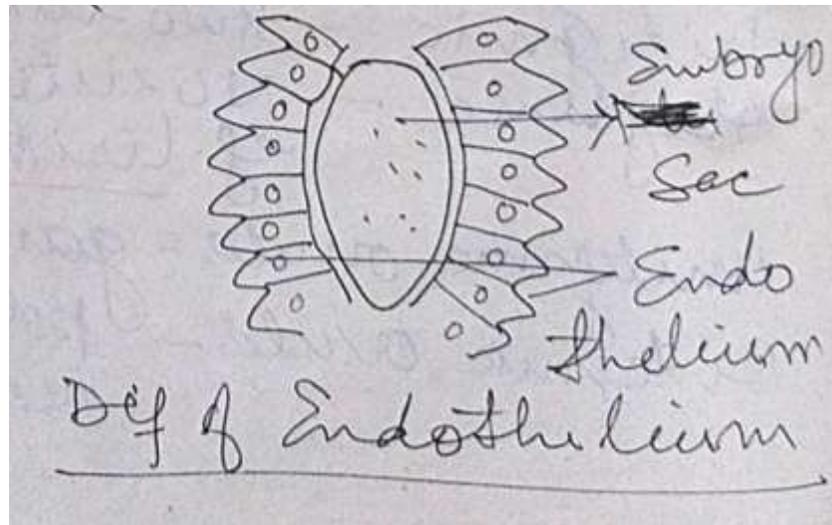
Outer most protective covering. Unitegmic - one integument, gamopetalae; bitegmic - 2 integuments, Polypetalae; monocots, ategmic - No integument, Olax. At the chalazal end integuments fused with nucellus, whereas at micropylar end they remain free from nucellus. In Asphodelus third integument called aril arises from the base of the ovule. In castor seeds outgrowth arise from the tip of outer integument is called as caruncle.





### **Endothelium:**

In unitegmic, tenuinucellate ovules nucellus degenerates at an early stage of the ovule development. The innermost layer of integument become specialized to perform nutritive function for embryo sac is called as endothelium. It is usually single layered but multi layered in Asteraceae. Cells of endothelium are meristematic and secretory in function also called integumentary tapetum.

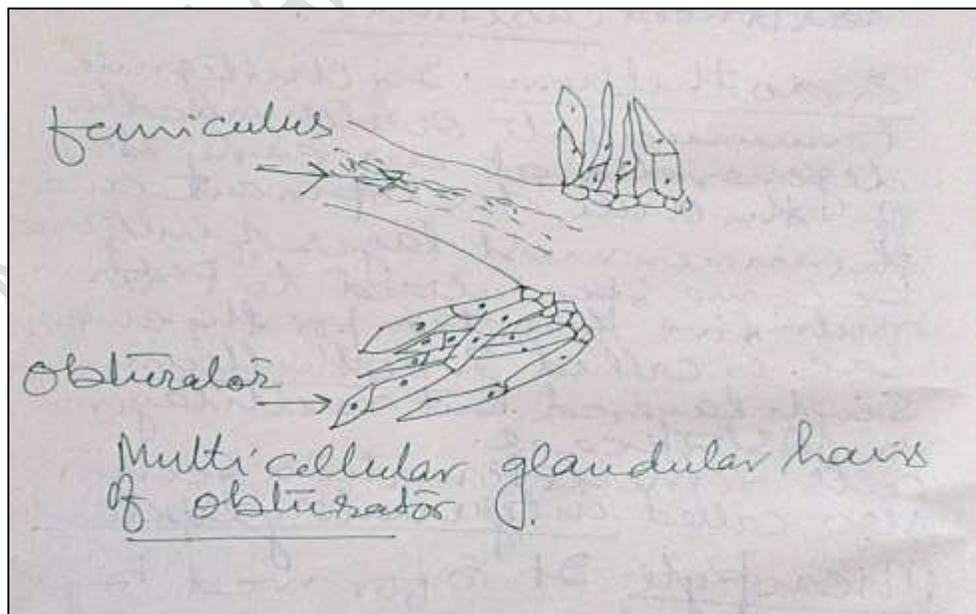


### **Micropyle :**

It is formed by integument. In bitegmic ovules both or only inner integument forms the micropyle.

### **Obturator :**

Ovule structure associated with funicle directing the growth of pollen tube towards the micropyle is called obturator. It may originate from placenta or funiculus. It degenerates after fertilization.



### **Hypostase and Epistase :**

Hypostase is formed from the tissue which is present below embryo sac and above the vascular supply of the funiculus. Cells are lignified. Epistase originates from nucellar epidermis lying above embryo sac and cells are cutinized.

### **Nucellus :**

It is rounded or oval mass of thin walled parenchymatous cell, diploid, sporophytic in nature enclosed by integument. Each ovule has only one nucellus but twin nucelli occur in *Aegle marmelos*. The archesporium differentiates from nucellus.

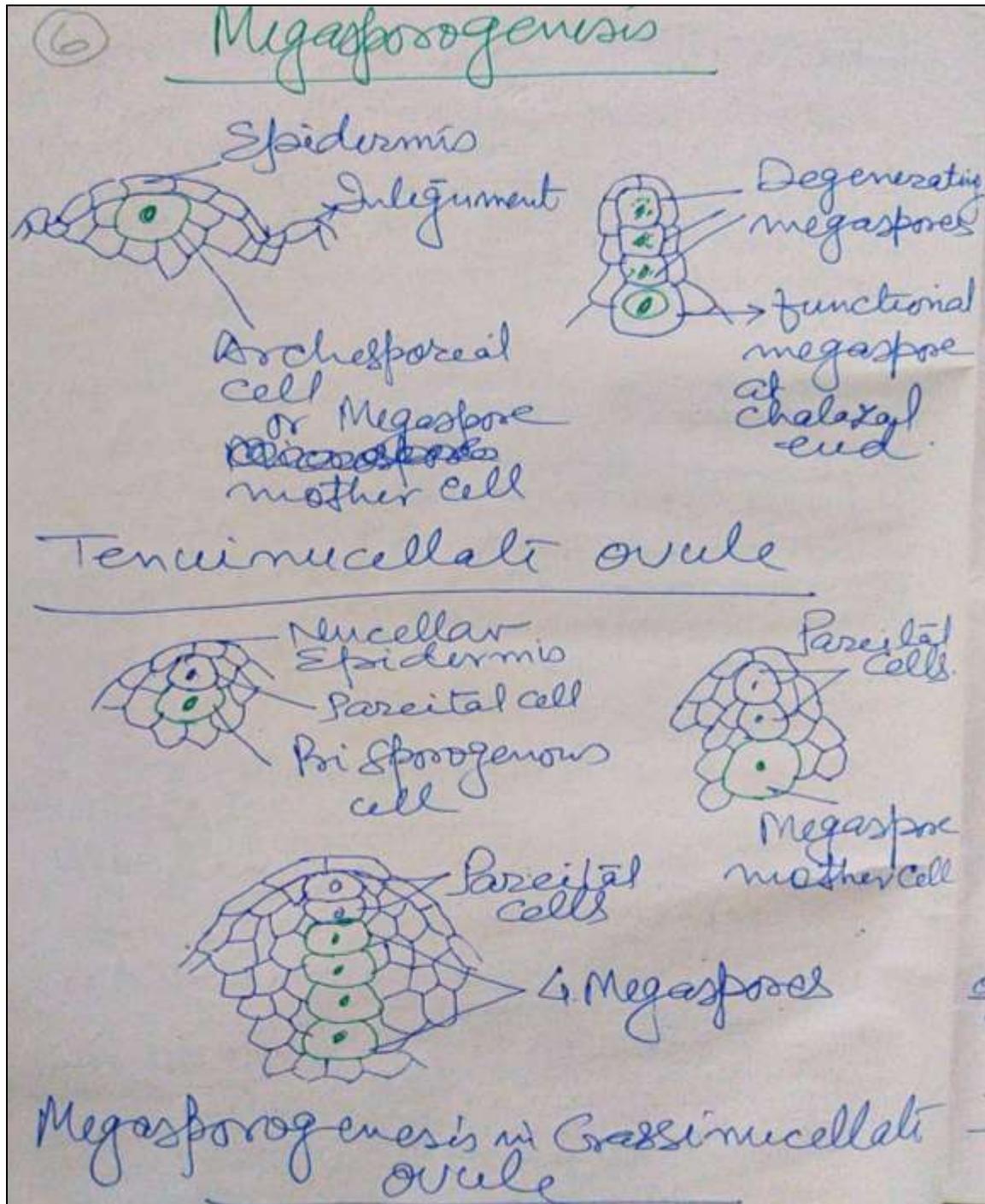
**Tenuinucellate ovule:** Archesporial cell is hypodermal in origin and surrounded by single layered epidermis.

**Crassinucellate ovule :** Archesporial cell is sub-hypodermal due to presence of the parietal cells. Sporogenous cell divides and form parietal cell and pri-sporogenous cell. Parietal cell divides and form more parietal cells so pri- sporogenous cells becomes sub-hypodermal.

**Tenuinucellate condition occurs in advanced families.** It may project into integument and forms nucellar beak. The nucellus is mostly consumed by the developing embryo sac or endosperm. When it persists it's called as perisperm.

## MEGASPOROGENESIS :

A single hypodermal cell in the nucellus functions as the archesporium. It is large in size, dense cytoplasm and has prominent nucleus.



In Tenuinucleate ovule archesporial cell function as megaspore mother cell where as in Crassinucleate ovule the archesporial cell divides and form primary parietal cell and primary sporogenous cell. The primary sporogenous cell acts as megaspore mother cell. Mostly the female archesporium is single celled but consist of a group of cells in family Paeonaceae and Crossosomataceae. In Sedum archesporium is multicellular and develop multiple megaspore mother cells. Multicellular archesporium is present in family Loranthaceae.

Megaspore mother cell divides by meiosis and form 4 haploid megaspores which may arrange linearly or in T-shaped tetrad. Callose is deposited around megaspore mother cell. Callose is highly impermeable and very readily synthesized and degraded. Out of 4 megaspores, the megaspore lying at chalazal end is functional e.g., Polygonum type; whereas megaspore lying at micropylar end is functional e.g., Oenothera type.

No ovule like structure is found in family Loranthaceae.