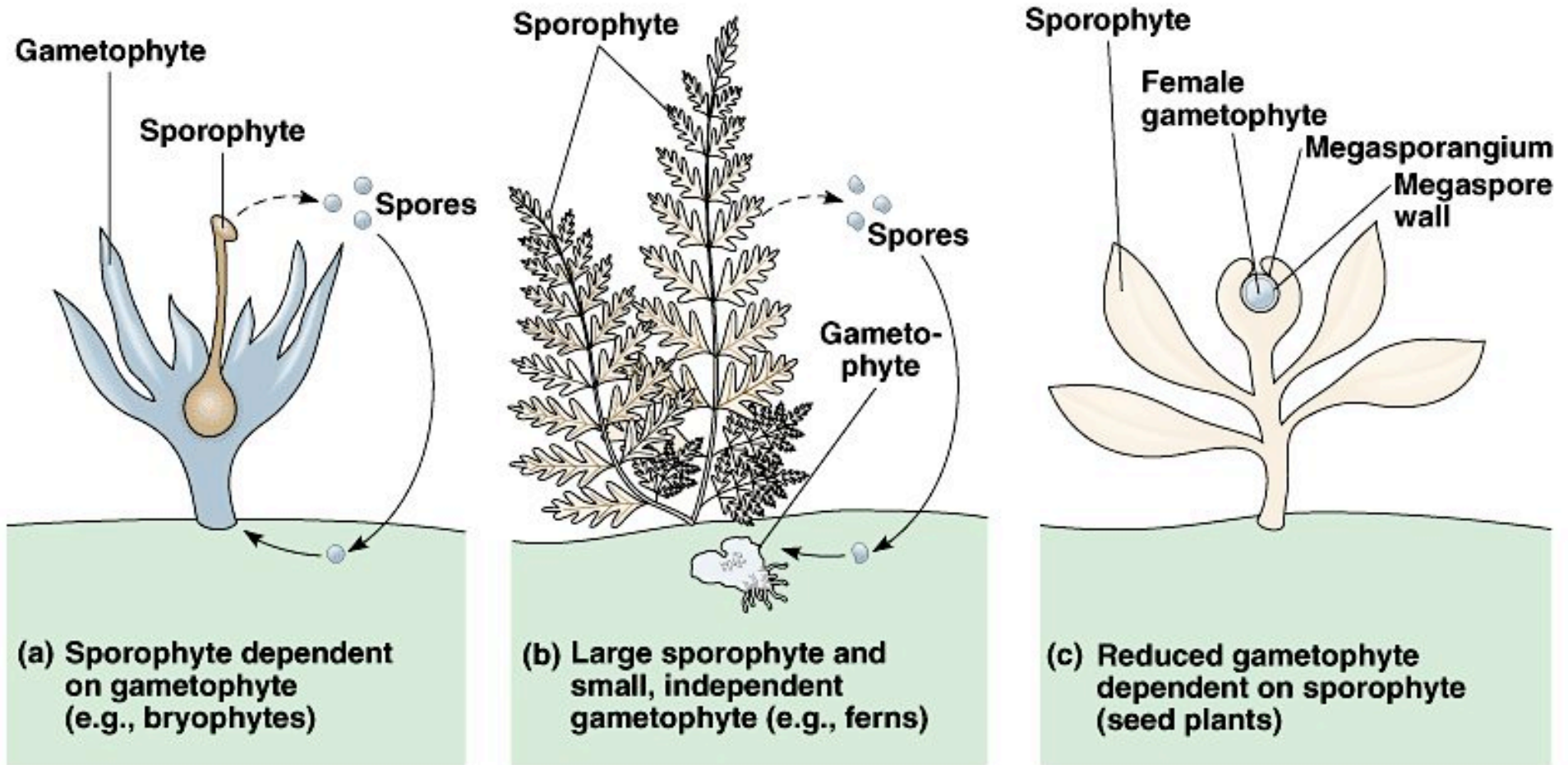


Haploid  
 Diploid

## 2 Gametophyte/sporophyte relationships

■ Gametophyte ( $n$ )  
■ Sporophyte ( $2n$ )



PHYLUM CYCADOPHYTA



*Cycas revoluta*

PHYLUM GINKGOPHYTA

*Ginkgo biloba*



PHYLUM GNETOPHYTA

*Welwitschia*



Ovulate cones



*Gnetum*

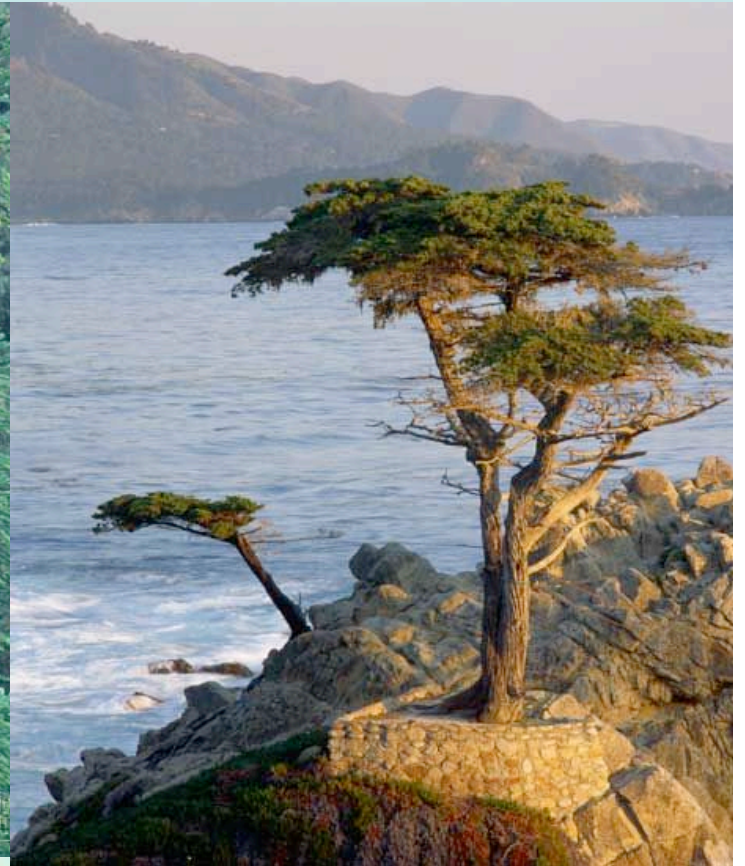


*Ephedra*





# 4 Phylum Coniferophyta





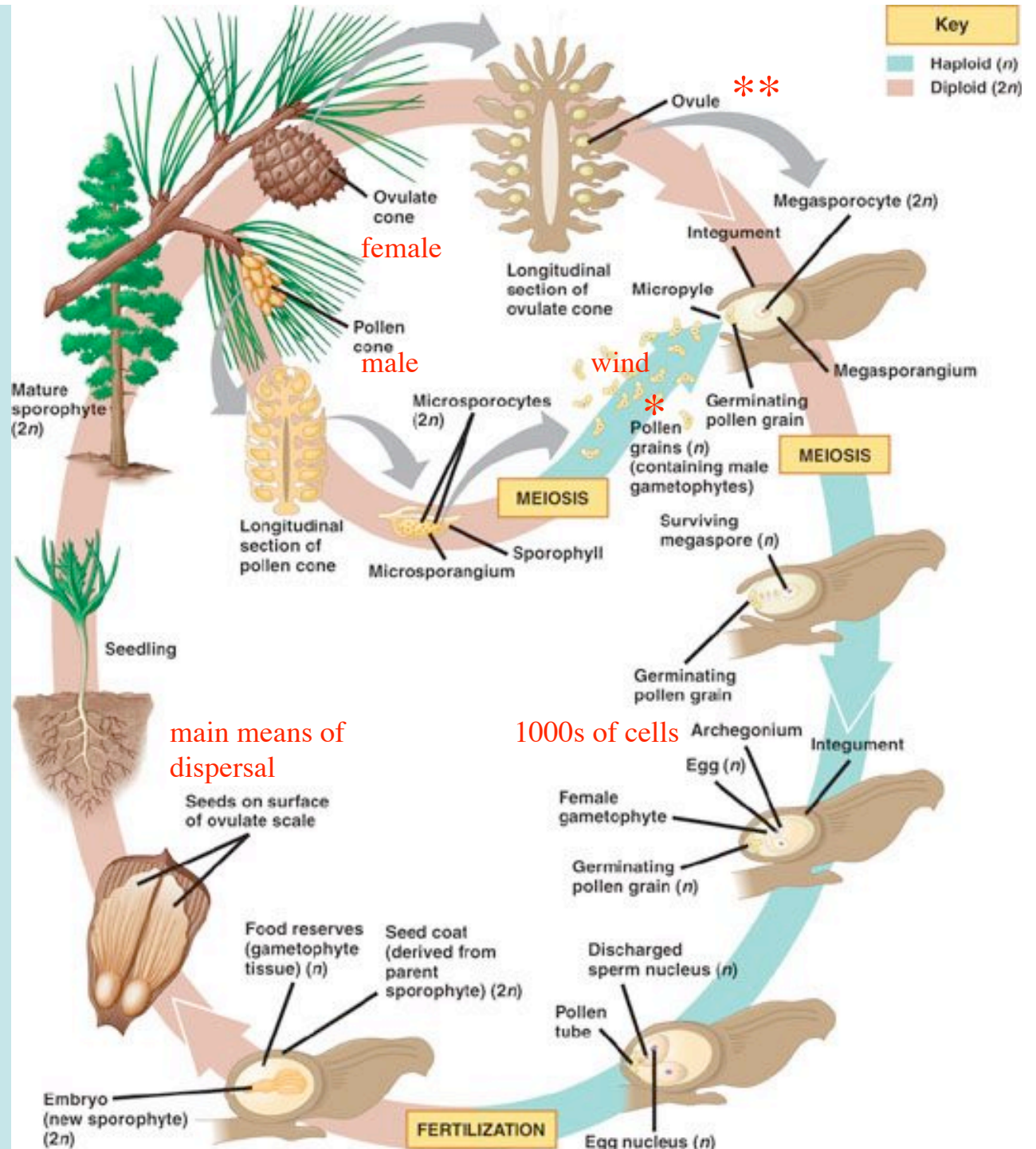
# Life cycle of a conifer

5

p. 579

\*pollen grain= male gametophyte  
 (4 cells)  
 1 tube cell  
 1 generative cell- 2 sperm nuclei  
 2 prothallial cells

\*\*ovule= integument,  
 megasporangium, megaspore



6

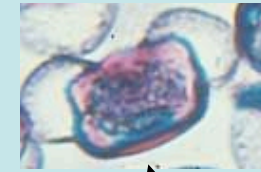
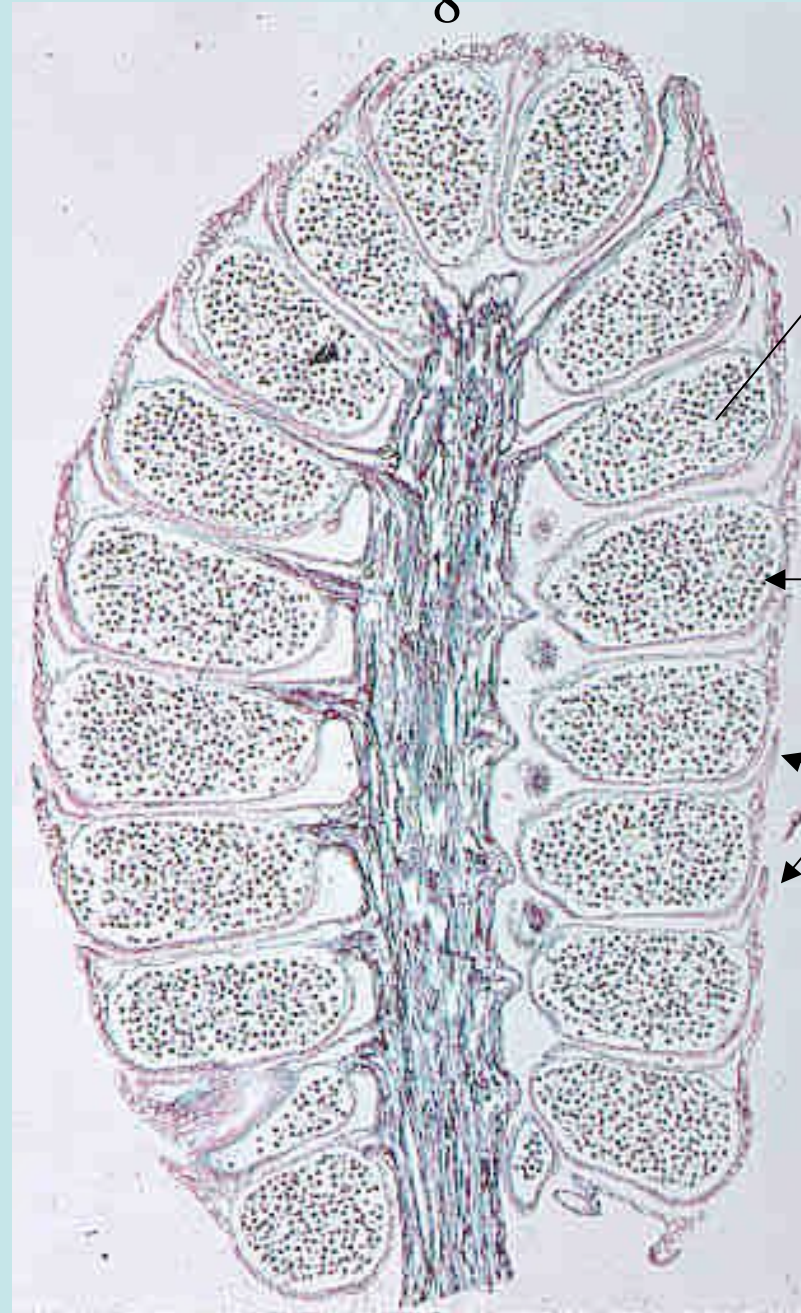


male cones (strobili) with sporophylls





8



pollen (male or microgametophyte)

microsporangium (pollen sac)

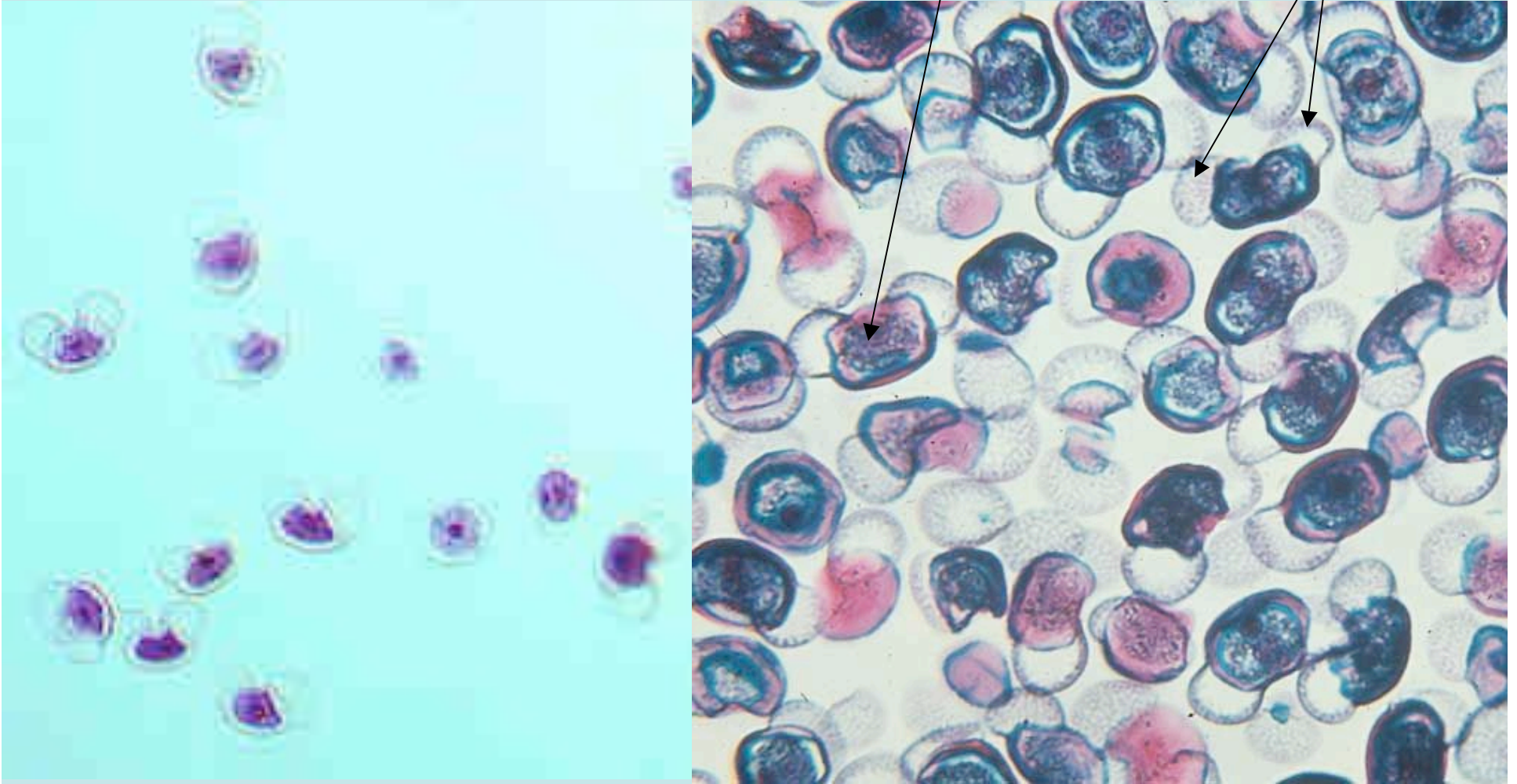
microsporophyll

male cone



9

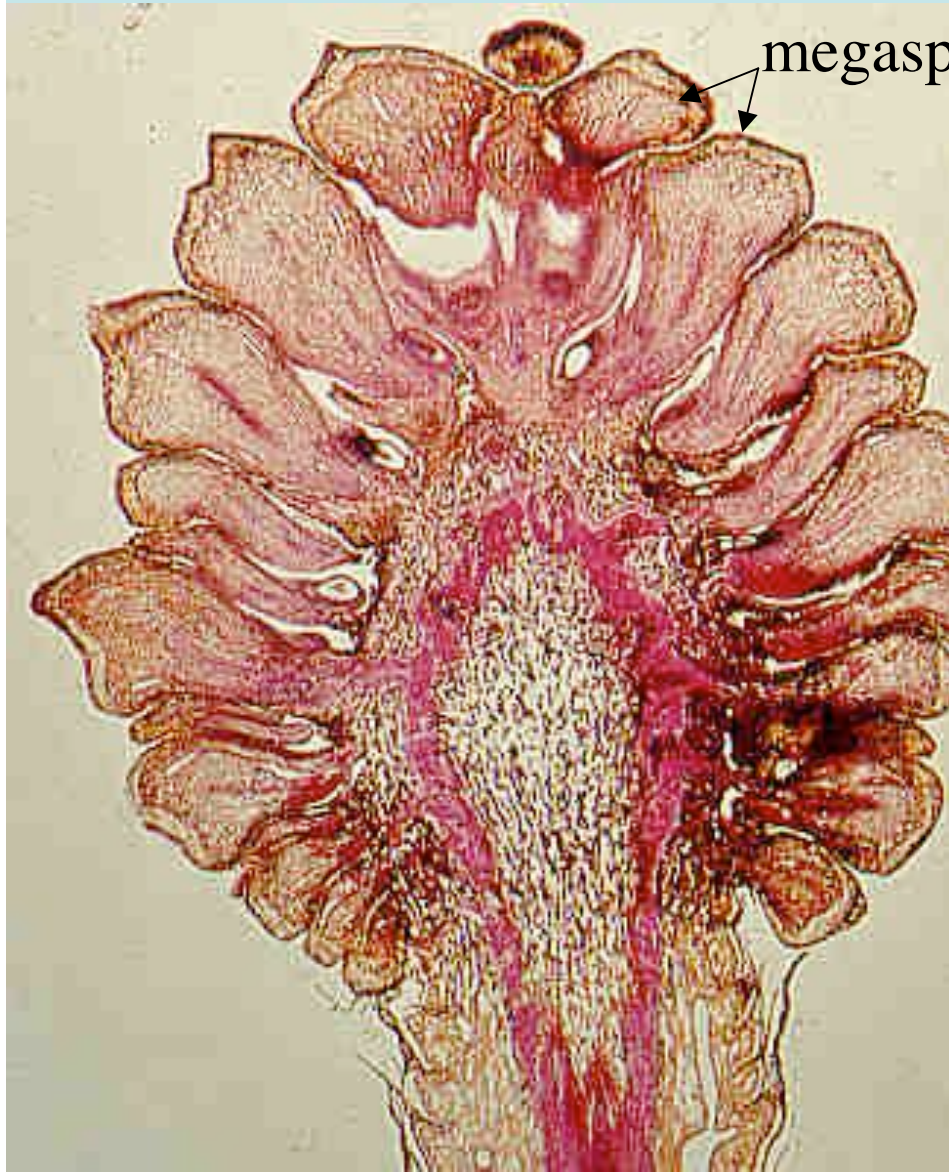
tube and generative cell wings



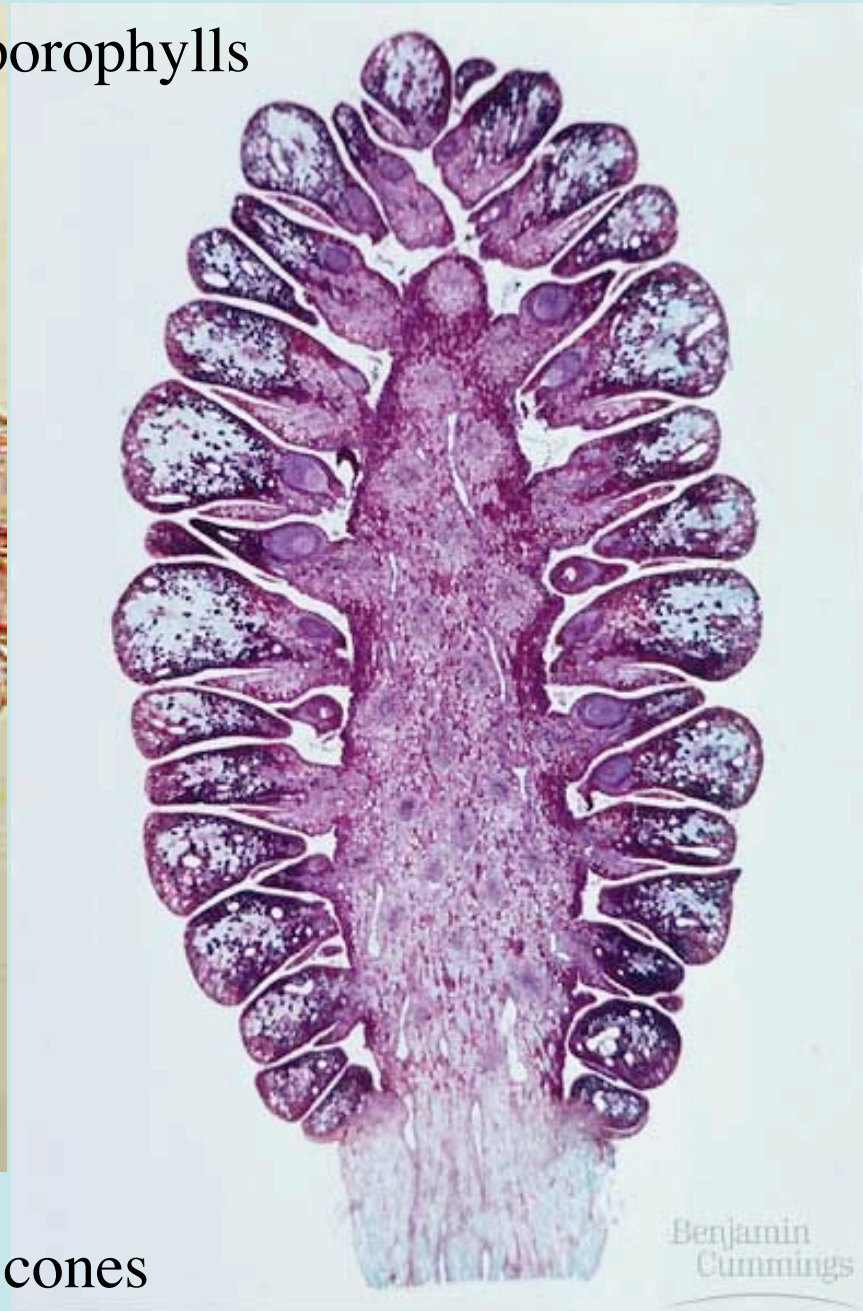
pollen grains (male gametophytes)







megasporophylls



female cones

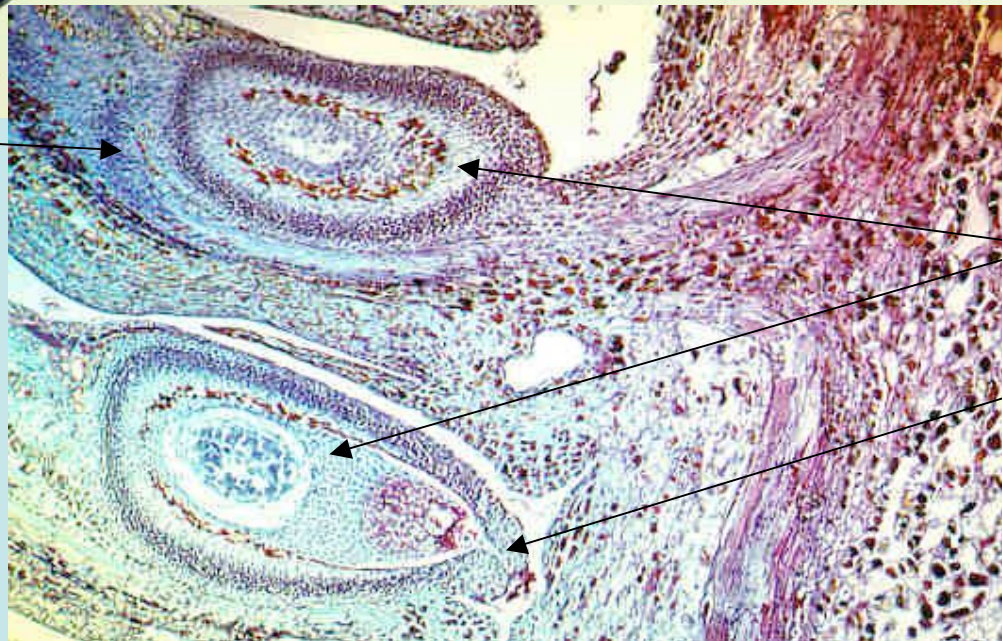
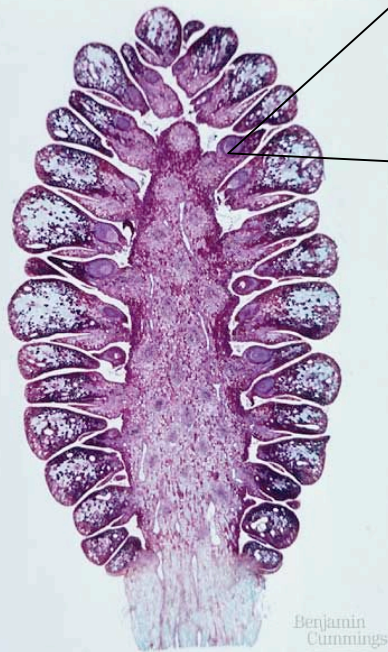
Benjamin  
Cummings



12

ovule (megasporangium)

sporophyll



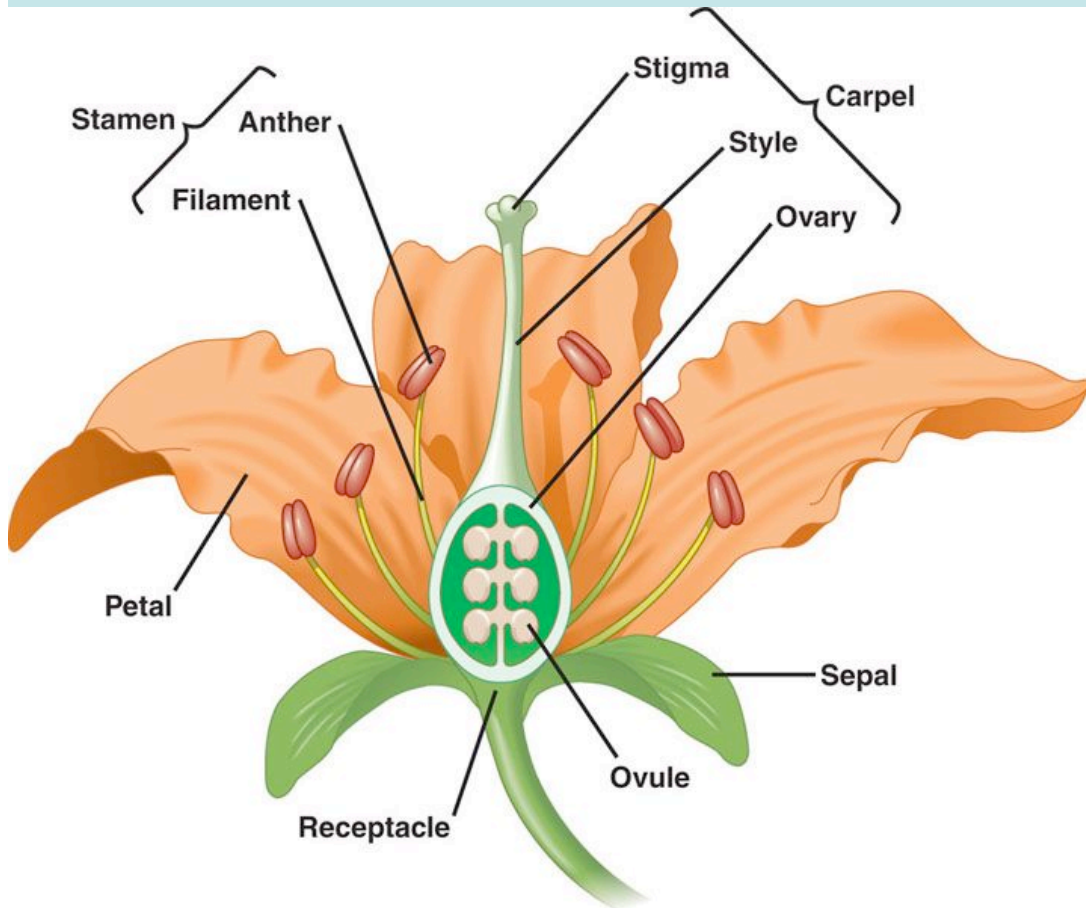
ovule

micropyle



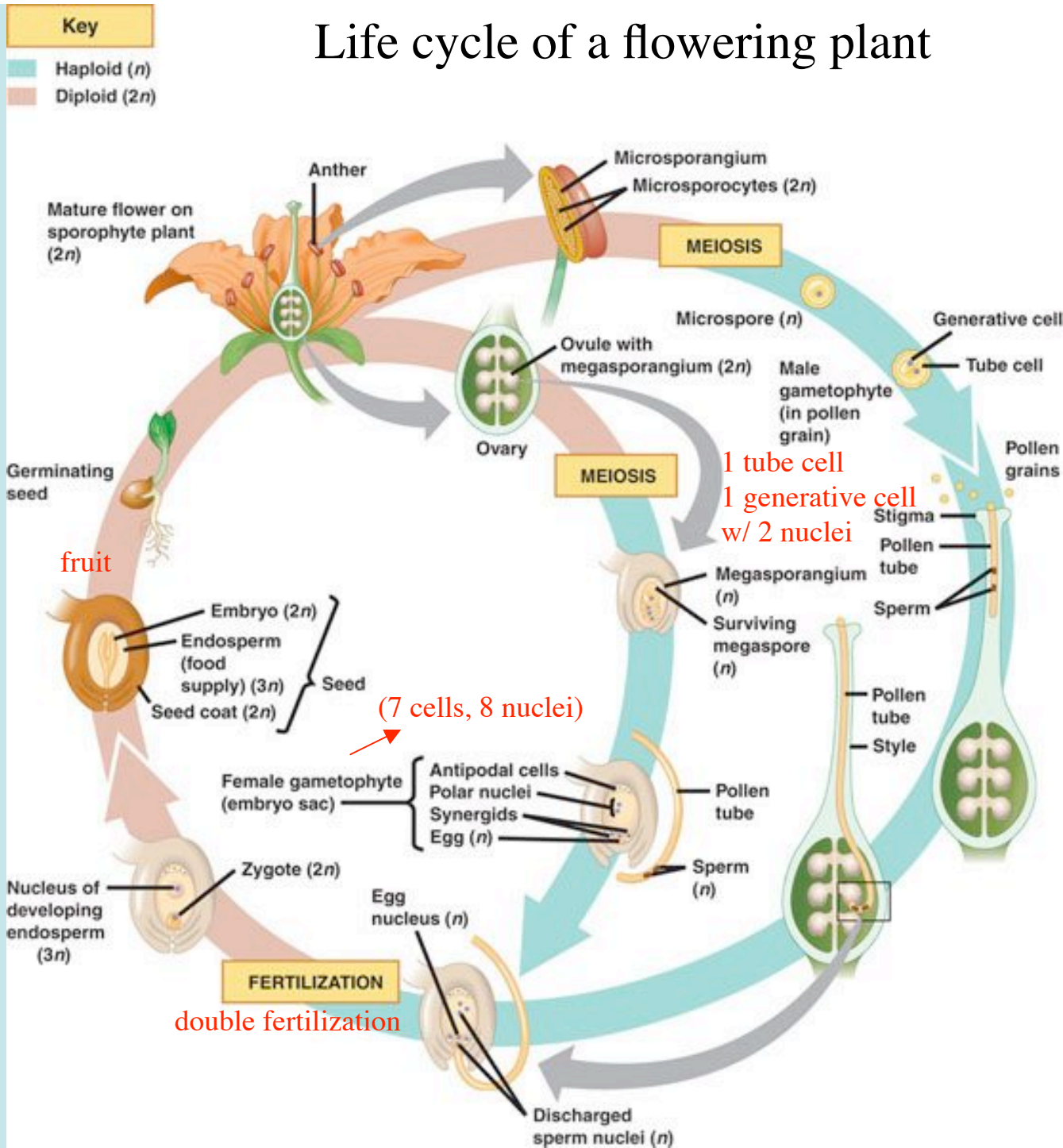
13



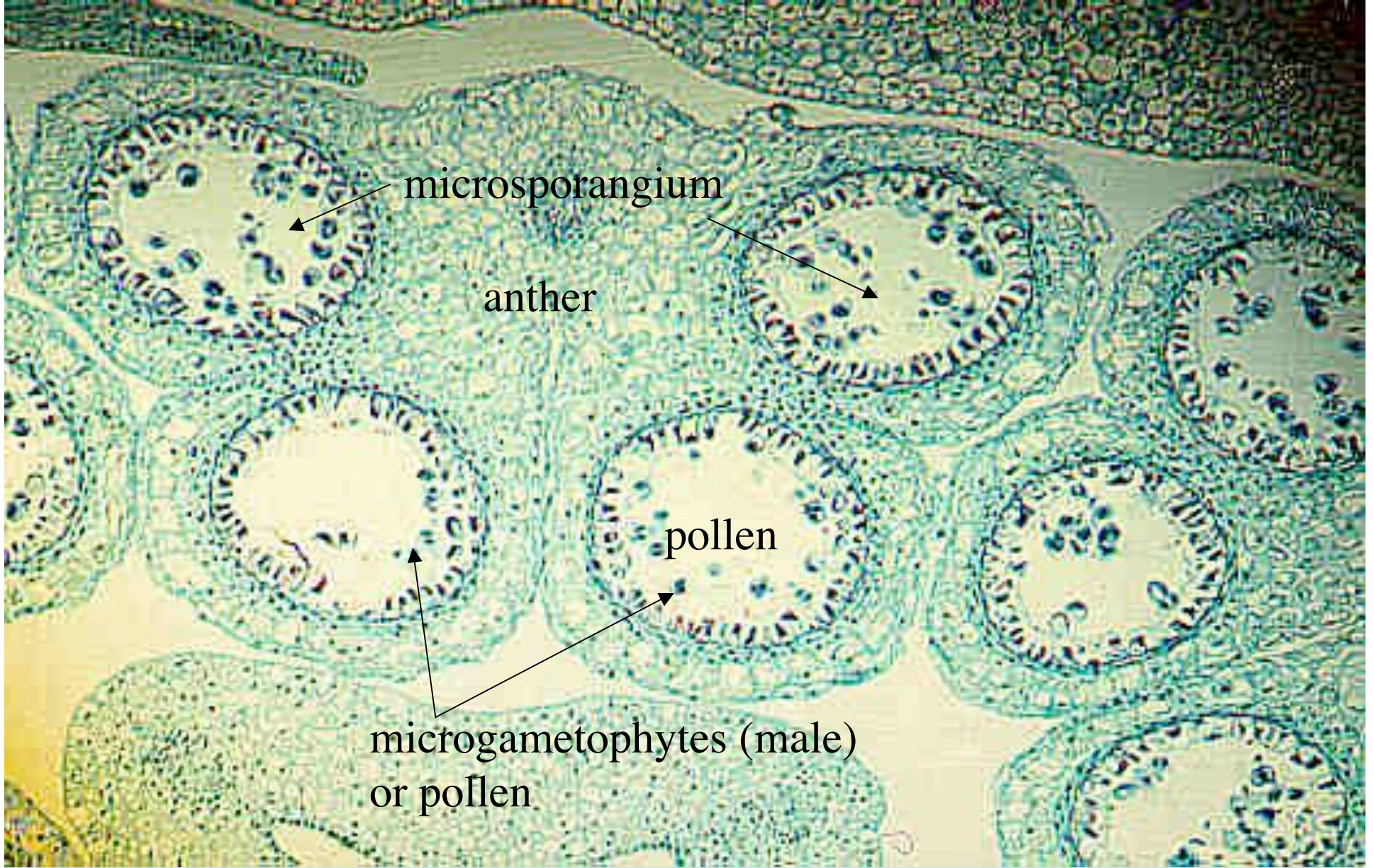




# Life cycle of a flowering plant







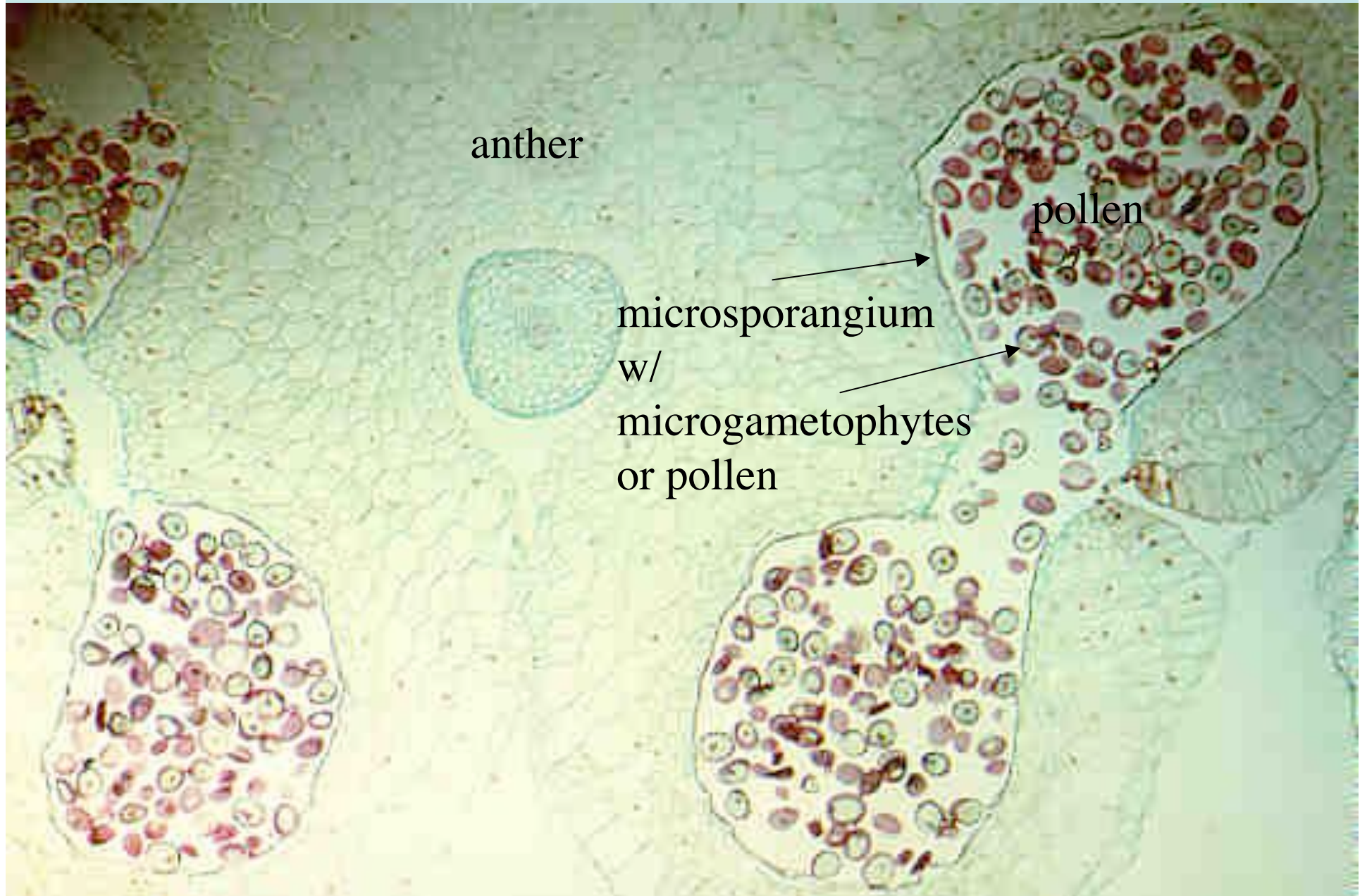
microsporangium

anther

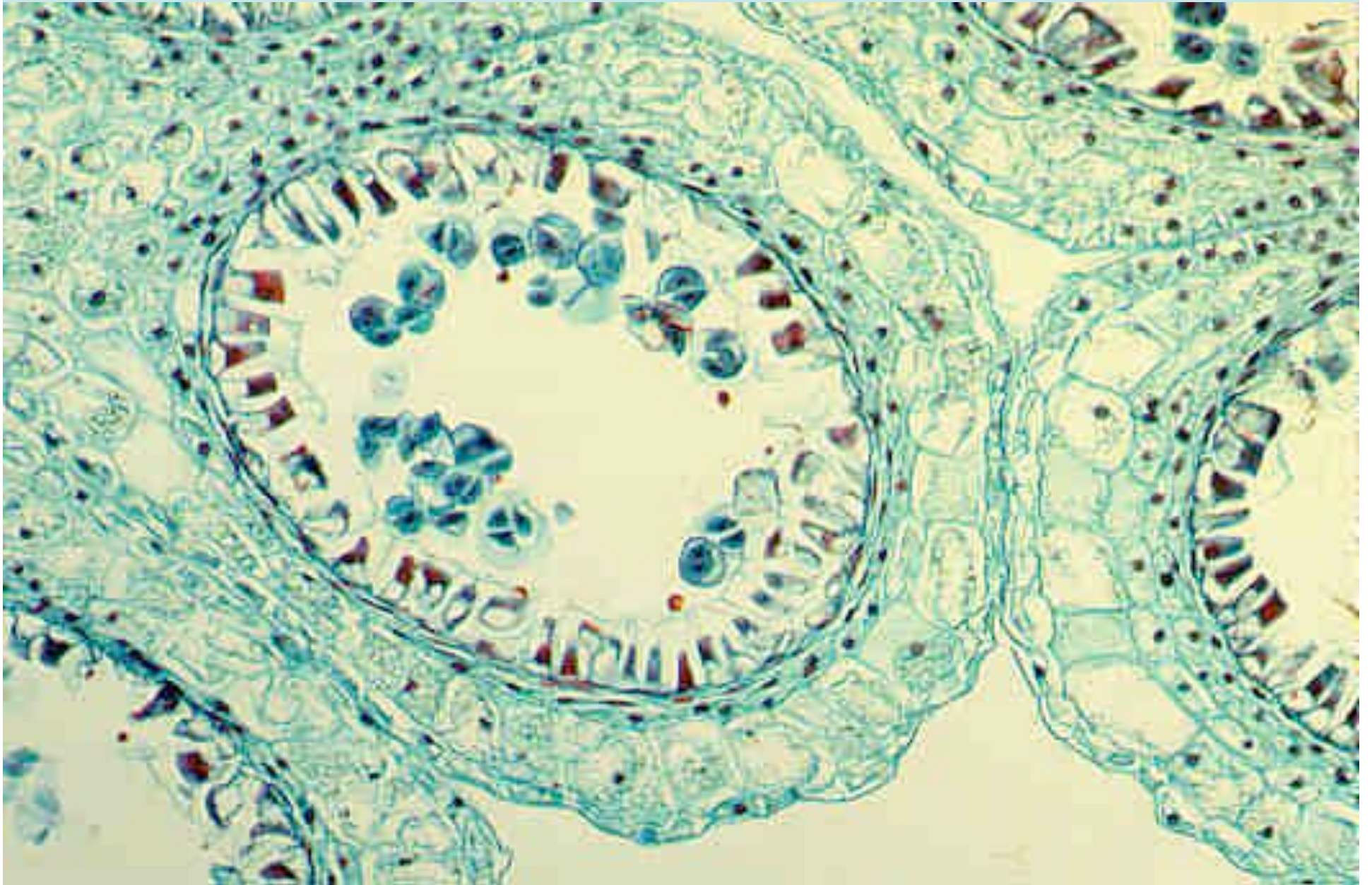
pollen

microgametophytes (male)  
or pollen





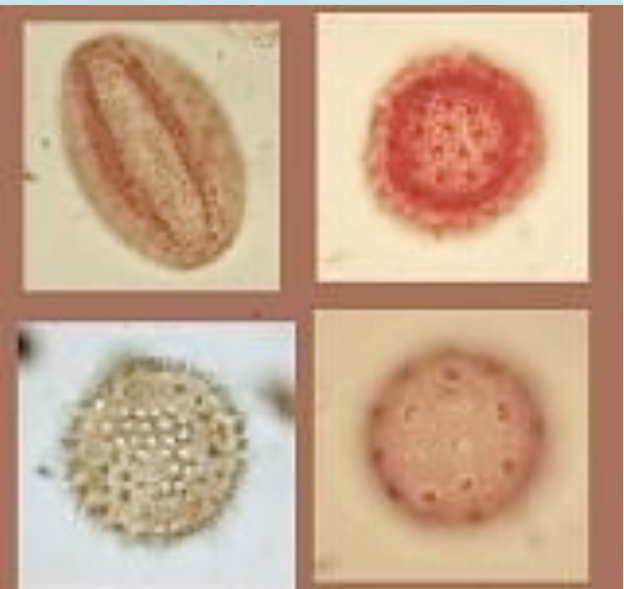
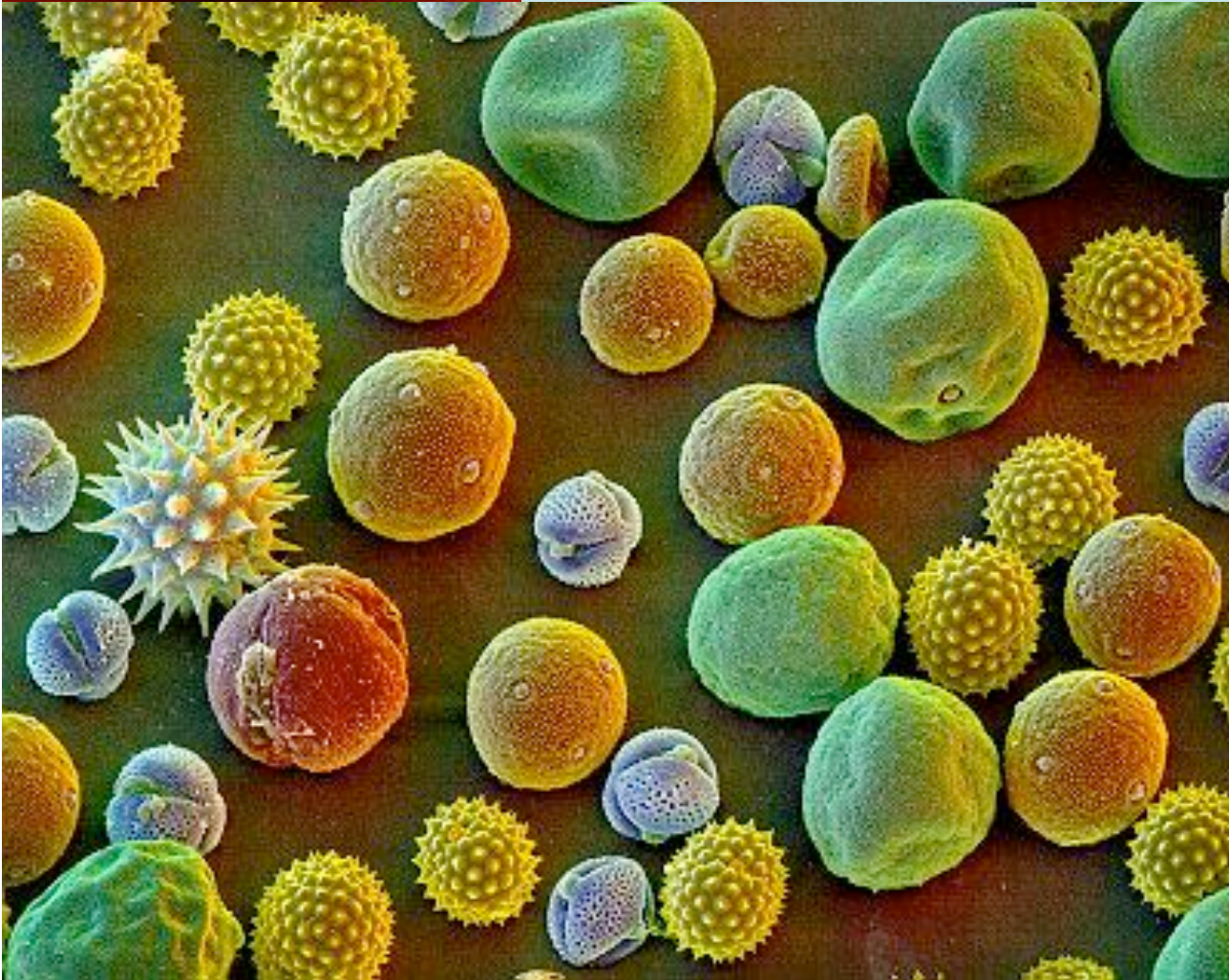
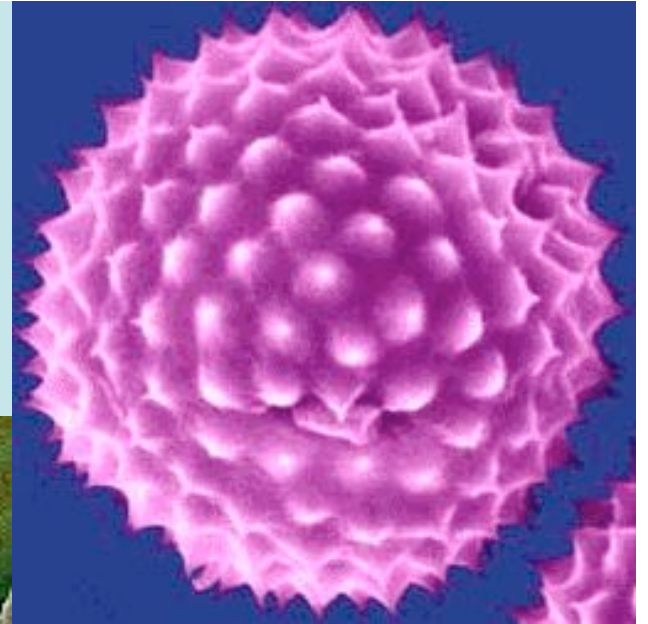
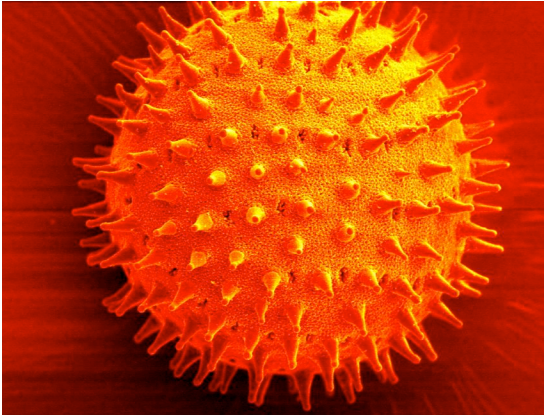




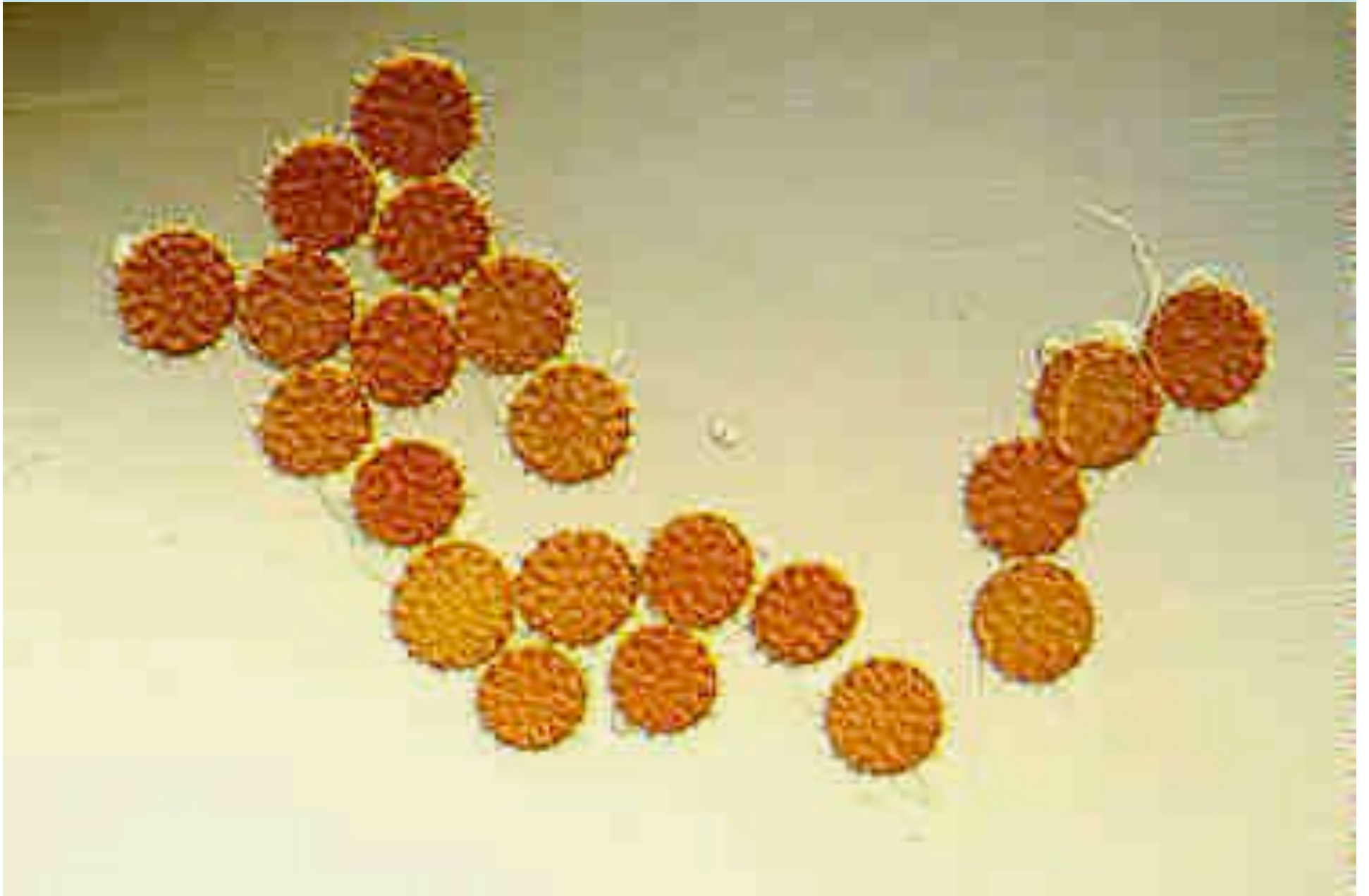


19

pollen= male gametophyte  
composed of 2 cells











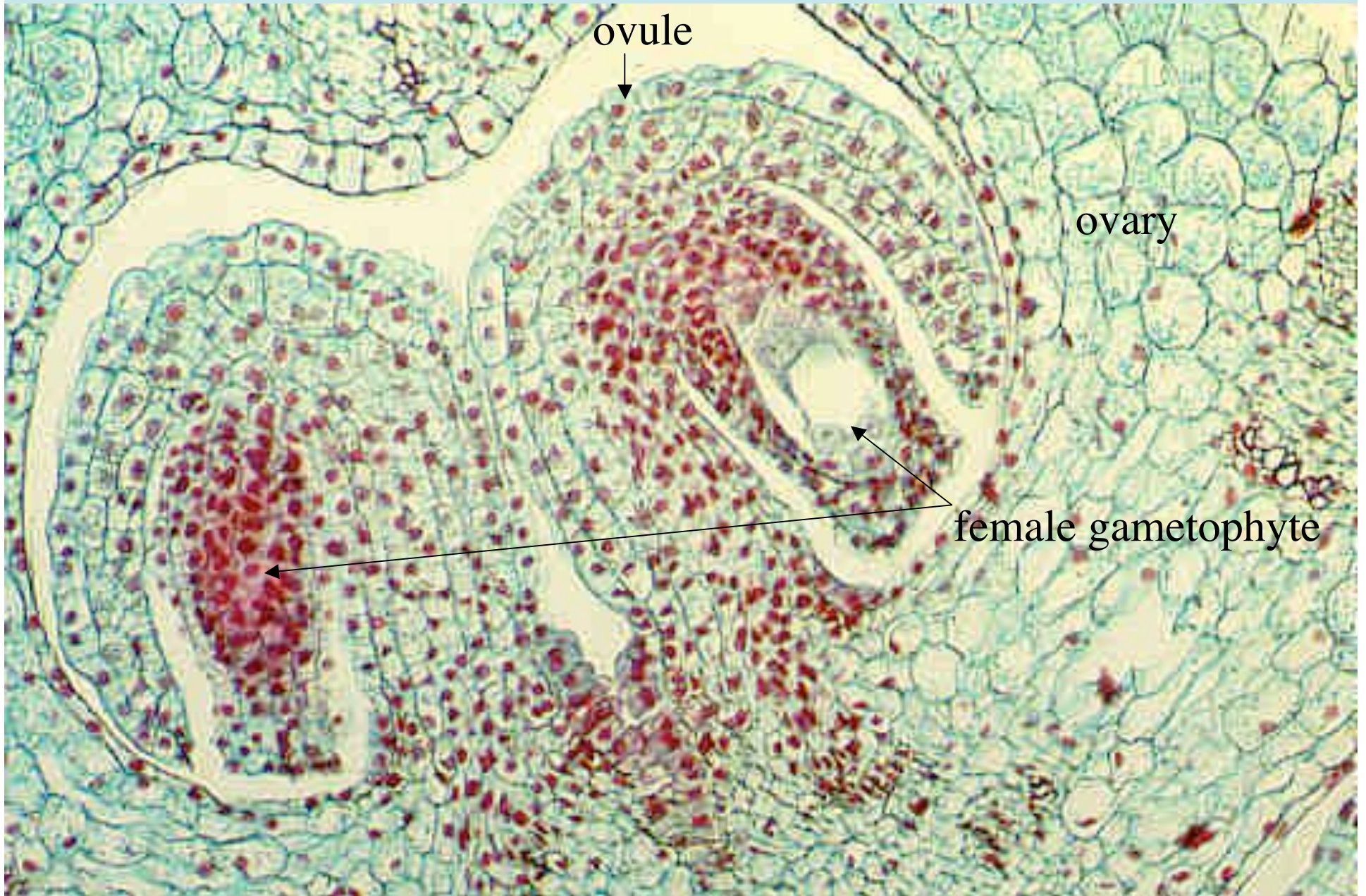
ovule or  
megasporangium

megagametophyte  
(female) or embryo  
sac

ovary

























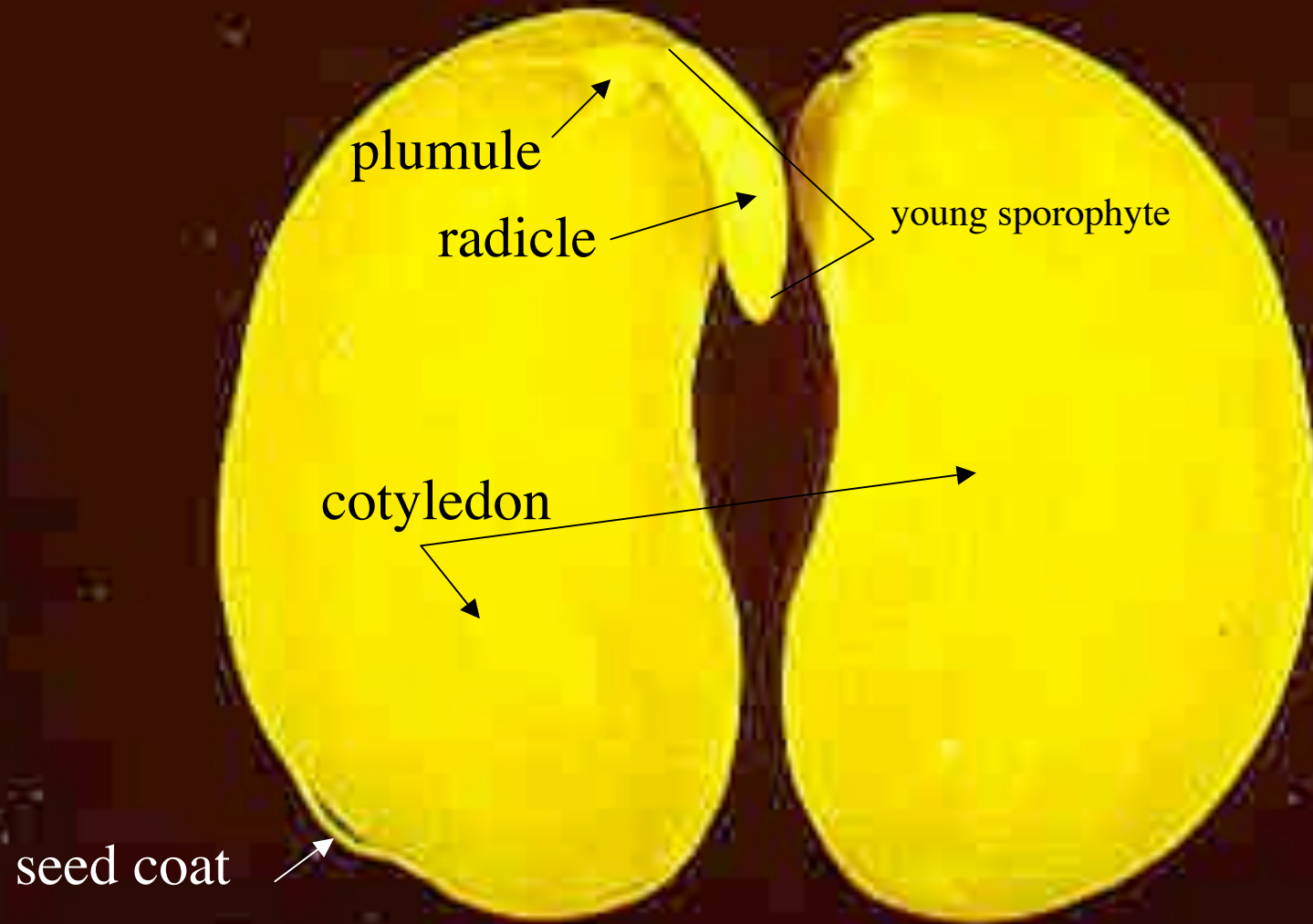
22



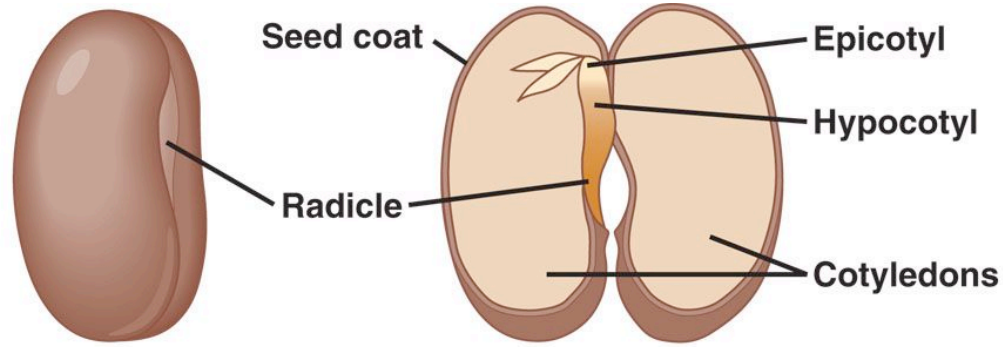


# Monocots vs Dicots (=Eudicots)

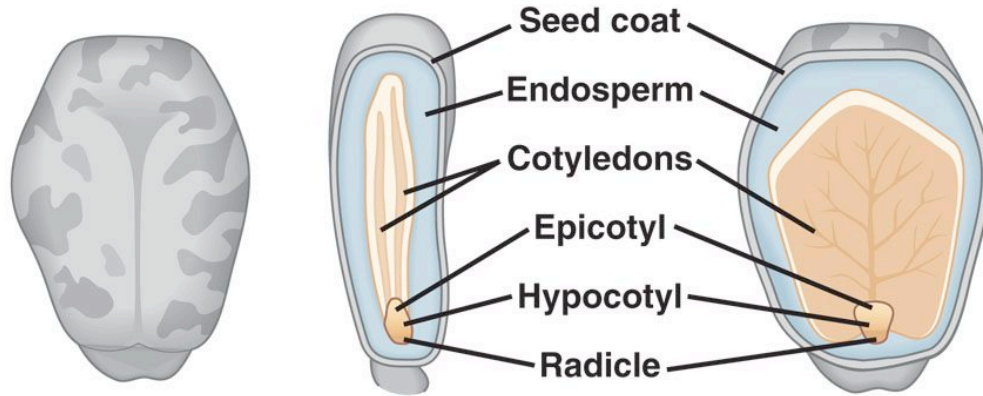
MONOCOTS		EUDICOTS	
 <p>Orchid (<i>Lamboglossum rossii</i>)</p>	<p><b>Monocot Characteristics</b></p>  <p>Embryos One cotyledon</p>	<p><b>Eudicot Characteristics</b></p>  <p>Embryos Two cotyledons</p>	 <p>California poppy (<i>Eschscholzia californica</i>)</p>
 <p>Pygmy date palm (<i>Phoenix roebelenii</i>)</p>	 <p>Leaf venation Veins usually parallel</p>	 <p>Leaf venation Veins usually netlike</p>	 <p>Pyrenean oak (<i>Quercus pyrenaica</i>)</p>
 <p>Lily (<i>Lilium</i> "Enchantment")</p>	 <p>Stems Vascular tissue scattered</p>	 <p>Stems Vascular tissue usually arranged in ring</p>	 <p>Dog rose (<i>Rosa canina</i>), a wild rose</p>
 <p>Barley (<i>Hordeum vulgare</i>), a grass</p>	 <p>Roots Root system usually fibrous (no main root)</p>	 <p>Roots Taproot (main root) usually present</p>	 <p>Pea (<i>Lathyrus noster</i>, Lord Anson's blue pea), a legume</p>
 <p>Anther Filament Stigma Ovary</p>	 <p>Pollen Pollen grain with one opening</p>	 <p>Pollen Pollen grain with three openings</p>	 <p>Zucchini (<i>Cucurbita pepo</i>), female (left) and male flowers</p>
	 <p>Flowers Floral organs usually in multiples of three</p>	 <p>Flowers Floral organs usually in multiples of four or five</p>	



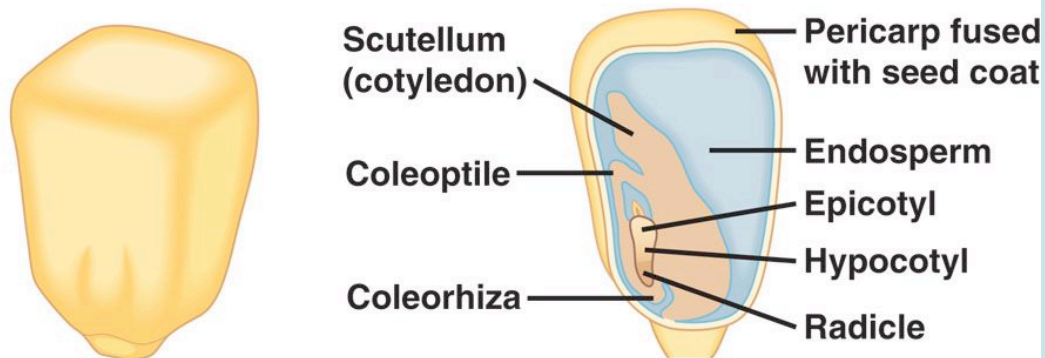




(a) Common garden bean, a eudicot with thick cotyledons

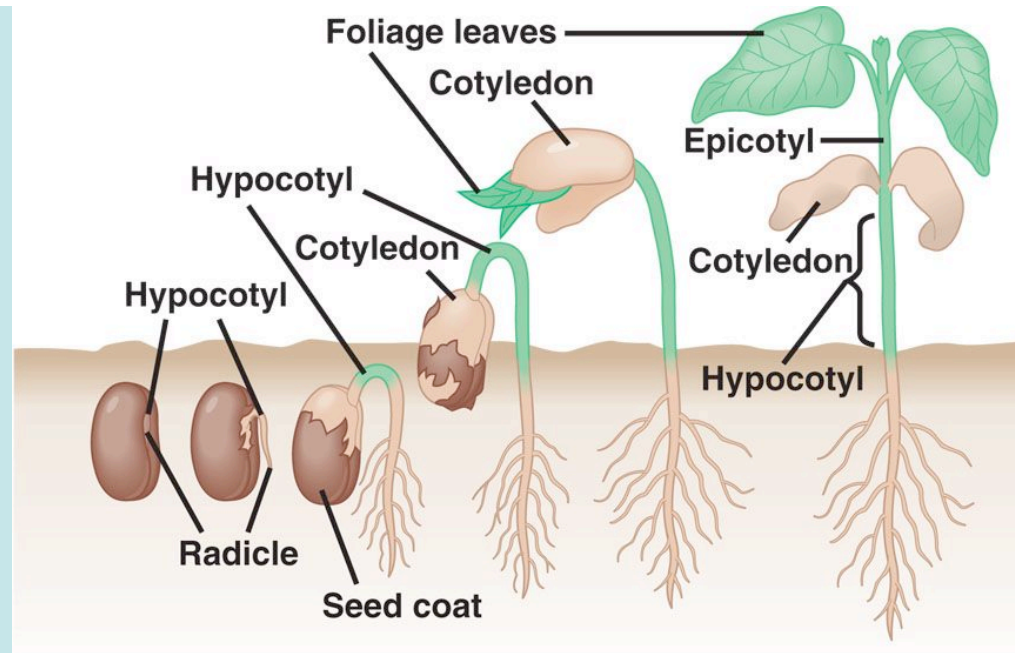


(b) Castor bean, a eudicot with thin cotyledons

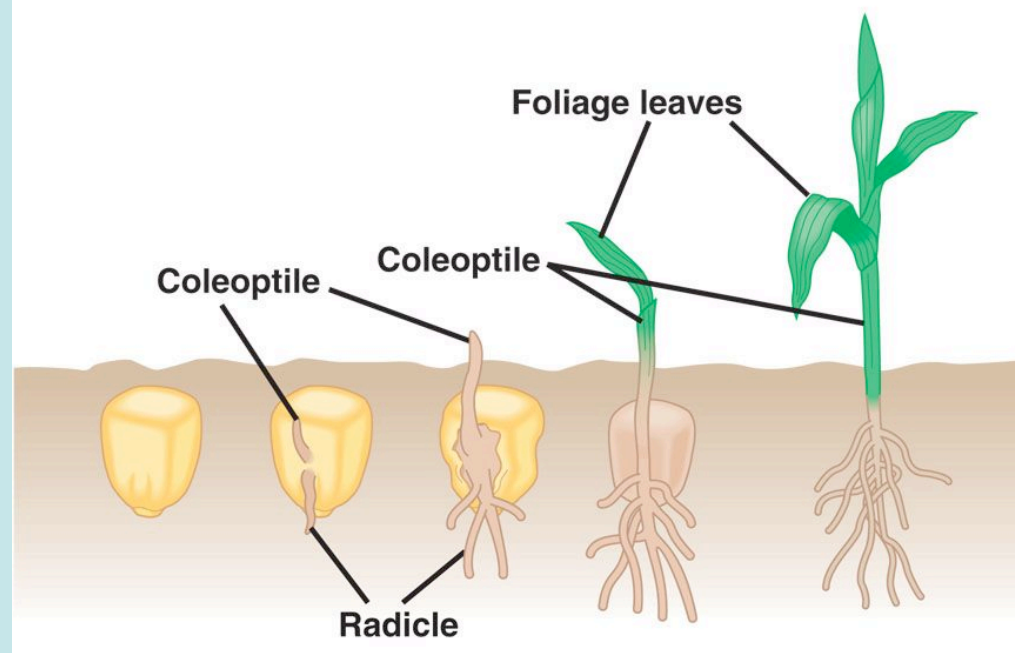


(c) Maize, a monocot

eudicot=  
dicot



(a) Common garden bean

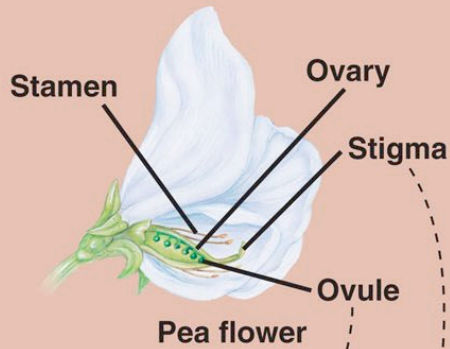


(b) Maize

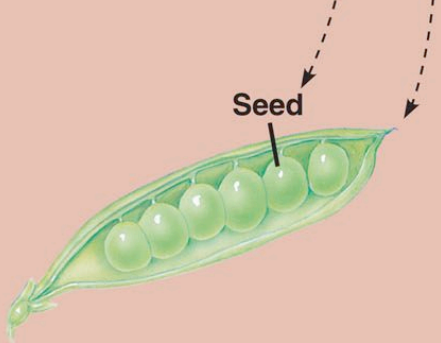




# Fruits

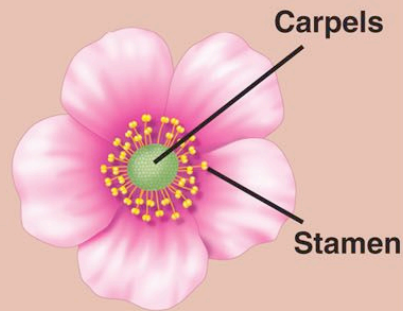


Pea flower

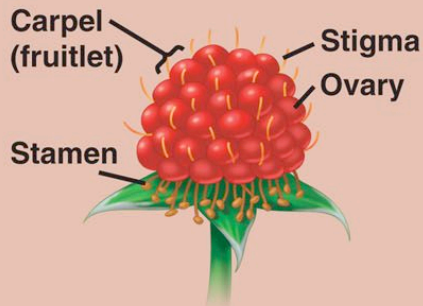


Pea fruit

(a) Simple fruit

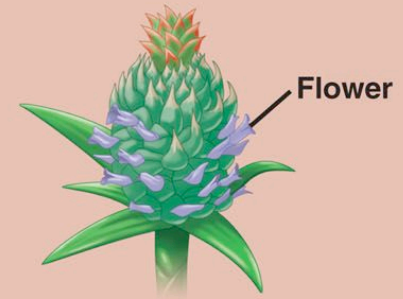


Raspberry flower

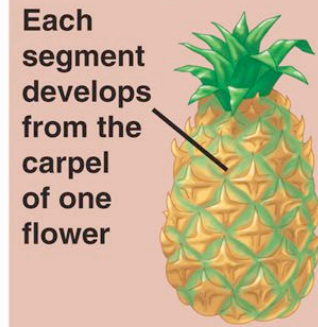


Raspberry fruit

(b) Aggregate fruit



Pineapple inflorescence



Pineapple fruit

(c) Multiple fruit



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thickened wall  
of fruit

**(a)** Tomato, a fleshy fruit with soft outer and inner layers of pericarp



**(b)** Ruby grapefruit, a fleshy fruit with a hard outer layer and soft inner layer of pericarp



**(c)** Nectarine, a fleshy fruit with a soft outer layer and hard inner layer (pit) of pericarp



**(d)** Milkweed, a dry fruit that splits open at maturity

**(e)** Walnut, a dry fruit that remains closed at maturity

