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C* All the remaining cells of embryosac, like "antipodal cells", "synergid" degenerate excluding zygote and primary endosperm nucleus after the fertilization.

At this time, zygote obtains food from degenerating synergid and antipodal cells.

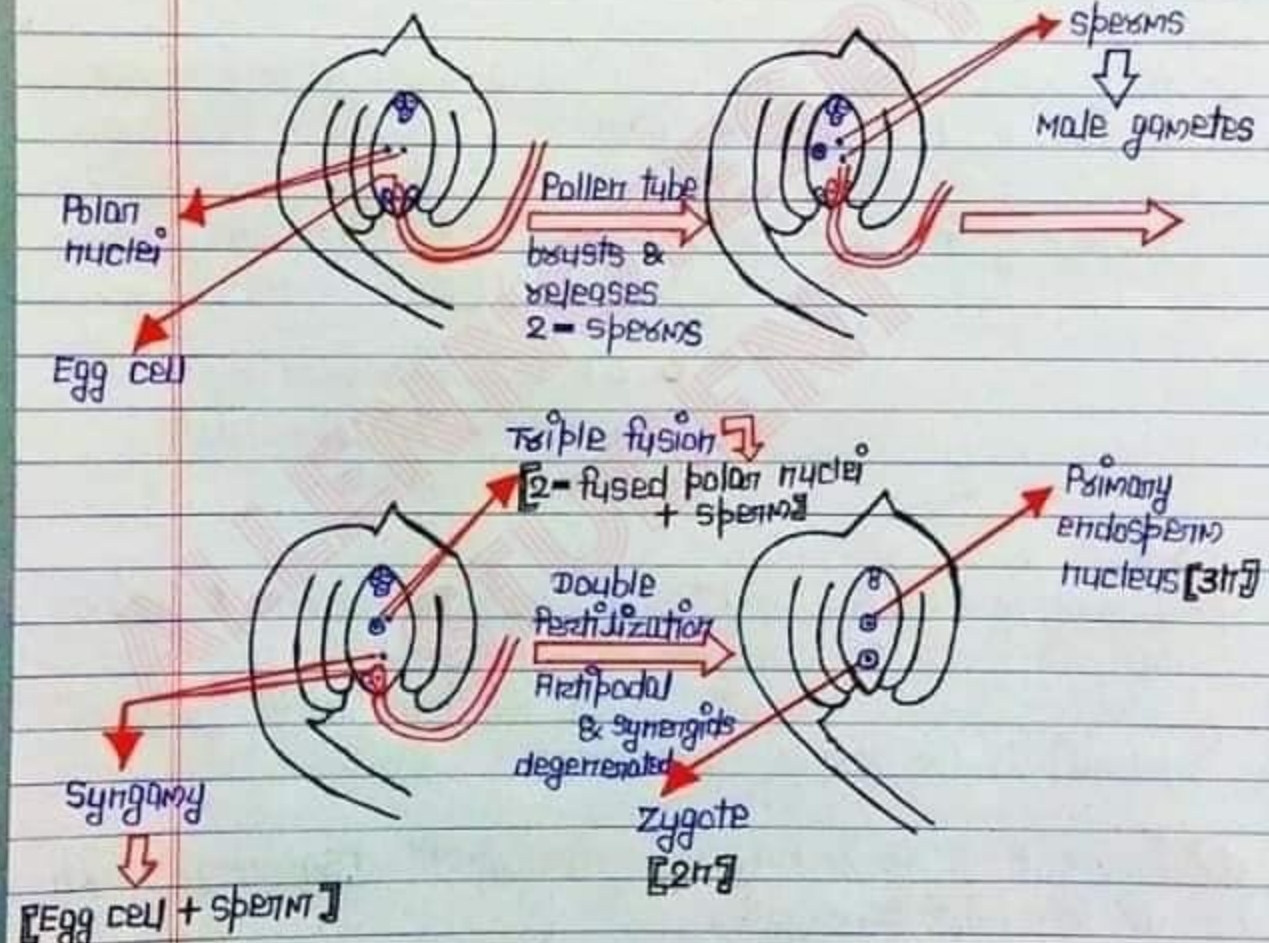

FIG :- PROCESS OF FERTILIZATION

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Syngamy is "true fertilization" process, discovered by "Strasburger" in "Monotropa".

The "2nd male gamete" fused with "diploid secondary nucleus" which is formed by fusion of 2 - polar nuclei. This fusion is known as "triple fusion" resulting, a triploid [3n] structure is formed, it is called "primary endosperm nucleus" [PEN].

"Fertilization" takes place "twice" at a time in Angiosperm it is called "double fertilization".

Syngamy + Triple fusion = Double fertilization

- D.F was discovered by "Nawaschin" in "Lilium" and "Fritillaria" plants.

"Double fertilization" and "tripe fusion" is unique / specific or universal characteristic of "Angiosperm".

"Five nuclei" and "three gametes" participate in "double fertilization".

A zygote is formed by true fertilization [Syngamy] which develops into "embryo".

In Triple fusion, triploid primary endosperm nucleus is formed in primary endospermic cell [PEC], which develops into the "endosperm" which is used as nutrition for growing embryo.

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***
➪ Any one synergid starts degenerating when the pollen tube comes near the egg apparatus.
The pollen tube enters into the embryosac through the degenerating synergid.

**
➪ When tip of the pollen tube enters into the embryosac, vegetative nucleus degenerates. The tip of the pollen tube swells and burst [Due to endosmosis], The pollen tube released all contents including both male gametes inside the degenerating synergid of embryosac.

**
➪ Two dark granules appear in the region of degenerating synergid, These are known as "⊠- bodies".
"⊠- bodies" are "two" in number and both ⊠- bodies are the degenerating "tube nucleus" [vegetative nucleus] and degenerating "synergid nucleus".

3. FUSION OF GAMETES =
Before / after the entrance of pollen tube into the embryosac [means before fertilization], both polar nuclei of the central cell fused together to form a "diploid nucleus", it is known as "secondary nucelus" / "definitive nucelus".

***
➪ out of two male gametes, "one male gamete" fertilized with "egg cell" to form a "diploid zygote". This fusion is known as "syngamy".

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- If "generative cell" and "pollen grain" is destroyed by laser beam then fertilization will take place, but "vegetative nucleus" or "cell" is destroyed then both fertilization and growth will not take place.

- The "fertilization" in which "non motile gametes" are carried to female gamete through "pollen tube" is known as "Siphonogamy".

- Occurence of more than 2 - male gametes into the ovule is called "Polyspermy". It may be due to entry of more than one pollen tube into embryosac.

POST FERTILIZATION :=

STRUCTURES AND EVENT

- Transformation of "ovary into fruit" and "ovule into seed" occur "simultaneously".

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IMPORTANT QUESTIONS :=

Q. For the formation of 1000 seeds of capsella, number of meosis will be requise ?

Sol :=

∵ 1000 megaspores is formed by 1000 meosis

⇩

[because from 1- meosis 4 - megaspores is formed, but in 4- megaspores only 1 - megaspore remains functional. so, from 1 meosis ⇨ 1 megaspore]

∵ For the formation of 4 - microspore 1 - meosis req.

∴ " " " " 1000 " $= \frac{1}{4} \times 1000$ " "

$= 250$ meosis

∴ Total number of meosis $= 1000 + 250$

$= 1250$ meosis Ans

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Q. For the formation of x seeds, number of meosis will require ?

Sol:- ** To produce a seed, we require the production of pollen [Microspose [m]] and egg [Megaspose [m]] and their fusion.

In pollen grain =

∵ 4 - pollen grains are produced by 1 - meiotic division.

∴ x " " " " $= \frac{1}{4} x$ " "

$= \frac{x}{4}$ meiosis

In egg =

∵ 1 - egg is produced by 1 - meiotic division

∴ x " " " " $= 1 \times x$ " "

$= x$ meiosis

∴ x seeds $= \left[x + \frac{x}{4} \right]$ meiosis

↳ formula.

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Q. For the formation of 50 seeds of wheat, number of meosis will require ?

Sol:-

No. of meosis = $50 + \frac{50}{4}$ ⇨ FROM FORMULA $\left[x + \frac{x}{4}\right]$ x = No. of Seeds

= 50 + 12.5

= 62.5

≈ 63 [Approx] Ans

Q. How many seeds of capsella produce by 35 meosis ?

Sol:-

No. of meosis = $x + \frac{x}{4}$

$35 = \frac{4x + x}{4}$

or, $5x = 35 \times 4$

or, $x = 28$ Ans

⇩

Seeds

⇨ For the formation of 28 seeds, 7 meiotic division in pollen grains 28 meiosis in megaspores.

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Q. Tetraploid male plant is crossed with hexaploid female plant then what will be ploidy of seed of Angiosperm ?

Sol:≡ ♂ × ♀

Given, 4n 6n

gamete 2n 3n

ploidy of seed = 5n

ploidy of Endosperm = 8n

Formula

$$\text{Ploidy of Endosperm} = \text{Ploidy of female} + \frac{\text{Ploidy of male}}{2}$$

Q. A male plant having chromosome no. 32 is crossed with female plant having chrosome no. 28 then what will be the chromosome no. in its seed and endosperm ?

Sol:=

♂ × ♀

Given,	32	28
Chromosom no. in gamete	16	14

Chromosome no. in seed = 30

Chromosome no. in endosperm = 28 + 16
= 44

DEVELOPMET OF ENDOSPERM

- 1st of all endosperm develops from the primary endosperm nucleus present in PEC which stores food materials. It is utilized by the embryo during the early development then after at the time of seed germination.
- Food is present in endosperm.

- The endosperm is of 3 - types on the basis of development :=

1. NUCLEAR ENDOSPERM OR FREE NUCLEAR ENDOSPERM

- This is the "most common" type of endosperm.
- This type of endosperm is found in "dicotyledon" [Polypetalae].
- Nuclear endosperm is also present in "capsella".
- Nuclear endosperm develops by "free nuclear divisions" of primary endosperm nucleus. Thus a "Multinucleated endosperm" is formed.

  Later on cytokinesis takes place, so that multicellular endosperm is formed at maturity.
- The milky fluid found in "green coconut" is an example of "nuclear endosperm", which is called "Liquid Syncytium".

2. CELLULAR ENDOSPERM

- This type of endosperm is found in "Gamopetalae group".