

CHAPTER 5 POLLINATION AND FERTILIZATION

This lesson is for Class 8 for the subject of Biology. Topic Fertilization which is covered in Chapter 5 titled Pollination and fertilization starting on Page No 38 of your text book titled Concise Biology Selina Publications.

Dear children let us start with the definition of -

Fertilization - is the union/fusion of the nuclei of male and female gametes (reproductive cells). In a flower, the pollen grains produce two male gametes and ovules (present inside the ovary) produce female reproductive cell or gamete.

STRUCTURE OF POLLEN GRAIN - Pollen grain has a double wall - outer exine and inner intine. Its nucleus divides into two forming - a tube nucleus and a generative nucleus at the time of pollination.

STRUCTURE OF OVULE - ovule is present inside the ovary. After fertilization ovary converts into fruit and ovules convert into seeds. Number of seeds in a fruit depends upon the number of ovules in its flower. Various parts of ovules are -

Integuments - Protective coverings around the ovules.

Micropyle - Integuments leave a small opening at one end called micropyle (for the entry of pollen tube).

Nucellus - Enclosed by the integuments is the mass of food laden cells called the nucellus. Inside the nucellus embryo sac is present.

Cells inside the embryo sac (7 cells = 3+3+1)

3 cells (towards micropyle) - one egg cell and two synergids

3 cells at opposite end called the antipodal cells

1 large central cell containing two polar nuclei fused together.

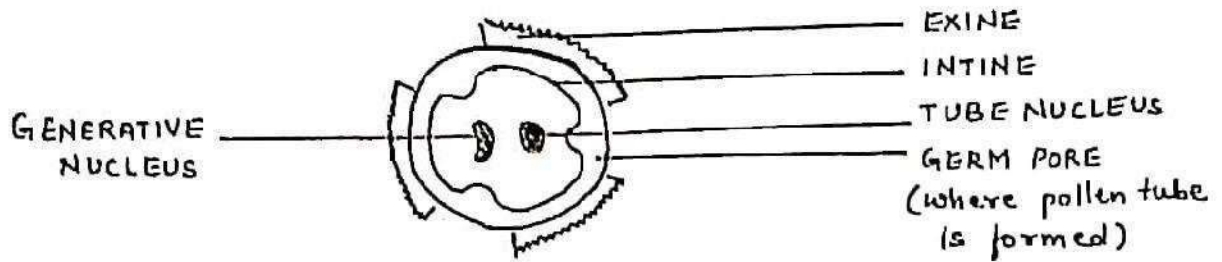
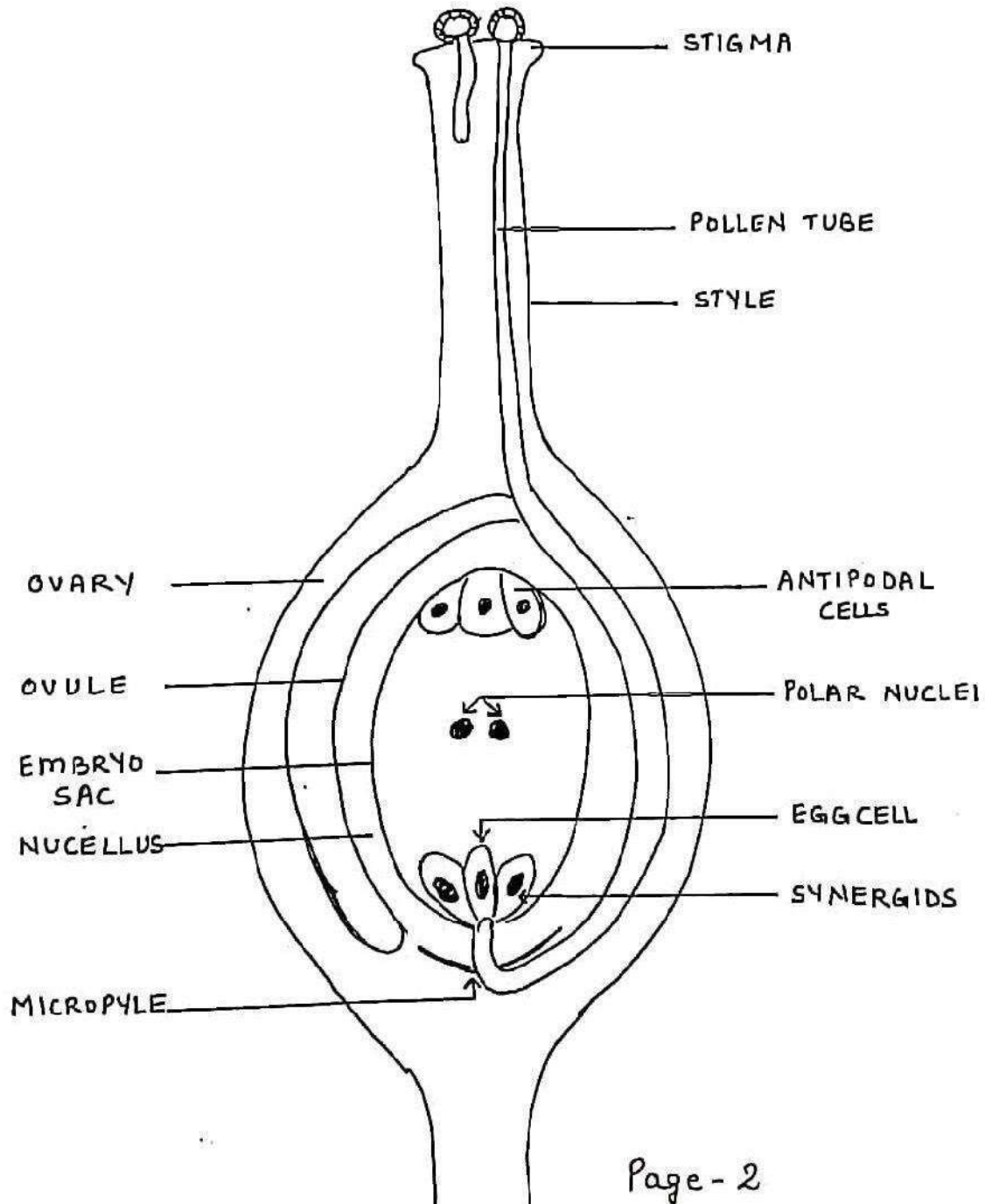


Fig 1 A mature Pollen grain

Fig. 2. Germination of Pollen grain on stigma
and Fertilization



Now before going further let us take a short break. kindly see the diagram showing various parts and cells present in ovule i.e. Fig 5.6 A&E carefully, understand them properly and answer the following questions in notebooks-

Q1 Name the protective coverings of ovule

Q2 How many cells are present in embryo sac of ovule.

Q3 What is the term given to mass of food laden cells which are enclosed by integuments of ovule?

Break is over children. Listen to the correct answers

A1 'Integuments' are the protective coverings of ovule

A2 There are 7 cells present in embryo sac

A3 Nucellus is the term given to mass of food laden cells which are enclosed by integuments of ovule.

Now let us resume the topic with discussion of

GERMINATION OF POLLEN GRAIN

If the pollen grain falls over the stigma of same species of plant it germinates else it is destroyed

Pollen grain during pollination falls over the stigma of same species plant then it forms

a pollen tube and there is stimulated to germinate due to release of certain kinds of

sugars by the stigma of same species flower.

Pollen tube grows out of the pollen grain through a point. Pollen tube contains two

nuclei - generative and tube nuclei. Later

generative nuclei divides into two sperm nuclei (called male gamete nuclei). Thus now is a

germinating pollen grain there are three nuclei that are not separated by cell walls and sharing a common cytoplasm (one tube nucleus and 2 sperm nuclei).

Pollen tube grows through the stigma, style and reaches the ovary (by dissolving the tissues with the help of enzymes). Pollen tube enters the embryo sac through the small opening in the integuments i.e. the micropyle. Tube nucleus that had directed the growth of pollen tube (from stigma to the embryo sac) all the way down, now disintegrates.

In the embryo sac the pollen tube enters through one of the synergids (destroying it in the way) and releases the two sperm nuclei inside the embryo sac. These two sperm nuclei cause fusion of two different cells thus causing double fertilization. i.e. two fertilizations have occurred.

In double fertilization -

One sperm nucleus fuses with egg cell nucleus to form the zygote.

Other sperm nucleus moves towards the two polar nuclei in the central cells and fuses with them. Here 3 nuclei have fused together. Thus it is called triple fusion. As a result of triple fusion endosperm nucleus is formed.

FATE OF FLORAL PARTS AFTER FERTILIZATION

After the fertilization (fusion of male and female gamete) has occurred, the flower has served its purpose (Function of flower is to cause reproduction thus forming the seeds). Hence after fertilization following changes are seen in a flower -

- 1) Petals / sepals / style / stigma - wither and generally fall off.
- 2) Calyx - may either fall off or may remain intact in a dried and shrivelled form.
Eg Guava, brinjal calyx may be seen.
- 3) Ovary - forms the fruit.
- 4) Ovary wall - forms the fruit wall (or Pericarp).
- 5) Ovule - forms the seed (which later grows into new plant).
- 6) Placenta - forms stalk of seed.
- 7) Integuments - form seed coat (outer layer of seed coat is testa and inner is tegmen).
- 8) Secondary nucleus (fused polar nuclei) forms the endosperm nucleus.
- 9) Egg cell (female gamete) forms the embryo.
- 10) Antipodal cells - are disorganised.

With this I am ending today's discussion children. On the basis of your understanding of today's topic all students are required to answer the following home assignment questions in the notebooks.

HOME ASSIGNMENT

- Q1 Students are required to answer (oneword)
A Multiple Choice Type questions and
B Short answer type questions
 in the book itself [Review Questions]
- Q2 Answer the E Structured / Application / skill type questions - Q No 1, 2, 3 in the notebook. [Review Questions]
- Q3 Draw a well labelled diagram of -
 - (i) Pollen grain (Fig 5.6 B)
 - (ii) Germination of pollen and fertilization (Fig 5.6 A)