Samičí gametofyt

Gynaeceum

Typy placentace, stavba vajíčka

Megasporogeneze (vývoj megaspor)

Megagametogeneze (vývoj zárodečného vaku)

Základní typy gyneceí a placentace

(Tachtadžan 1945)

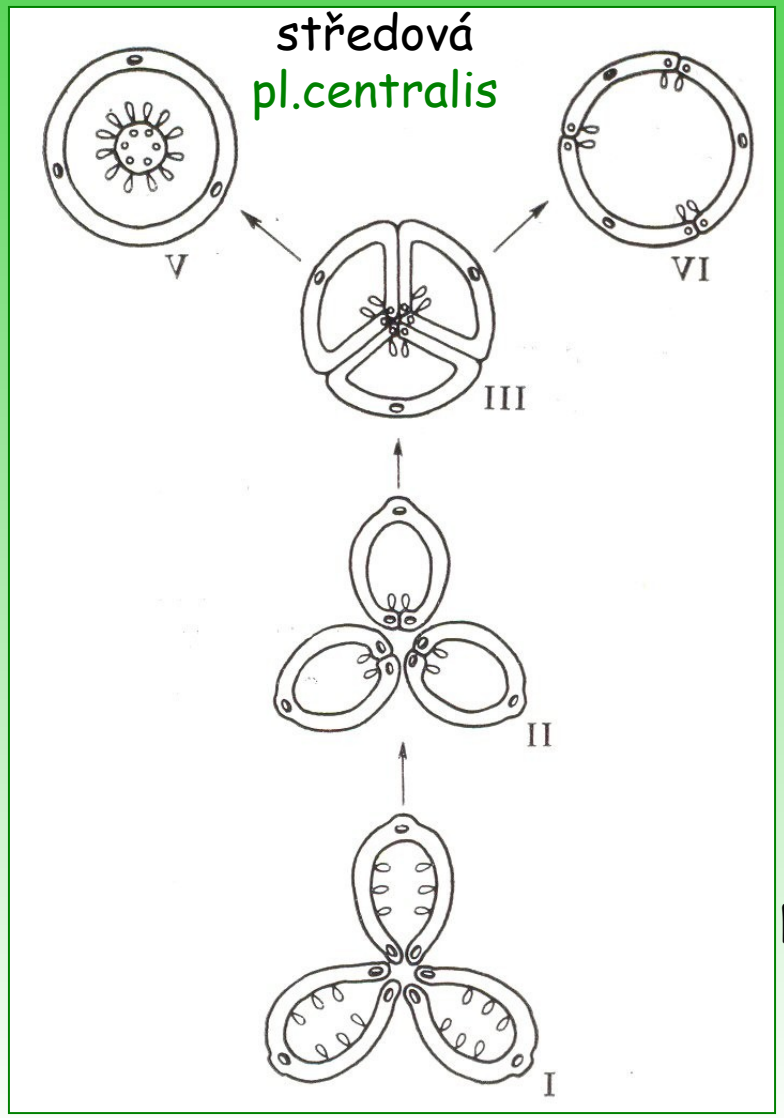
Gynaeceum

V lysikarpní
hvozdík, primula

IV parakarpní

III synkarpní
tulipán, lilie

I, II apokarpní
pivoňka, pryskyřník
magnolie



Placentace

nástěnná
pl. parietalis

komisurální úhlová
pl. commisuralis axilaris

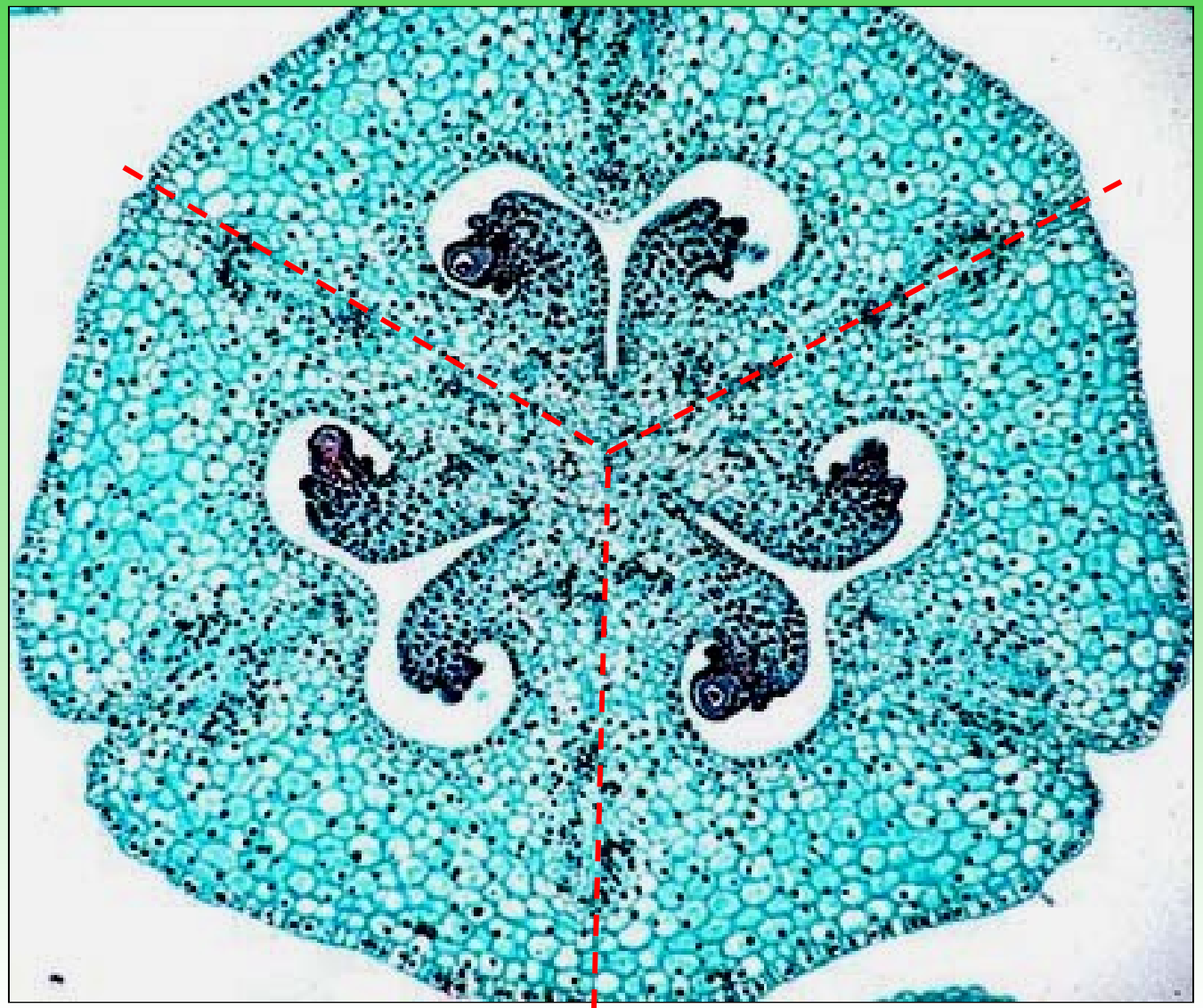
povrchově středová
pl. parietalis marginalis

povrchově boková nástěnná
pl. parietalis laminaris

Příčný řez semeníkem

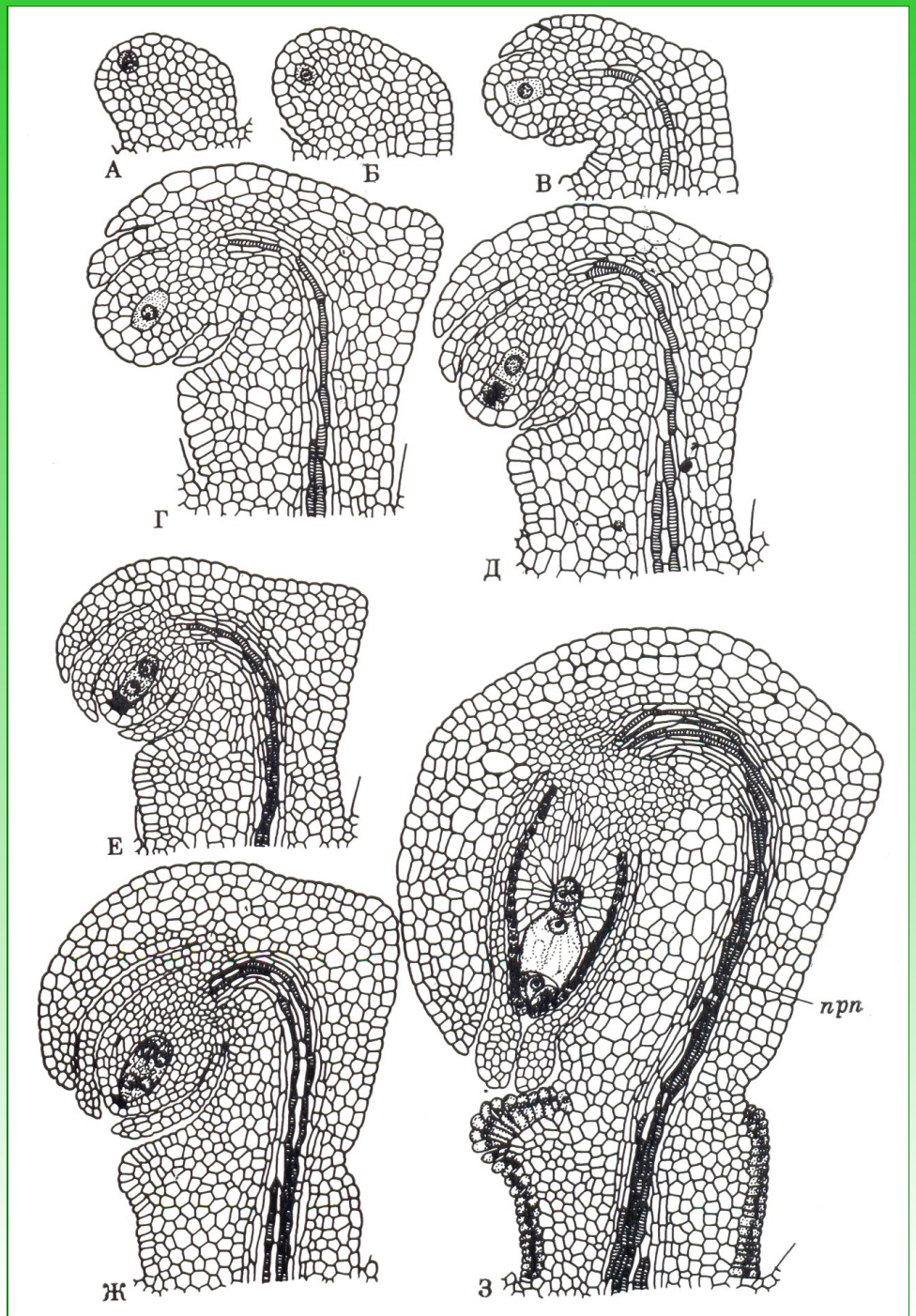
3 plodolisty

axilární placentace



Vývoj vajíčka *Beschorneria*

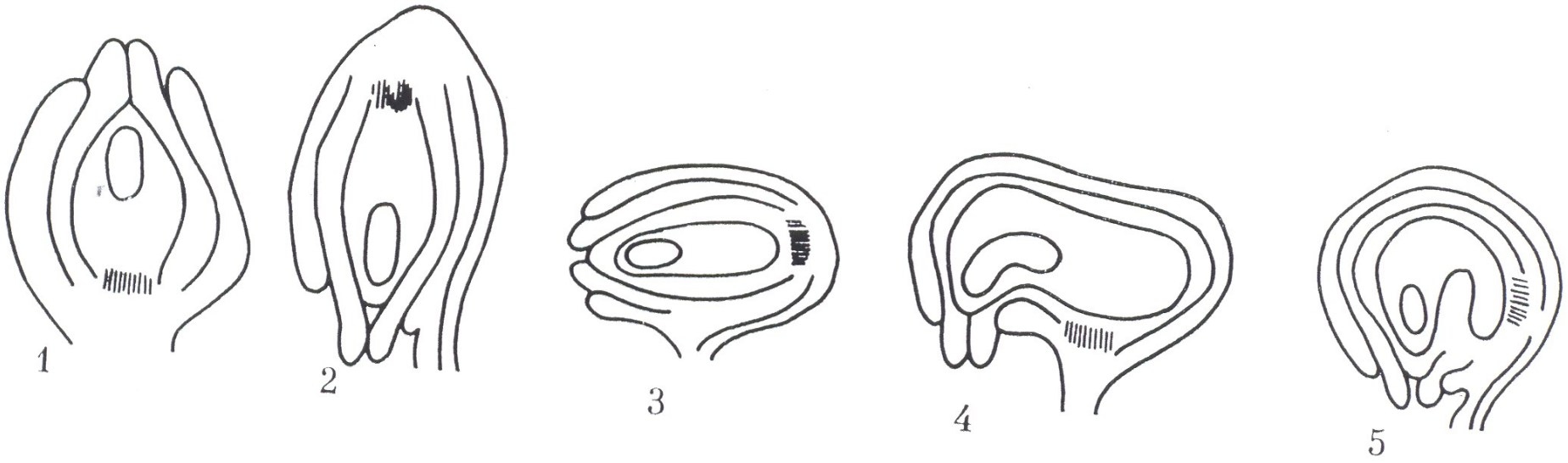
Savčenko a Komar 1965



Základní typy vajíček

Goebel 1933

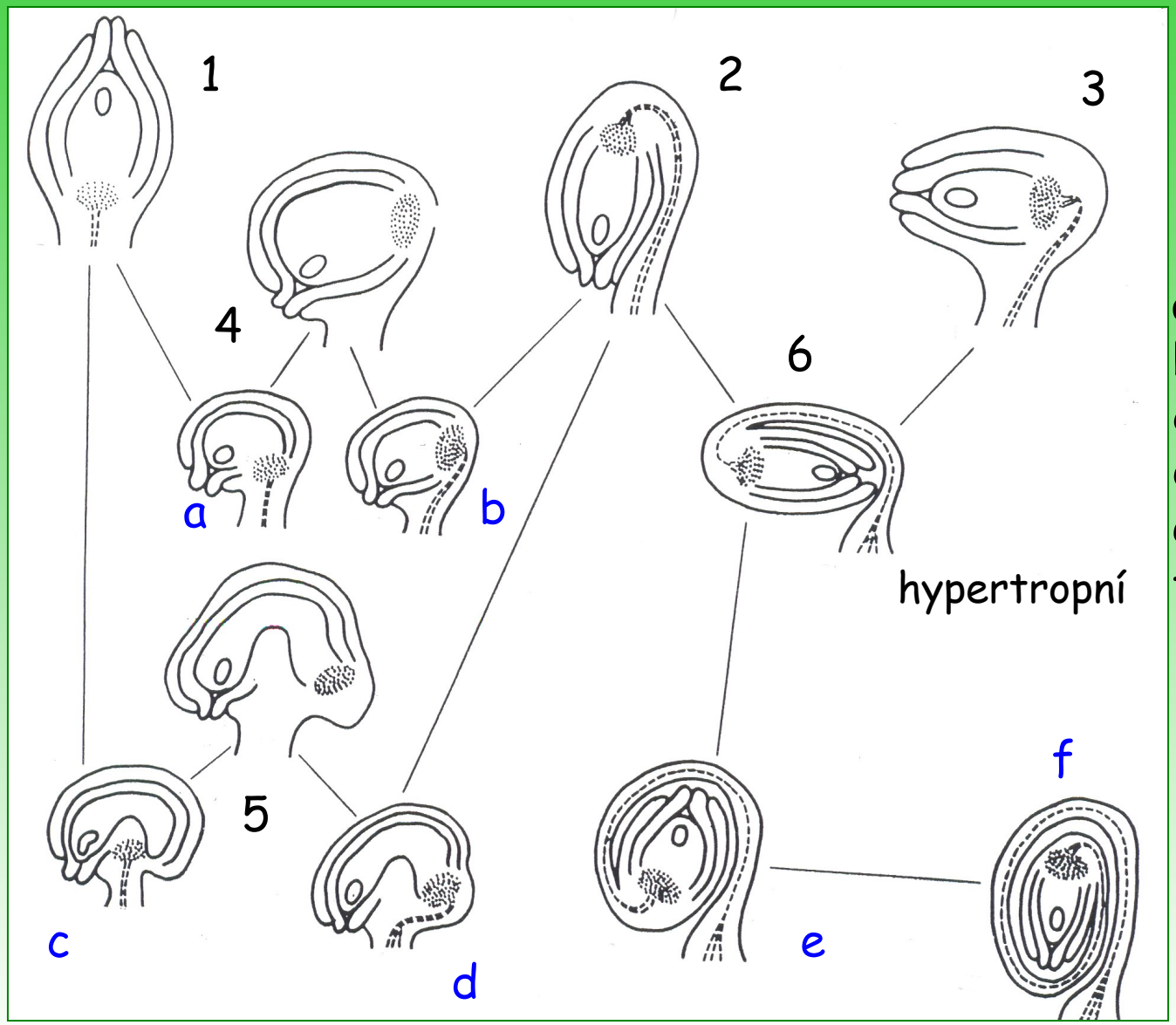
přímé **obrácené** **příčné**



ortotropní (atropní) anatropní hemitropní kampylotropní amfitropní

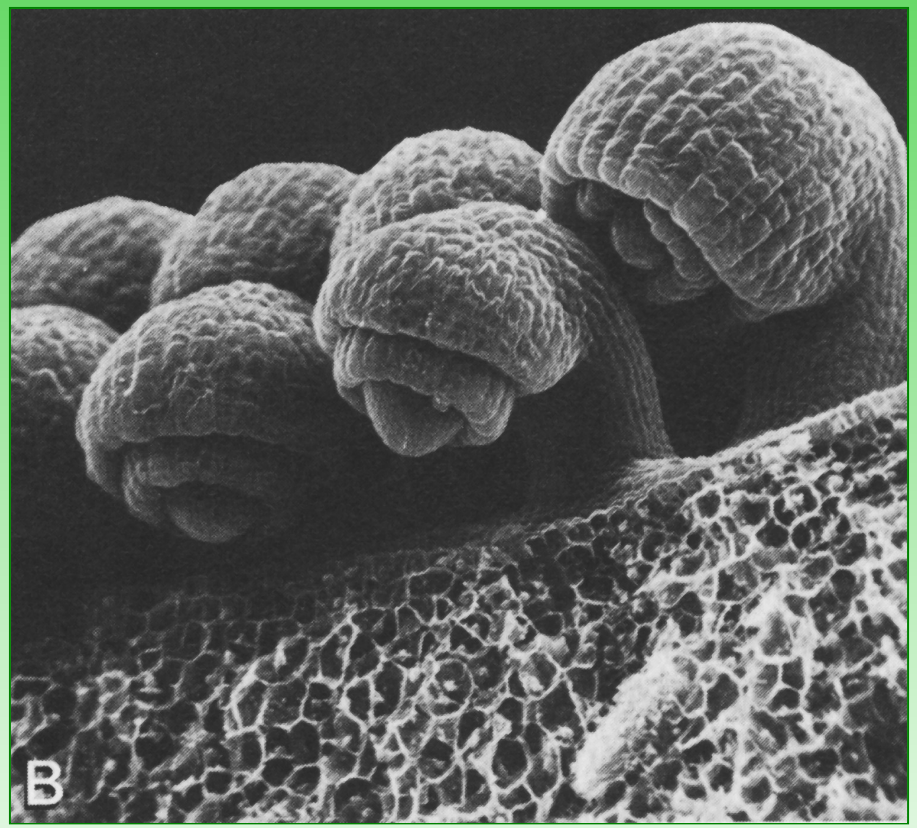
Vztahy mezi typy vajíček

Savčenko 1973



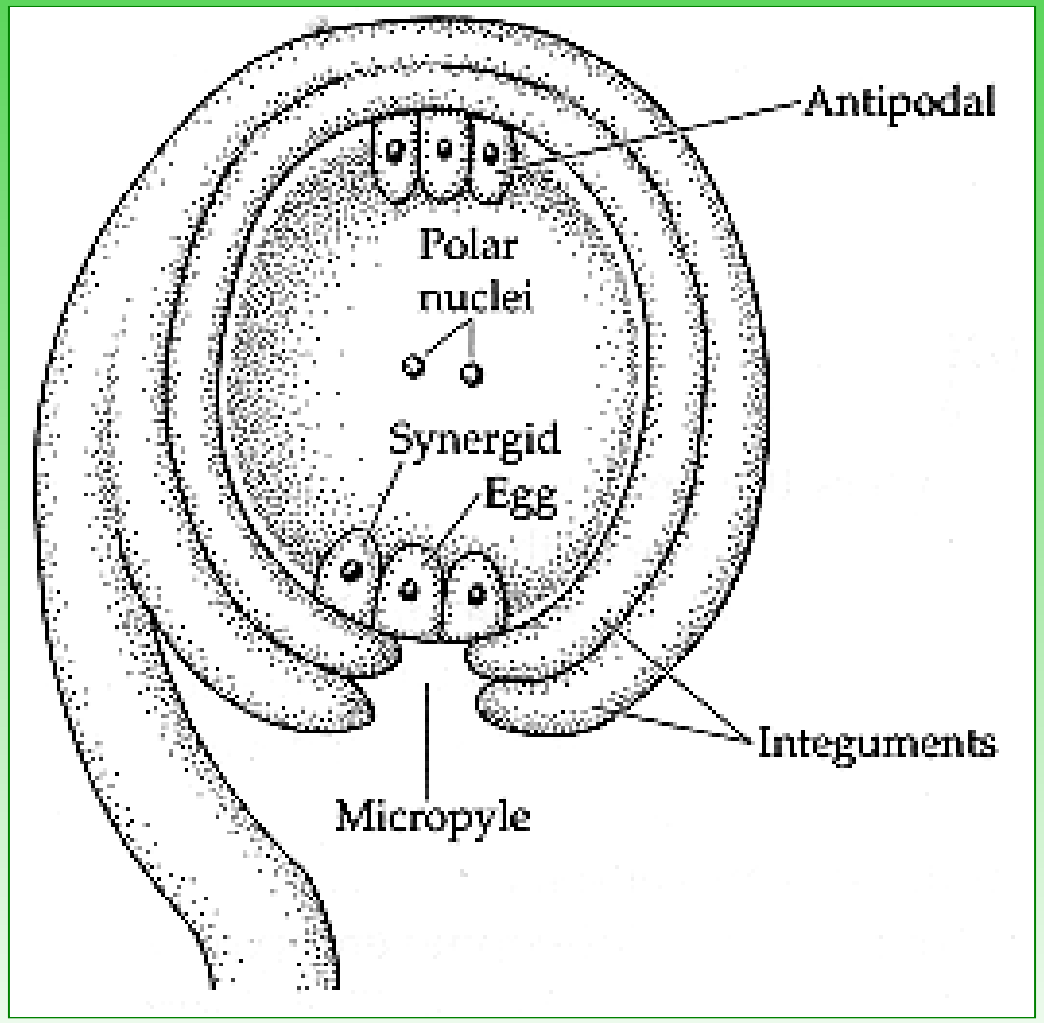
a orto-kampylotropní
b ana-kampylotropní
c orto-amfitropní
d ana-amfitropní
e orto-circinotropní
f ana-circinotropní

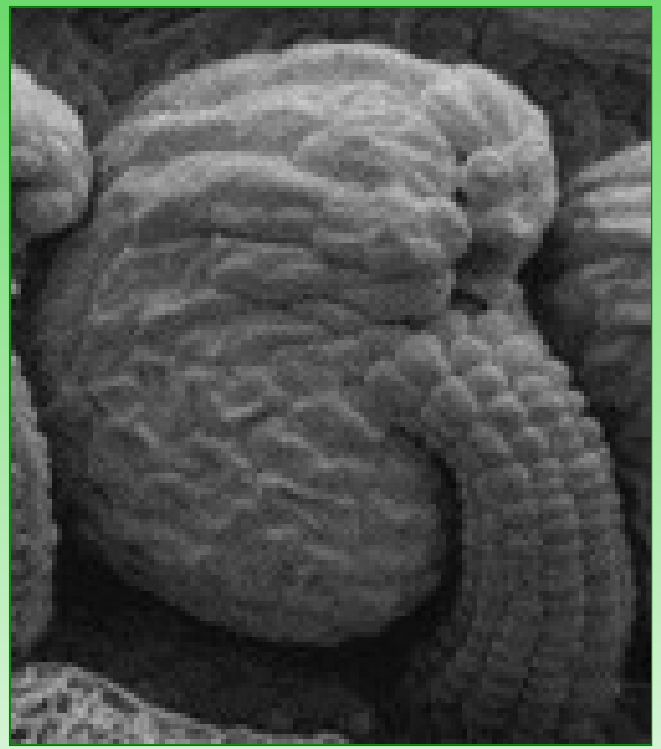
Vajíčka



Johri 1984

Anatropní vajíčko - schéma





Megasporogeneze = tvorba makrospor

samičí archespor

↓

megasporocyt

↓ meióza

tetráda haploidních megaspor

Megagametogeneze = tvorba zárodečného vaku

tetráda haploidních megaspor

↓

fungující megaspora (megaspory)

↓ mitotická dělení

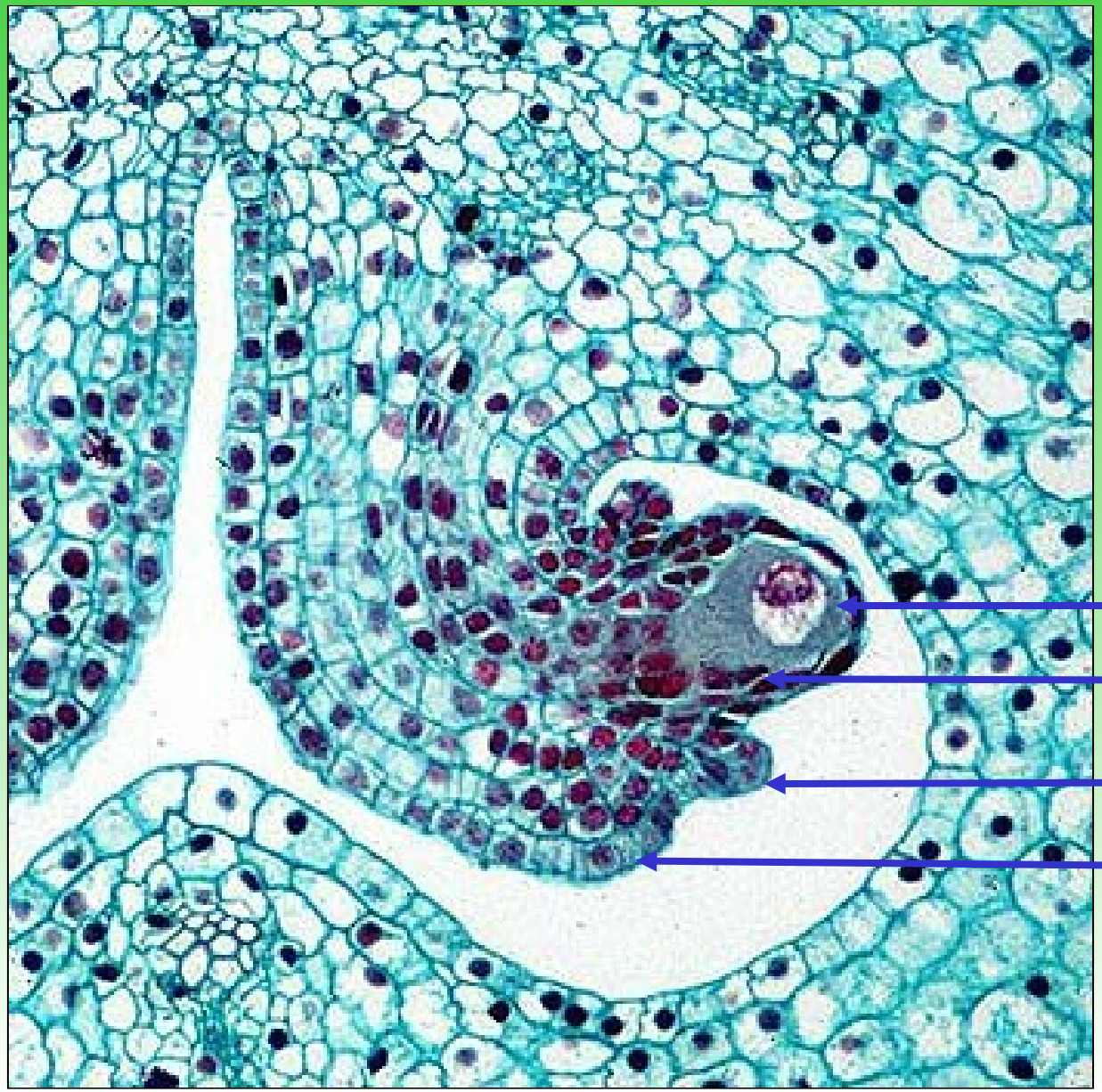
mladý zárodečný vak

↓ diferenciace buněk

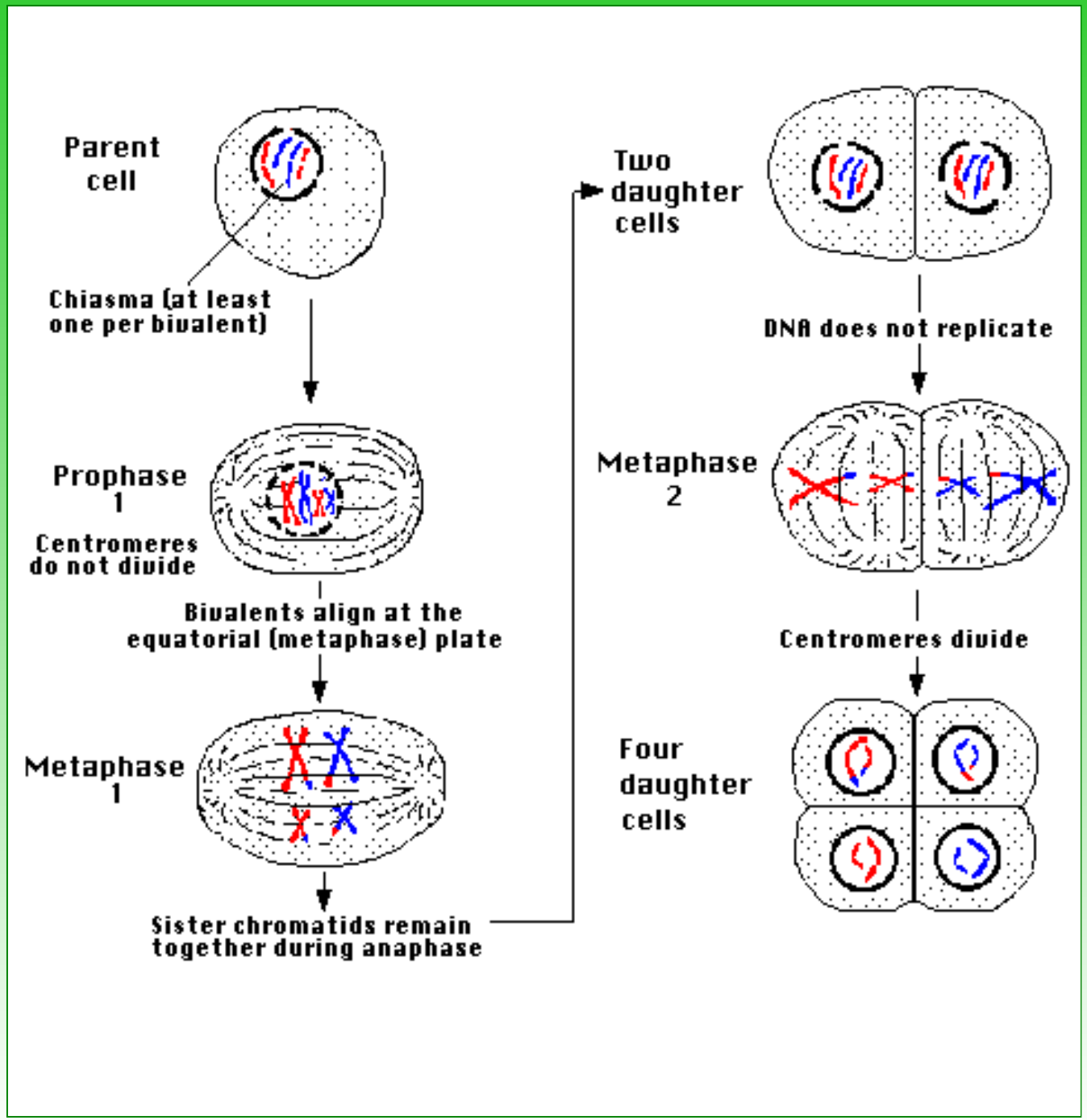
<u>zralý zárodečný vak</u> = samičí gametofyt

monosporický, bisporický, tetrasporický

Megasporocyt = mateřská buňka megaspor



Meióza

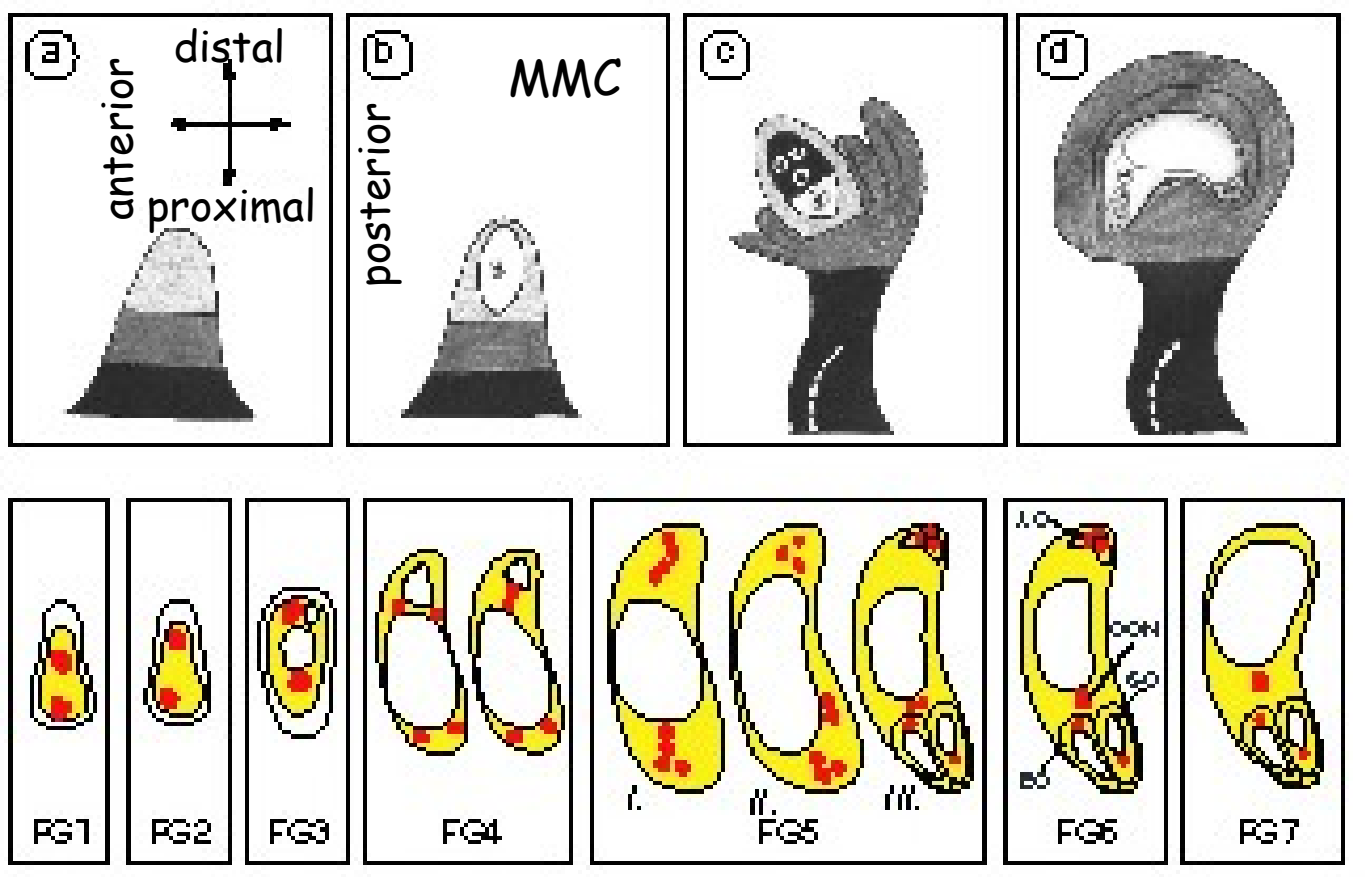

Parent cell
Chiasma (at least one per bivalent)
Prophase 1
Centromeres do not divide
Bivalents align at the equatorial (metaphase) plate
Metaphase 1
Sister chromatids remain together during anaphase
Two daughter cells
DNA does not replicate
Metaphase 2
Centromeres divide
Four daughter cells

Přehled typů zárodečných vaků

Erdelská 1981 (podle Maheshwari 1951)

monosporické	***Polygonum***	*8 jaderný, bipolární*
	Oenothera	*4 jaderný monopolární*
bisporické	***Allium***	*8 jaderný, bipolární*
	Podostemon	*4 jaderný, monopolární*
tetrasporické	***Adoxa***	*8 jaderný, bipolární*
	Fritillaria	*8 jaderný, bipolární*
	Plumbagella	*4 jaderný, bipolární*
	Drusa	*16jaderný, bipolární*
	Peperomia	*16 jaderný, tetrapolární*
	Penea	*16jaderný, polypolární*
	Plumbago	*8 jaderný, tetrapolární*

Vývoj zárodečného vaku u *Arabidopsis*

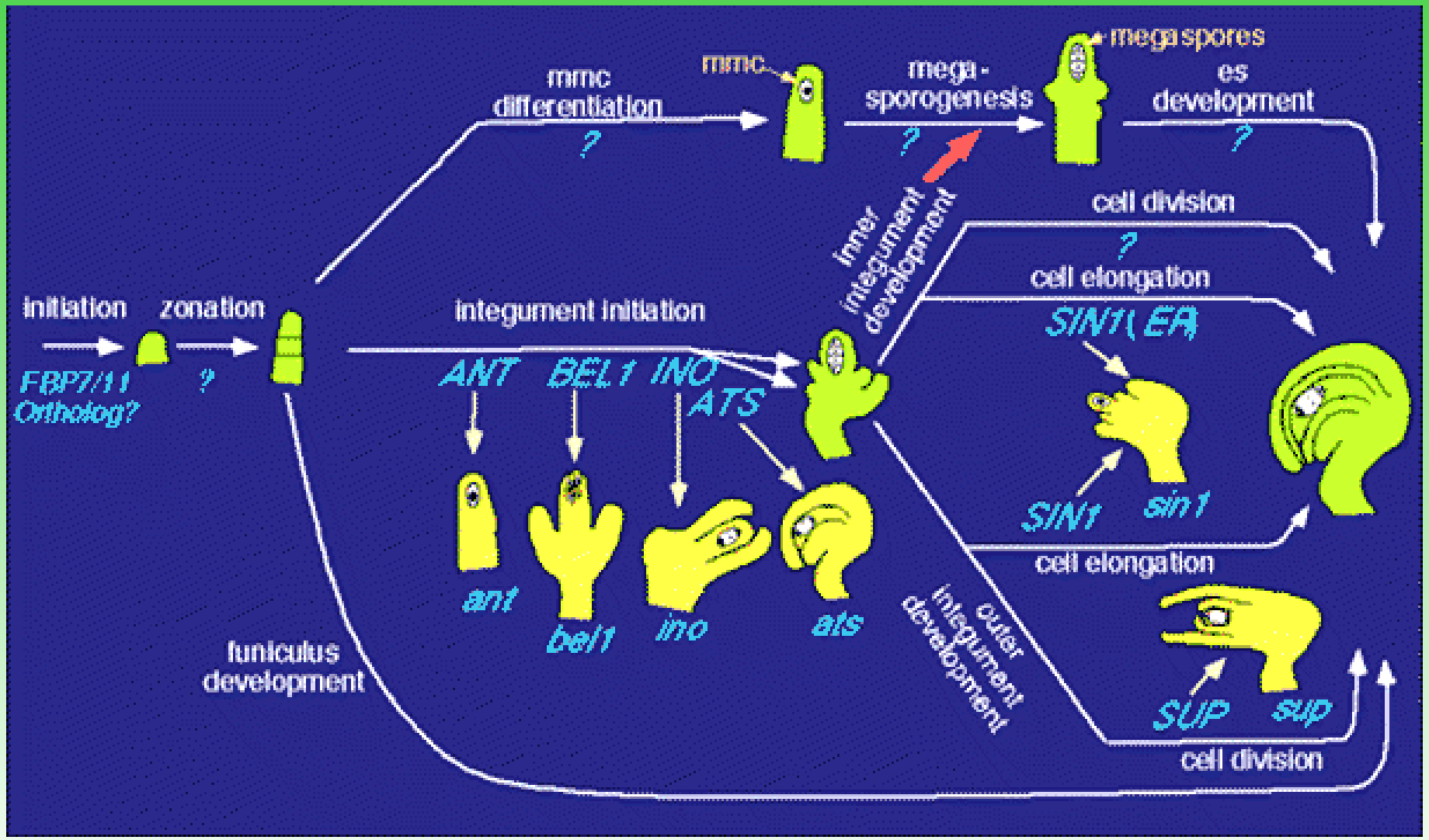


Grossnilaus a Schneitz 1998

Hejátko et al. 2003

vývojová stádia

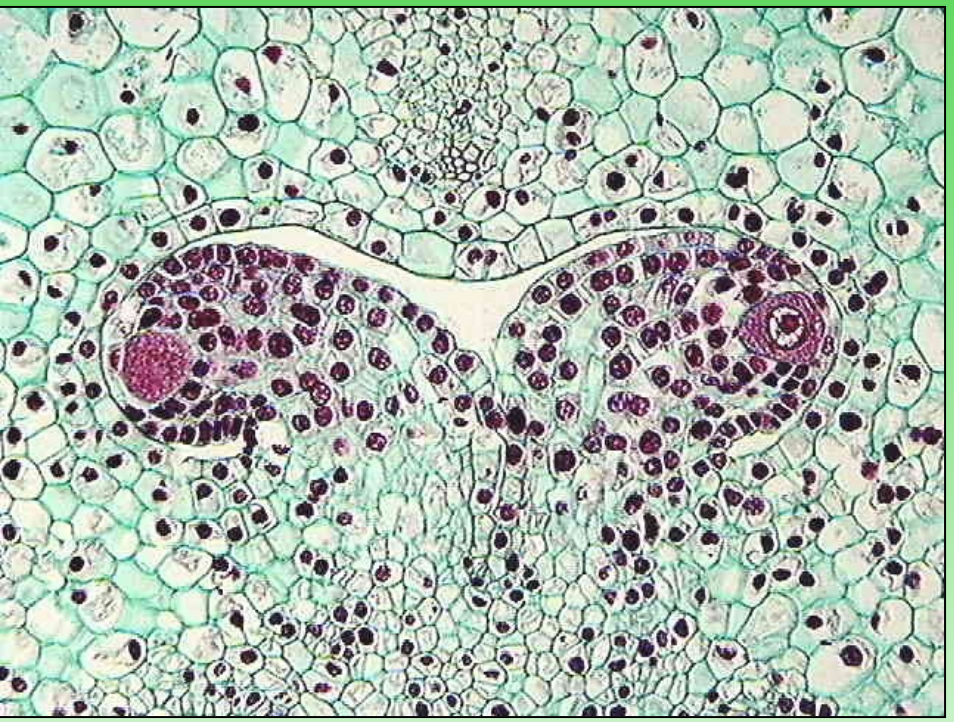
Regulace vývoje vajíčka *Arabidopsis*

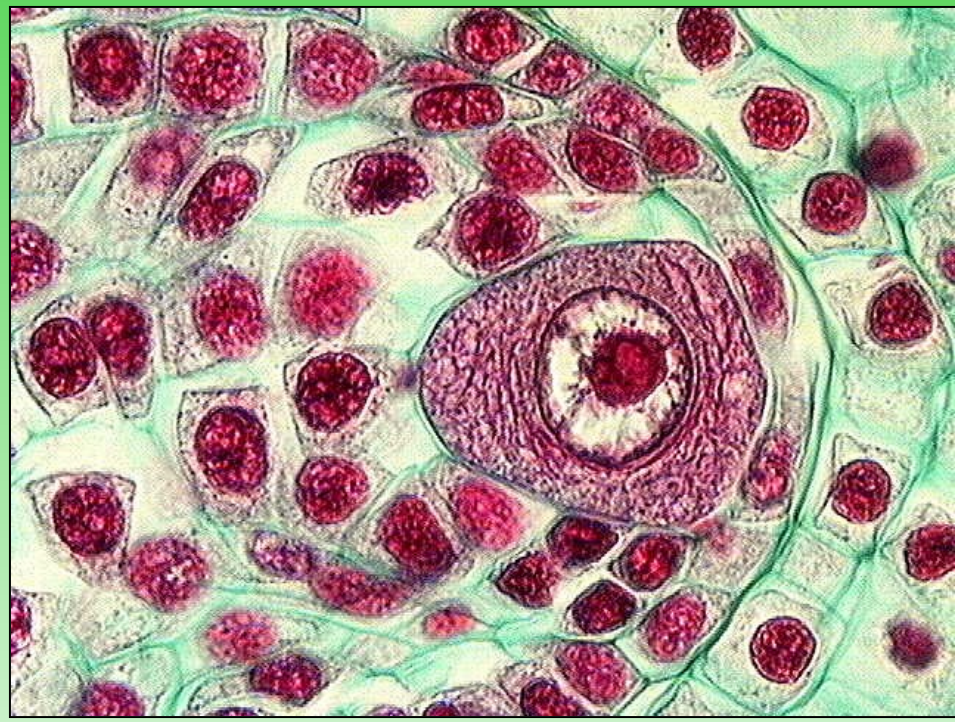


Megasporogeneze ve vajíčku lilie

http://images.iasprr.org/lily/female.shtml

Ranná profáze I v megasporocytu

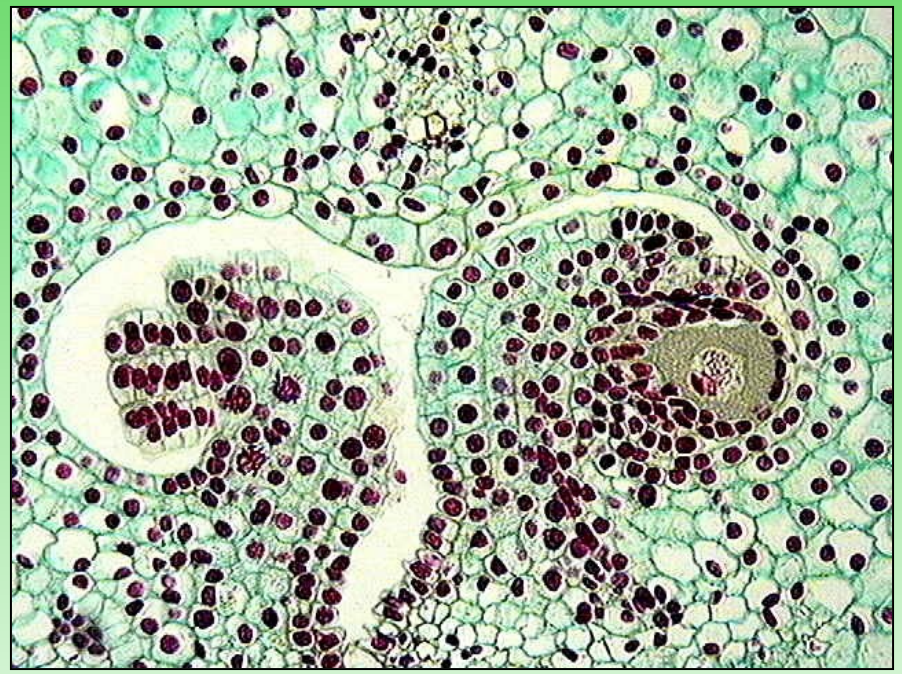




The parallel stripes in the cytoplasm are layers of endoplasmic reticulum. Initially, the nucleolus is prominent and centrally located.

IASPR

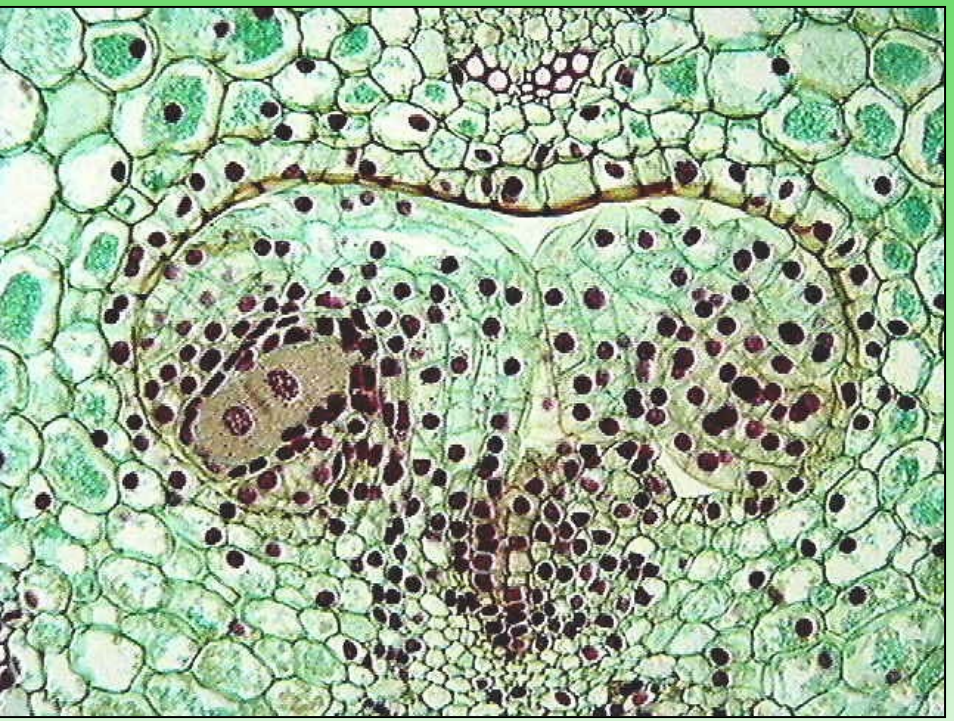
Mid prophase I in the megasporocyte.



The nucleolus, tightly appressed to the nuclear envelope of the megasporocyte, forms a nucleolar cap. Chromosomes are paired at this stage (near pachytene) during crossing-over.

IASPRR

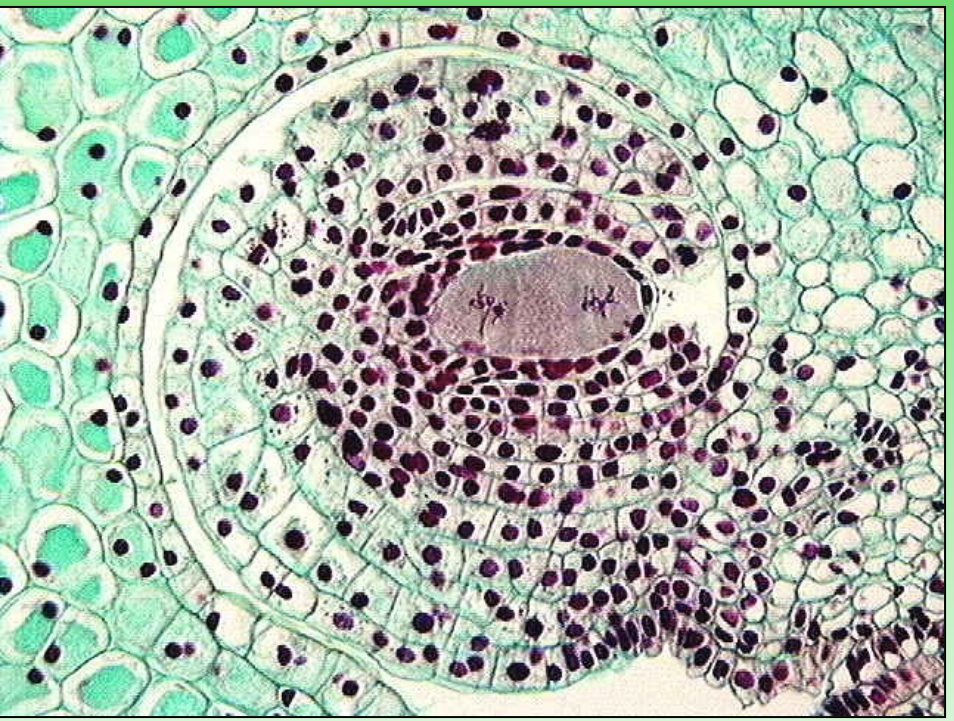
Telophase I in the megasporocyte.



The nuclear envelopes frequently reform in monocots. The phragmoplast located between the dyad nuclei will disperse without forming a cell wall.

IASPRR

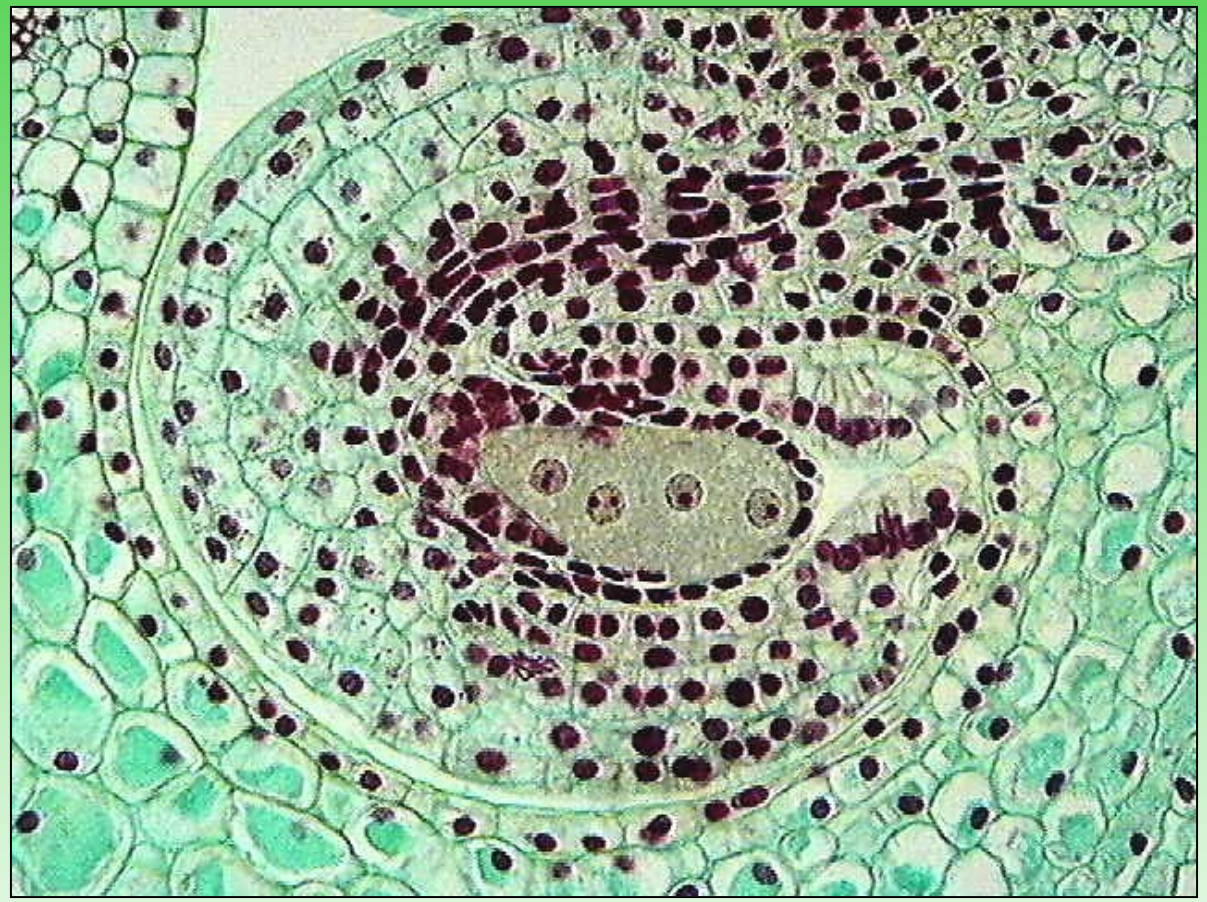
Dyad nuclei dividing: Metaphase II.



The two dyad nuclei form a transverse spindle during the second half of meiosis.

IASPRR

Linear tetrad of megaspores

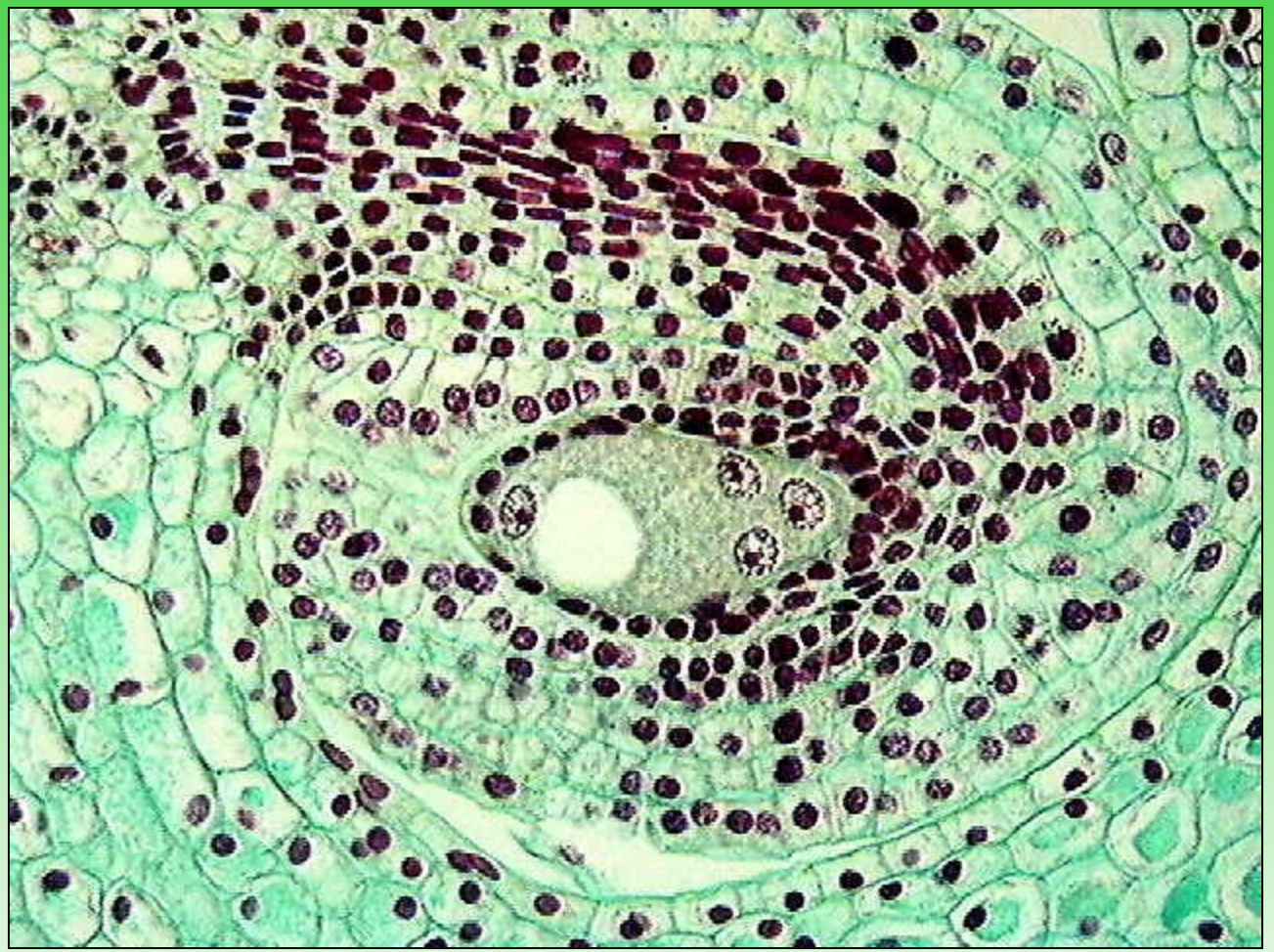


IASPRR

At the conclusion of meiosis, there are four equal megaspore nuclei formed in lily. Since all four megaspore nuclei persist and contribute to the forming embryo sac, this is *tetrasporic*

Megagametogeneze u lilie

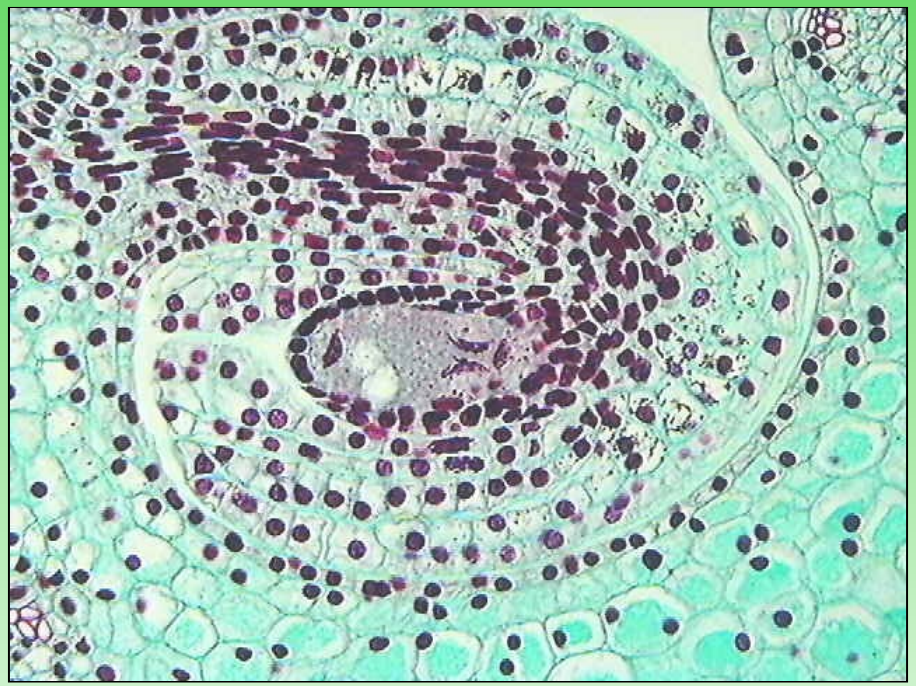
Migration of megaspore nuclei



IASPRR

Soon after their formation, three of the megaspore nuclei migrate to the chalazal end, while one remains in the micropylar end. As this occurs, a central vacuole enlarges

Preparation for the first mitotic division



IASPRR

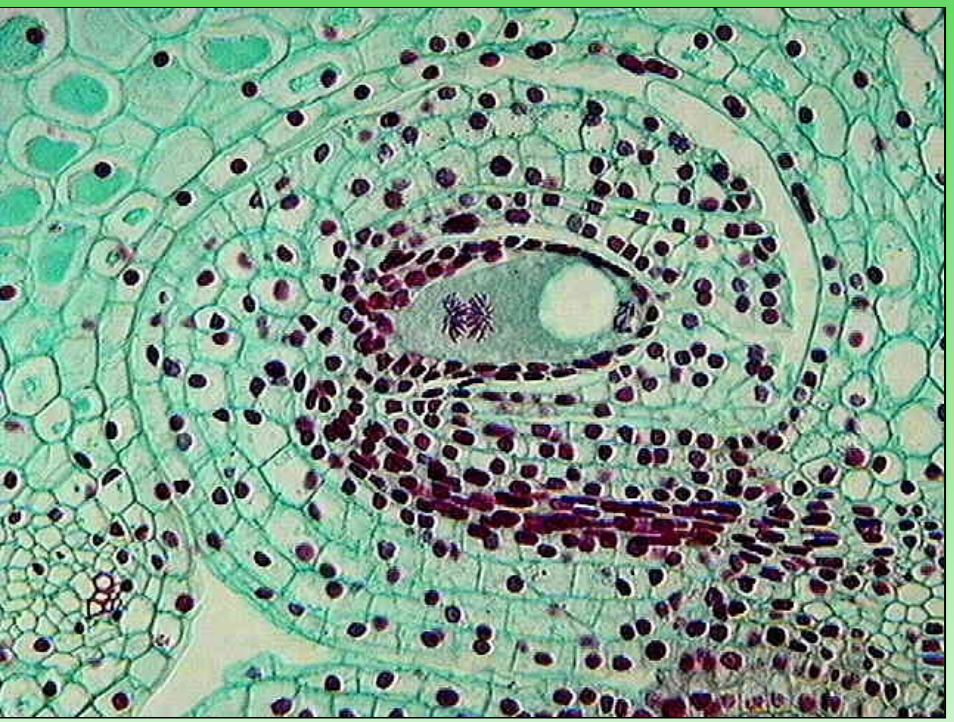
The micropylar and chalazal chromosomes condense prior to *mitotic* division. The micropylar end of the embryo sac will contain two 1N nuclei

Preparation for the first mitotic division

IASPRR

The chalazal cluster becomes part of a common mitotic spindle and will reconstitute two 3N nuclei after the completion of mitosis

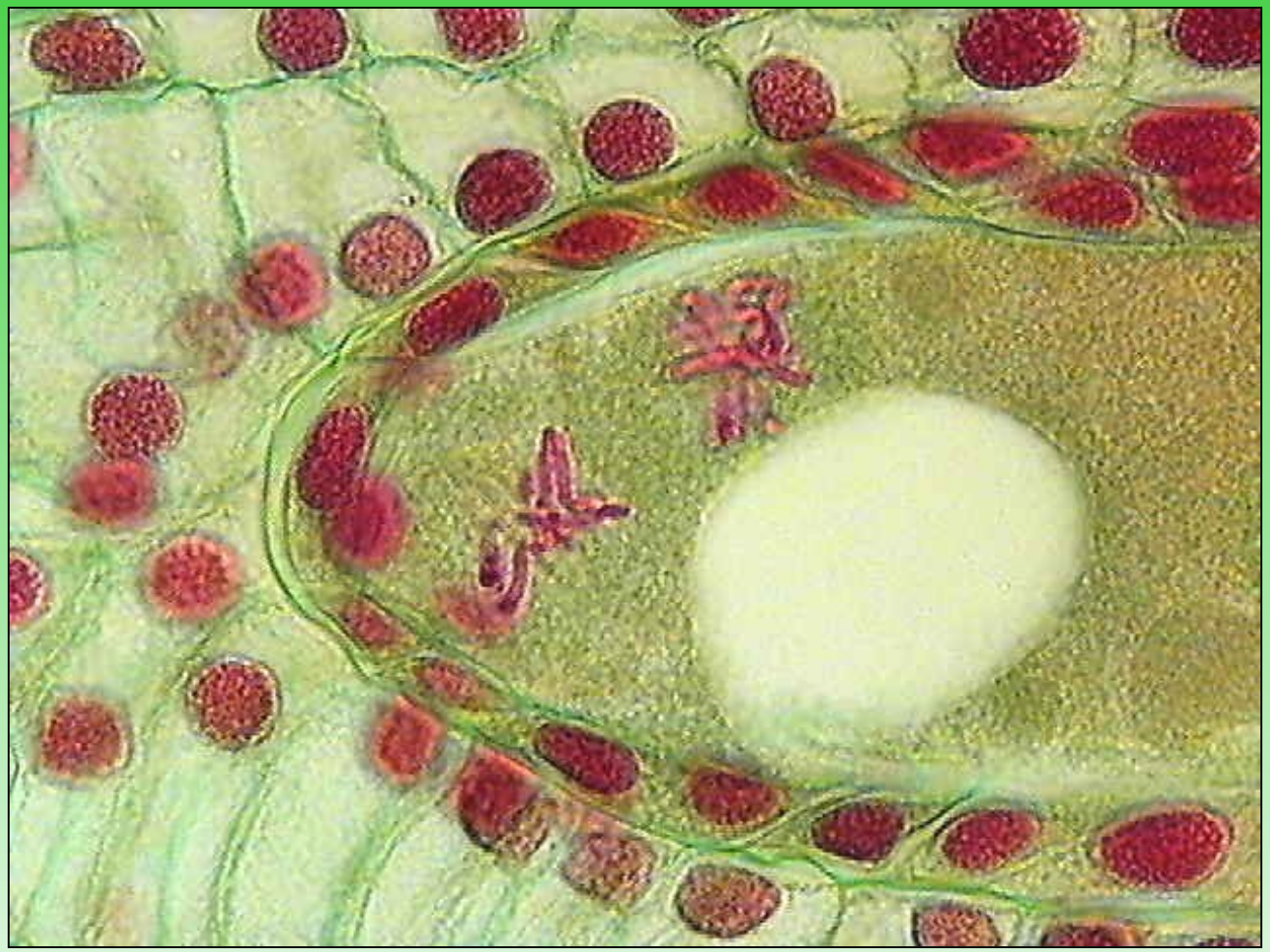
Anaphase during the first mitosis



IASPRR

Ultimately, the mitotic assemble in the embryo sac form traditional spindles. The chromosomes in the chalazal end outnumber the micropylar ones by a 3:1 ratio

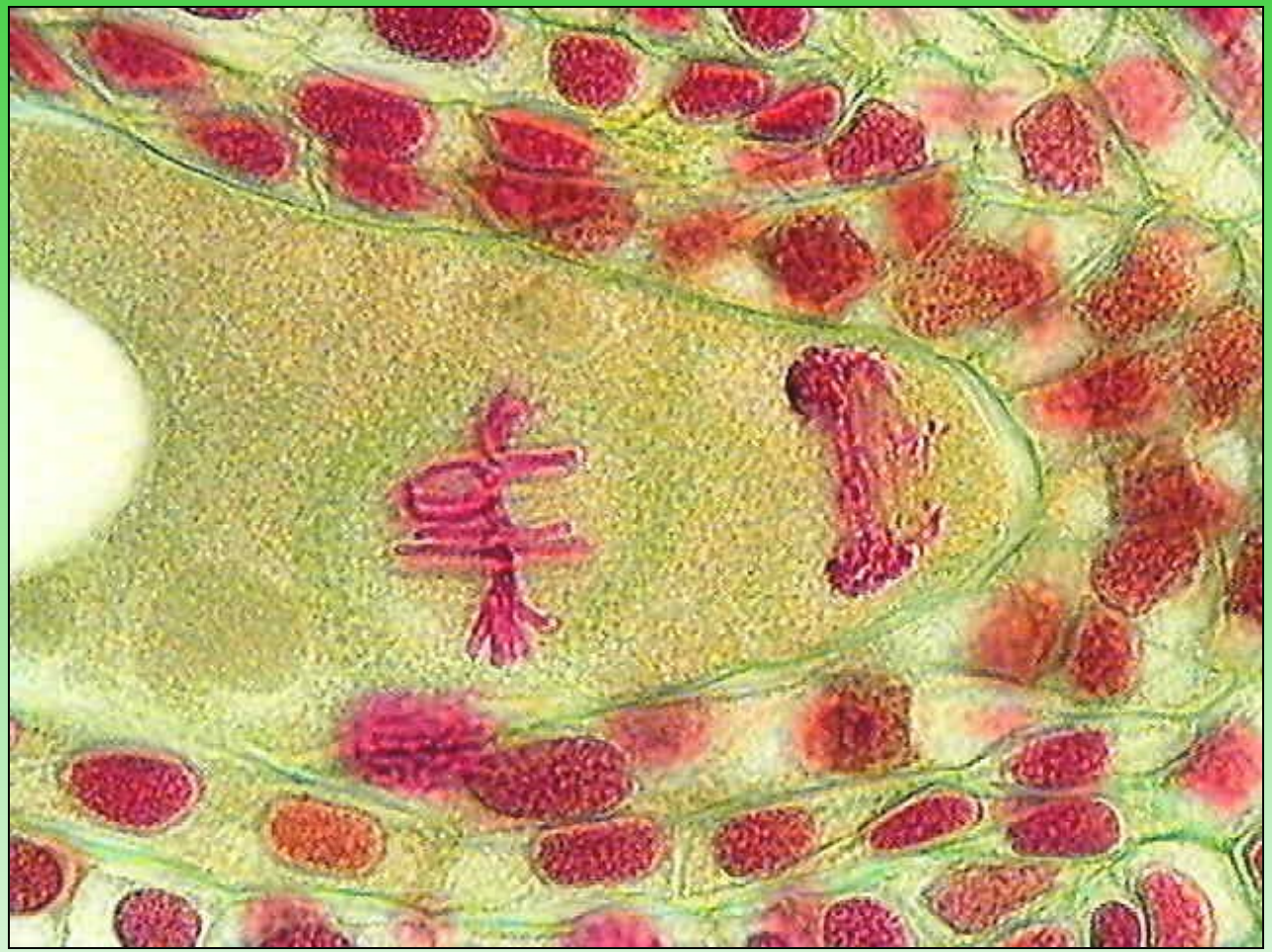
Metaphase during second mitosis.



IASPRR

The micropylar nuclei develop spindles with perpendicular nuclei. The micropylar spindle is located transversely and will form the two synergids, while the more chalazal spindle of the two is at right angles and will form the egg and a polar nucleus

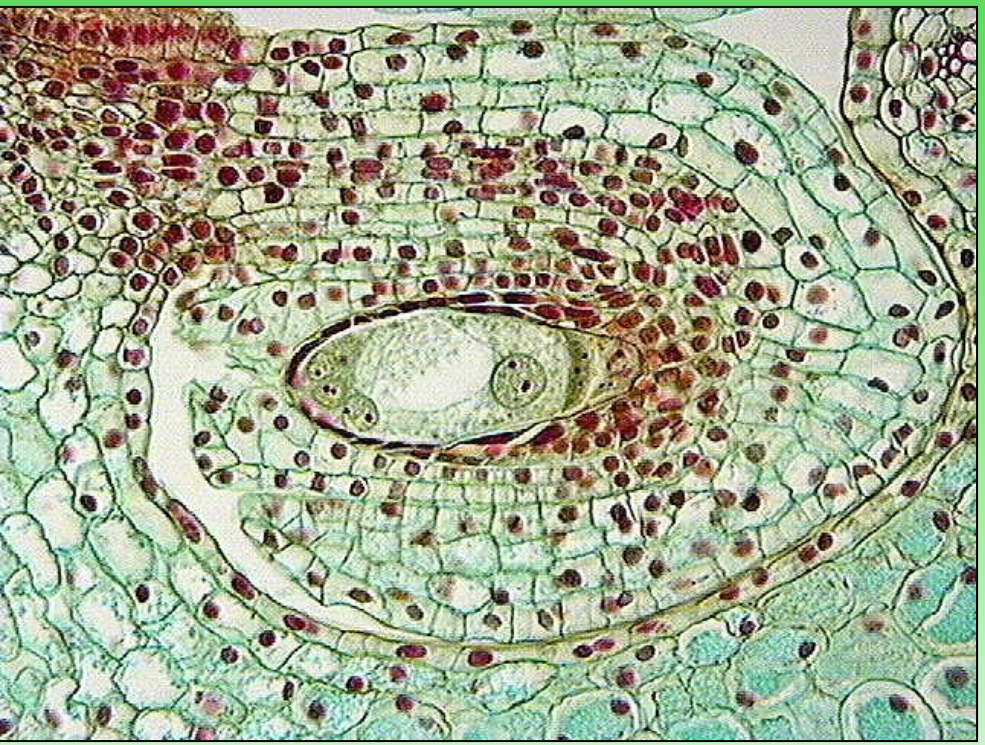
Metaphase during second mitosis.

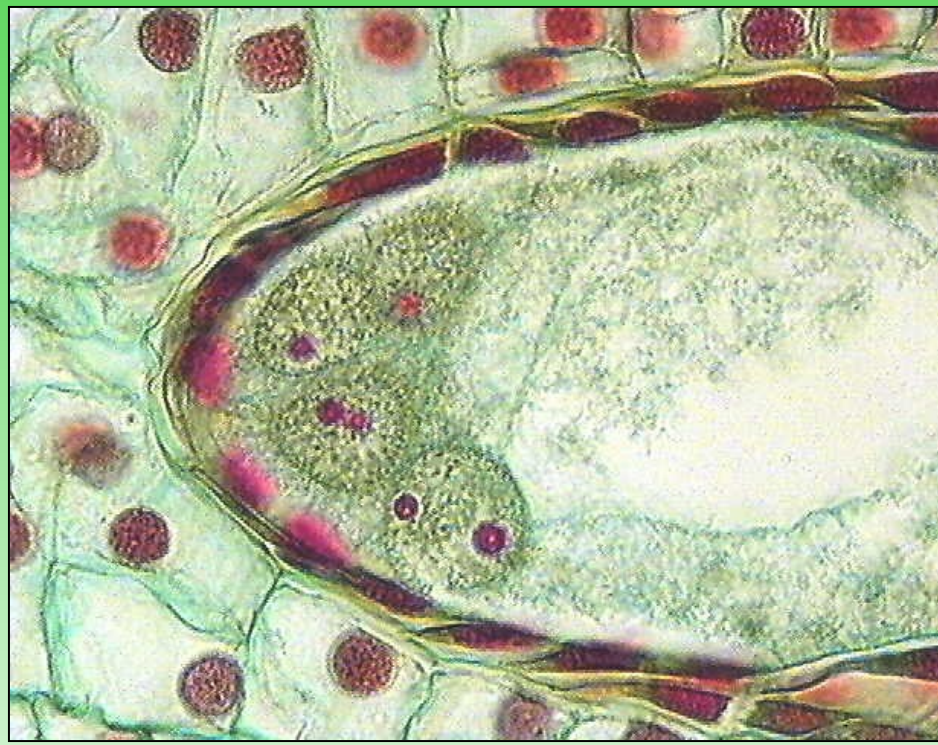


IASPRR

Among the chalazal products of mitosis, the spindles are also oriented perpendicular to one another. The chalazal of the two spindles is poorly formed, whereas the more central of the two spindles will form a polar nucleus and one antipodal

Maturing megagametophyte





IASPRR

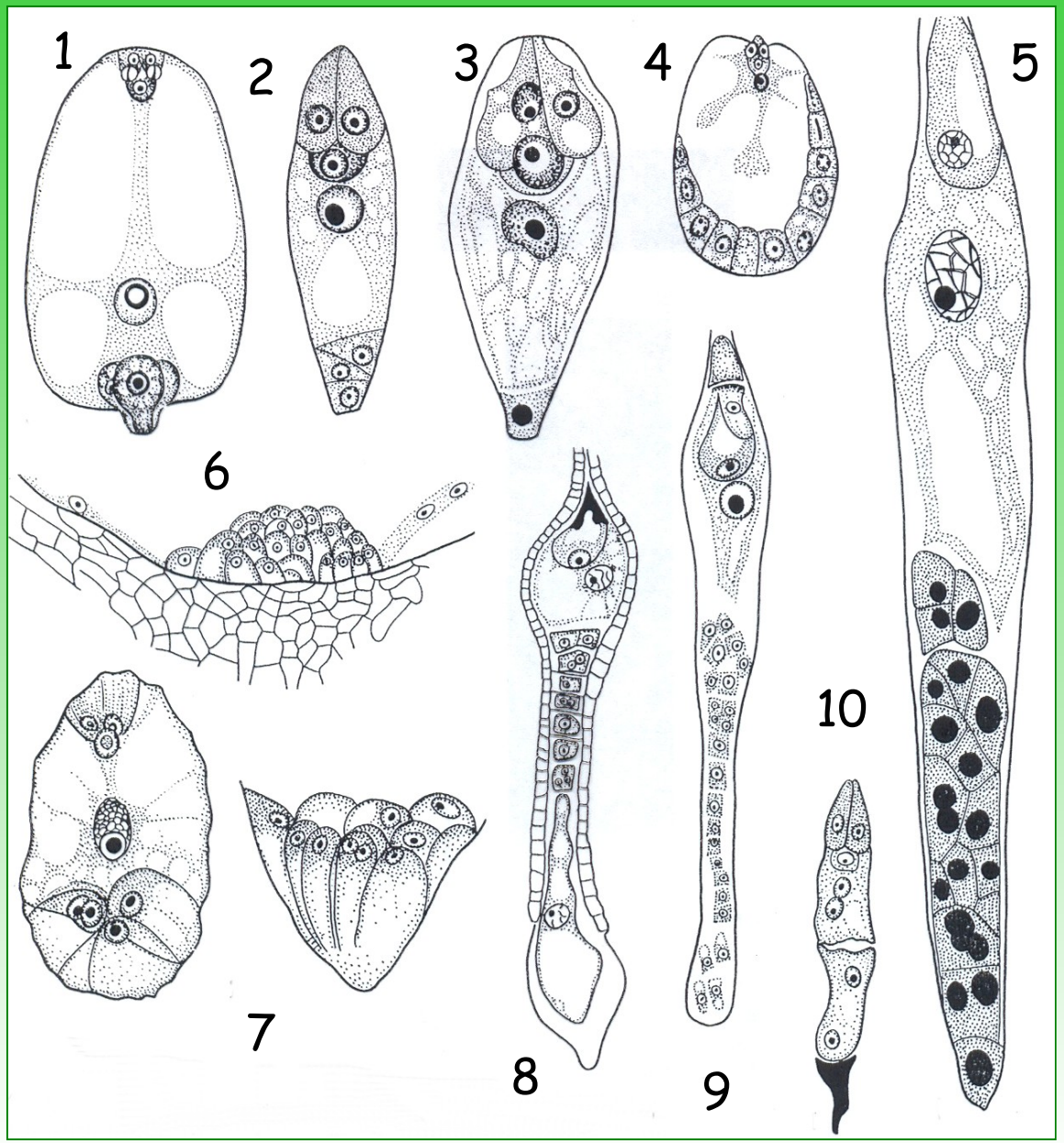
The four micropylar nuclei are all haploid (1N) nuclei that will form the egg, two synergids and one of the two polar nuclei

Maturing megagametophyte

IASPRR

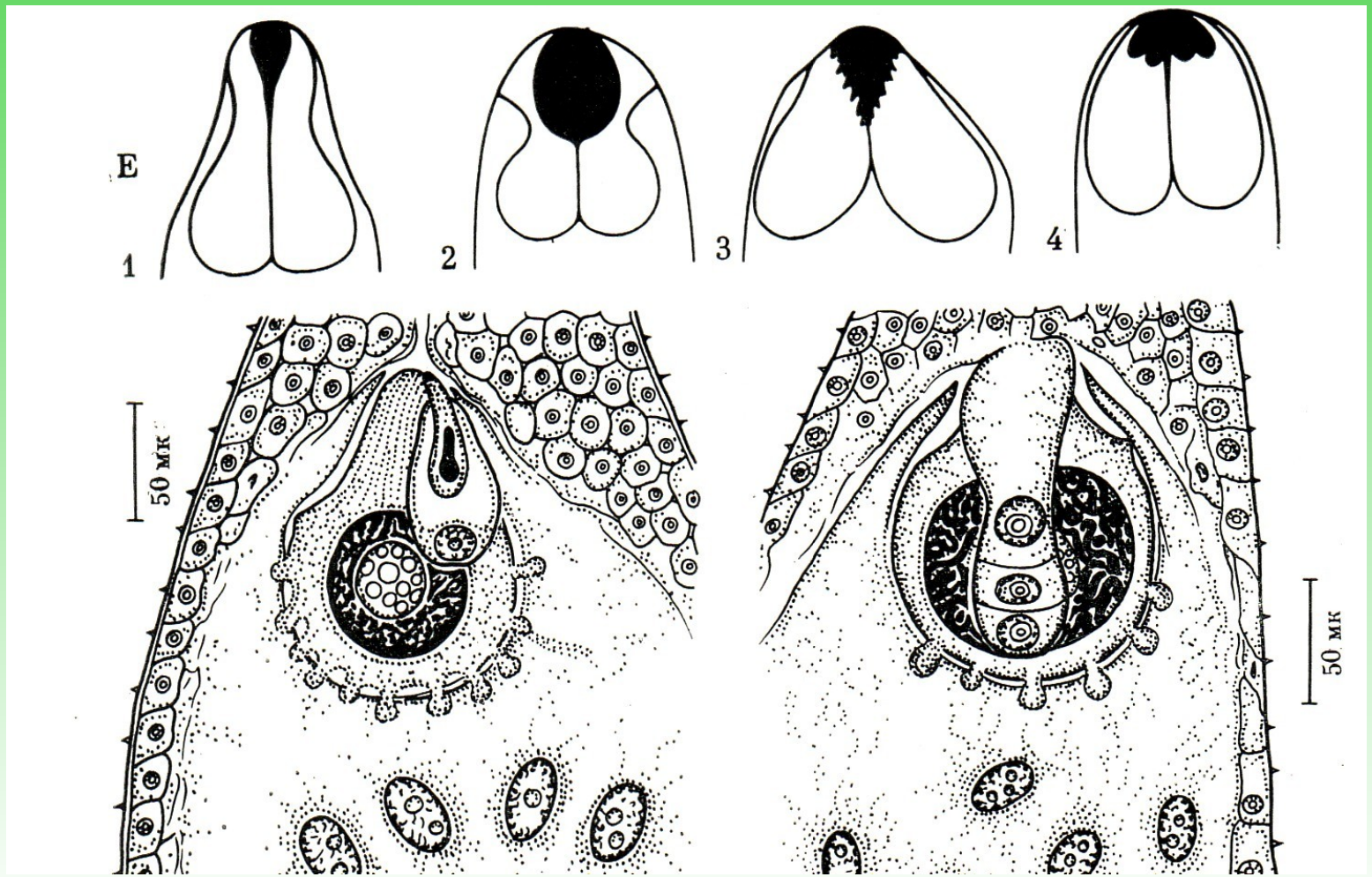
The large chalazal nucleus is the 3N polar nucleus. The adjacent cell is a 3N antipodal cell. Chalazal to this is another antipodal cell. Since the two chalazal nuclei never complete mitosis, only one cell (potentially 6N) is formed instead of two

Variabilita utváření antipod

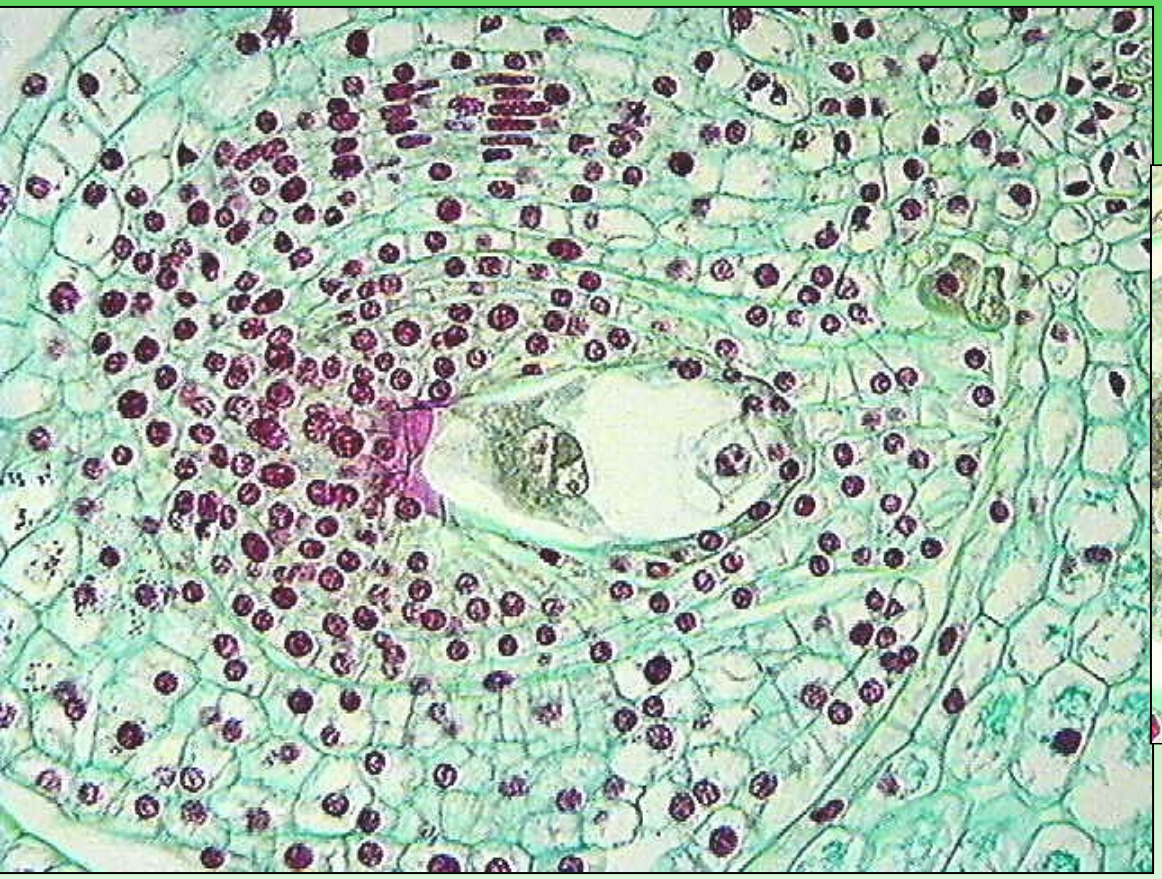


1 *Delphinium*
2 *Sedum*
3 *Butomopsis*
4 *Gentiana*
5 *Ligularia*
6 *Spargania*
7 *Trautweteria*
8 *Chrysocoma*
9 *Anthemis*
10 *Bidens*

Synergidy a filiformní aparát



Double fertilization



IASPRR

The micropylar end of the embryo sac (to the right) contains a dense male nucleus and a less dense female nucleus, which will fuse to form the zygote

Chalazální konec zárodečného vaku

IASPRR

The chalazal end of the embryo sac contains the fusing polar nuclei, which are less dense, with the darker male nucleus. This product of *triple fusion* forms a 5N endosperm (1N + 1N + 3N).

Triple fusion

IASPRR

The nucleus to the left is the 3N (formerly chalazal) polar nucleus. In the center is the male (sperm) nucleus. On the right side is the 1N (formerly micropylar) polar nucleus