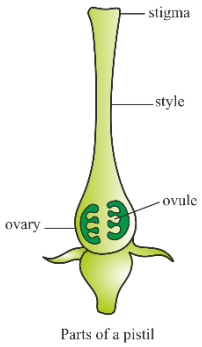
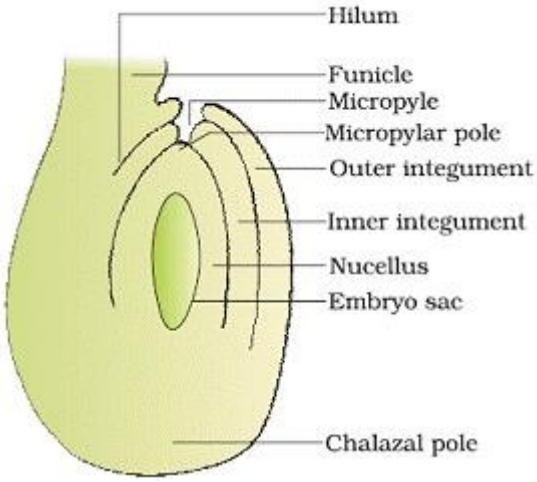
Pistil, Megasporium and Embryo sac

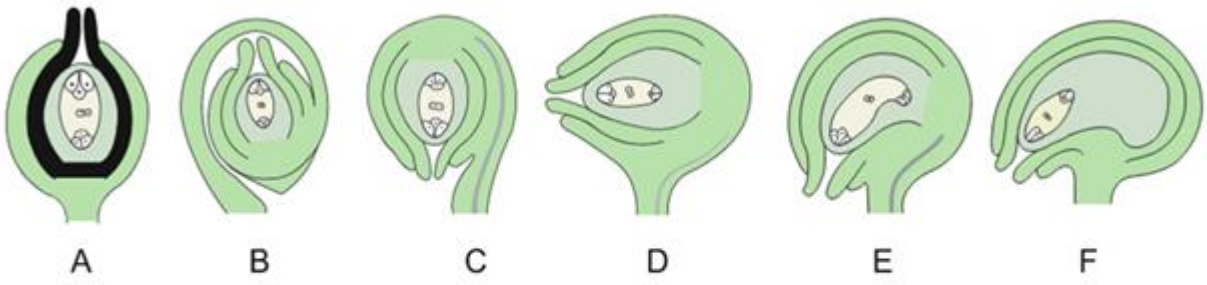


Parts of a pistil

- The female reproductive part of the flower- **gynoecium**.
- Each Carpel/Pistil consists of –
  Stigma(pollen grains landing site),
  Style(long slender section below stigma)
  Ovary(bulged section containing ovule)
- It consist of one or more carpel:
  Monocarpellary (Single Carpel) ex: pea
  Multicarpellary (Many Carpel) ex: rose
  - Carpels may be free- **Apocarpous**. ex: *Michelia*
  - Carpels may be fused – Syncarpous. Ex: *Papaver*
- The ovarian cavity comprises of placenta from where the megasporangia (Ovule)emerges.
- **Placenta**: Special tissue forms inner wall of ovary bearings one or more ovule.
- **Placentation**: Arrangement of ovules in ovary. Marginal (pea), Axile (Lemon), Free Central (Dianthus), Parietal (Cucurbita), Basal(Sunflower or wheat)
- Ovary may contain one ovules (ex- Wheat, Rice, Mango) or Many (Papaya, Water melon, Orchid).
- The ovule consists of –
  Funicle- Short stalk connecting ovary
  Hilum- Region where ovule fuses with Funicle.
  Integuments- one or two protective envelopes
  Micropyle- a small opening at the tip of nucellus where integuments do not encircle.
  Chalaza- Basal part of the ovule.
  Nucellus- Mass of cells enclosed within the integuments containing abundant reserve food materials
  Embryo sac- Female gametophyte.



- An ovule generally has a single embryo sac formed from a megaspore.
- An ovule may be classified on the basis of position of funicle, micropyle end and chalaza end as:



Types of ovule. A,Orthotropous ; B,Circinotropous ;C,Anatropous ; D,Hemianatropous; E,Amphitropous; F,Campilotropous

- **Megasporogenesis:** The process of formation of megaspores from the MMC(megaspore mother cell).
- Ovule differentiates a single megaspore mother cell (MMC) in the **micropylar** region of ovule.
- MMC undergoes **I meiotic division** resulting into **Dyad** than **II meiotic division** that results into the production of (four) Megaspores **Tetrad**.
- In most of the flowering plants **three megaspores degenerate**, one functional megaspore develops into female gametophyte (embryo sac).
- The nucleus of functional megaspore divides **mitotically** to form two nuclei which move to opposite poles to form 2-nucleate embryo sac. Two more sequential mitotic division results into 8-nucleate embryo sac.
- Finally after **free nuclear division** the cytoplasmic division takes place. Six of the eight nuclei surrounded by cell wall and remaining two nuclei (polar nuclei) collectively forms **Central cell.**

- Three cells are grouped at micropylar end to constitute **2-synergids** & **1- egg apparatus** rest three cells at chalaza end forms **antipodal cells.** At maturity, embryo sac is **8-nucleate and 7 celled.**
- The synergids have special cellular thickenings at the micropylar tip called filiform apparatus (cellular thickening at micropylar end) allow the pollen tubes into the synergid.