

UNIVERSIDADE FEDERAL DO  
OESTE DO PARÁ

BOTÂNICA  
ANATOMIA DA RAIZ

Professora: Cristina Aledi Felsembrugh

# Anatomia da Raiz

## Funções:

- 1- Fixação;
- 2- Absorção;
- 3- Reserva;
- 4- Condução.

## - Desenvolvimento

- meristema apical radicular

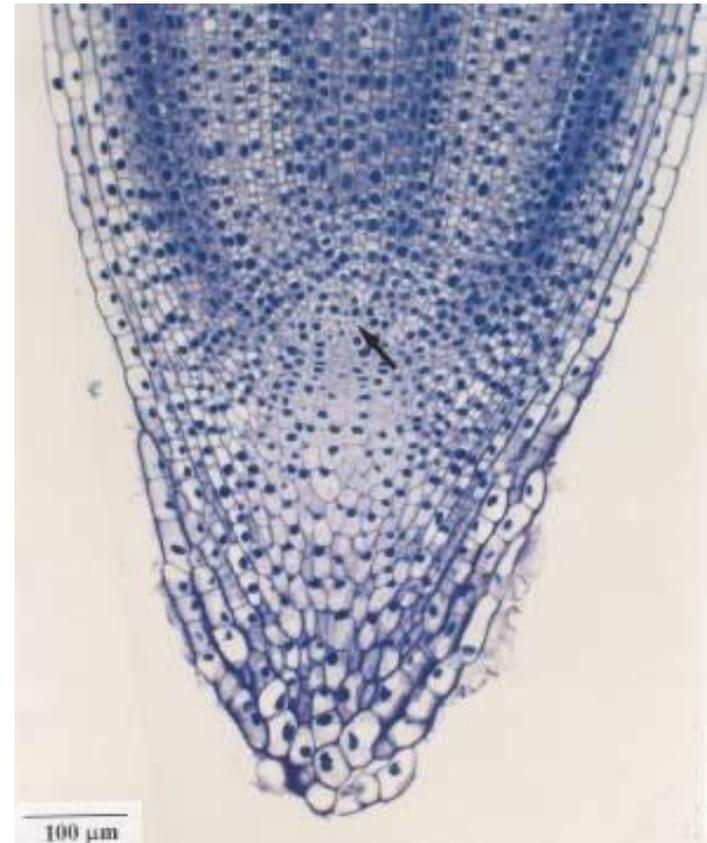
- **Coifa:** proteção  
mucilagem

## Organização:

### Apical do tipo fechado

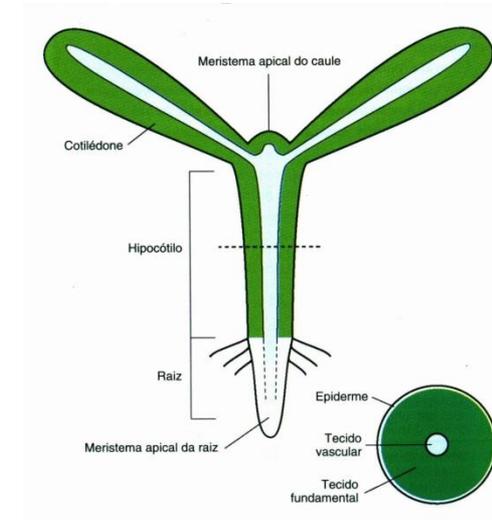
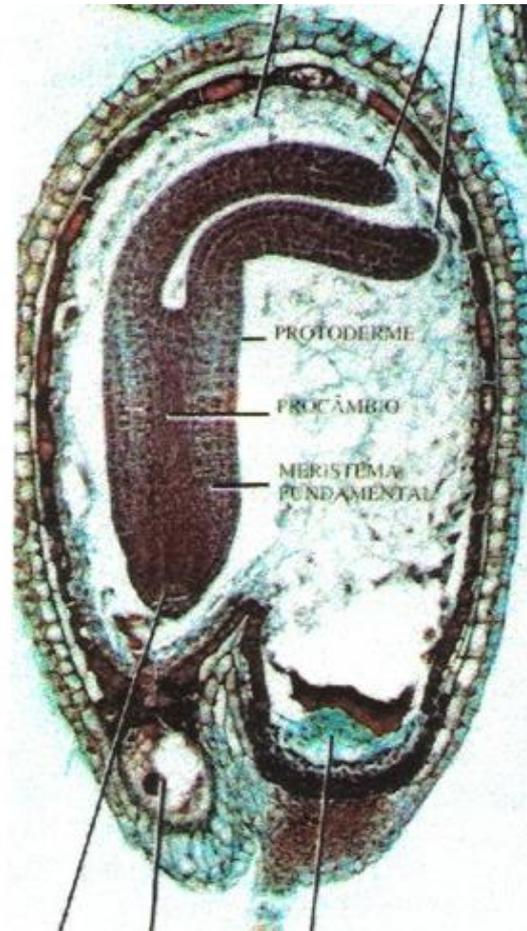
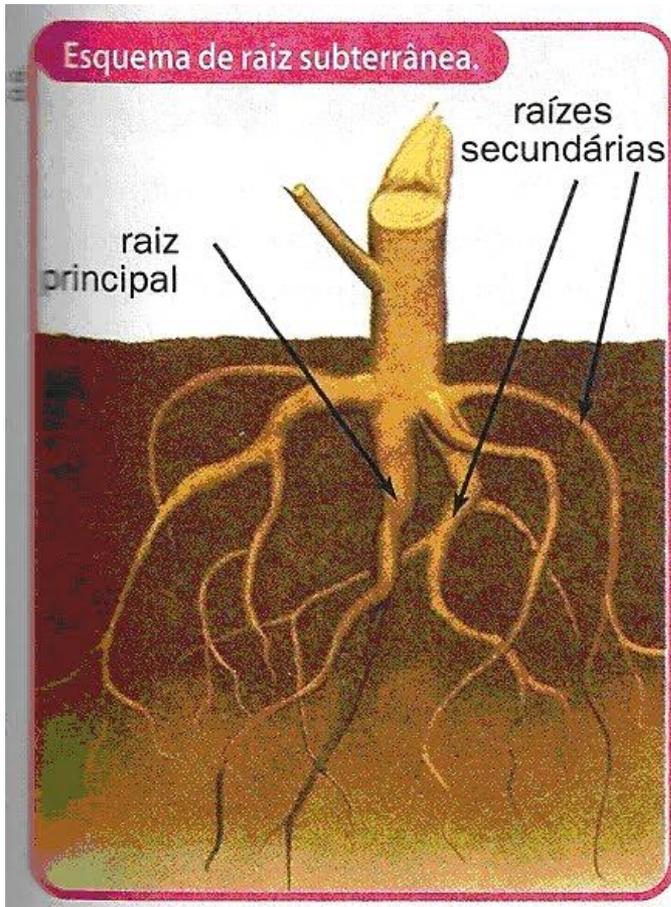


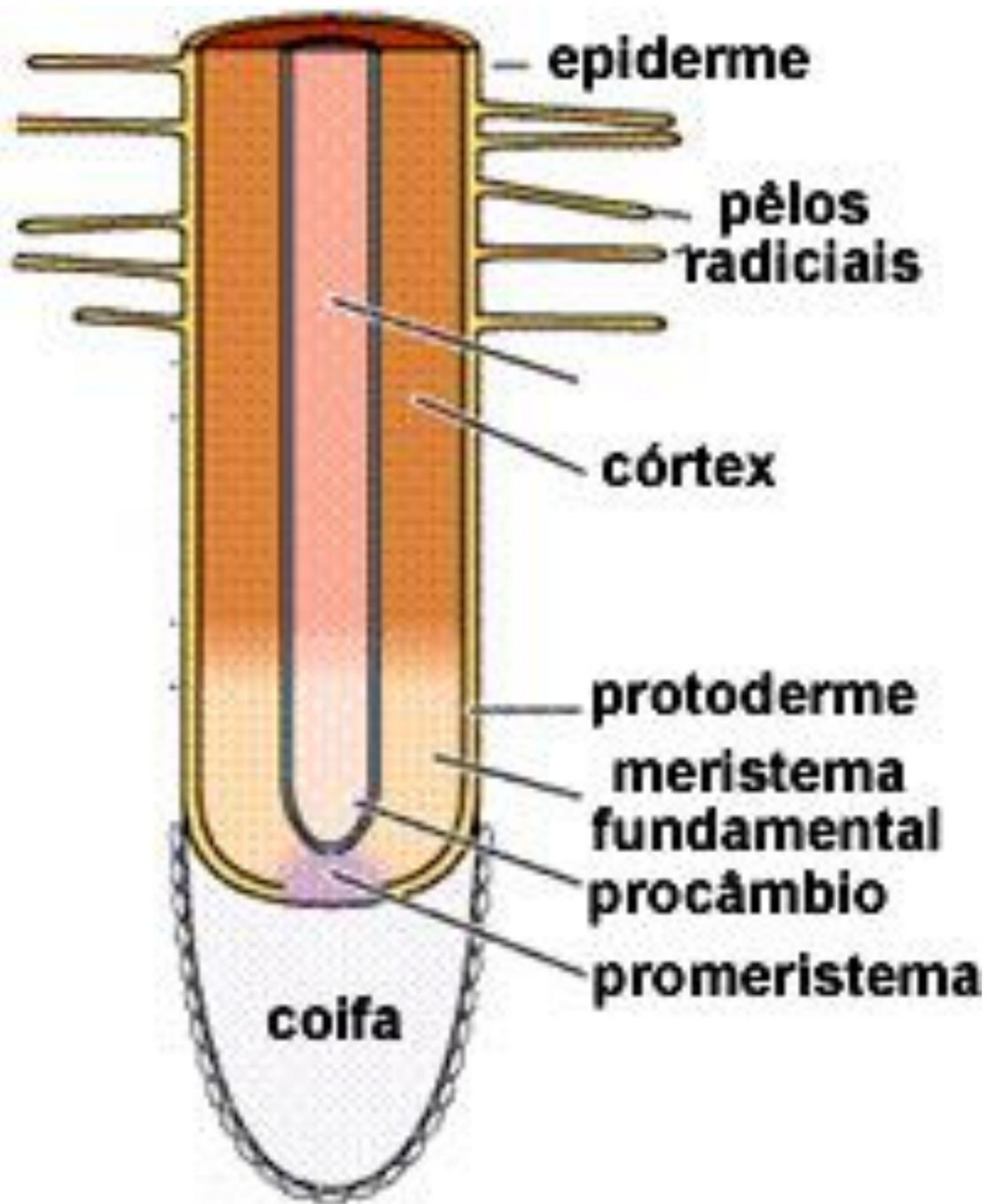
### Apical do tipo aberto



# ORIGEM DA RAIZ

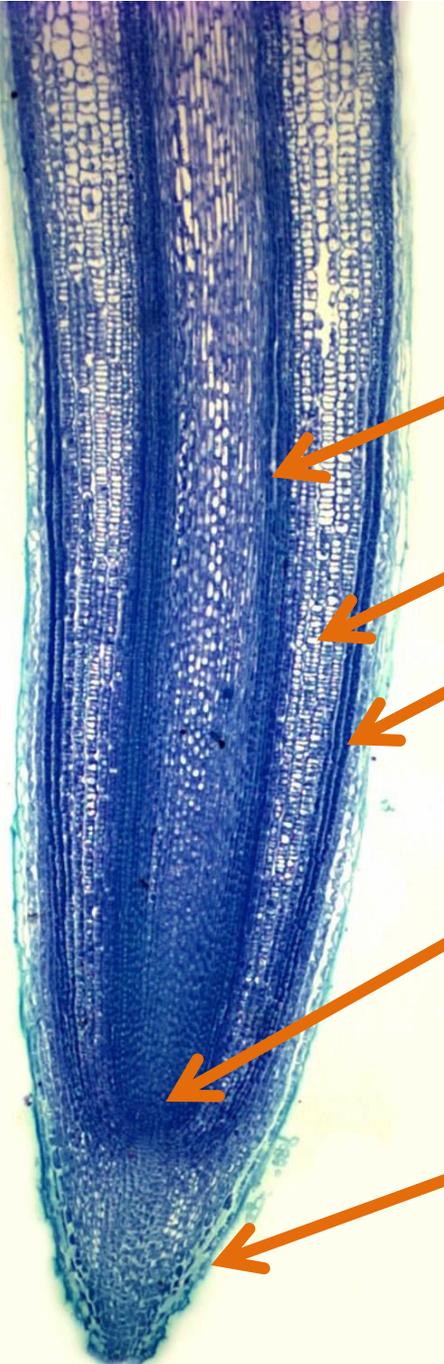
- Raiz primária: origina-se do meristema radicular do embrião.
- Raiz secundária: origina-se do periciclo (procâmbio)





Estrutura primária

# RAIZ: origem



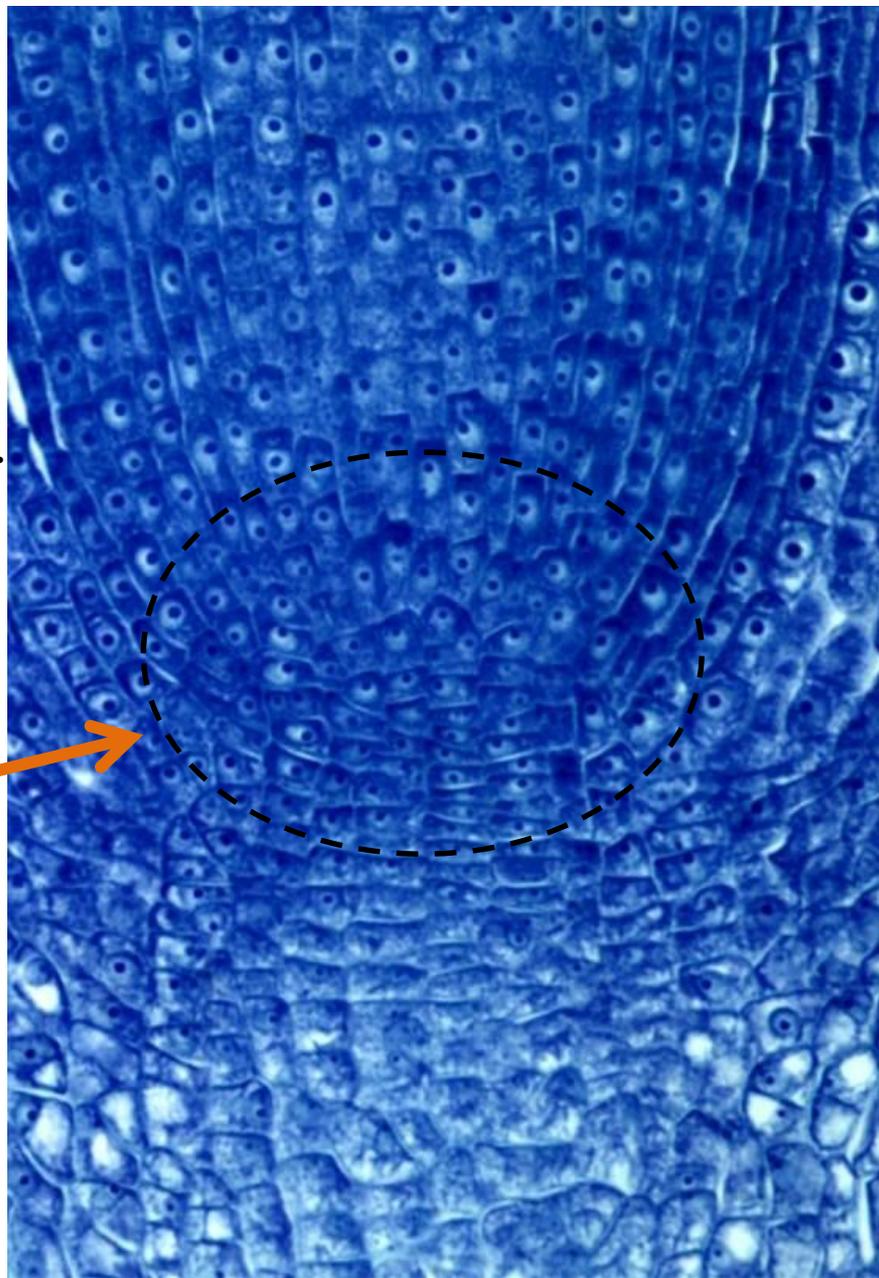
PROCÂMBIO

MERISTEMA  
FUNDAMENTAL

PROTODERME

PROMERISTEMA

COIFA



# Estrutura Primária:

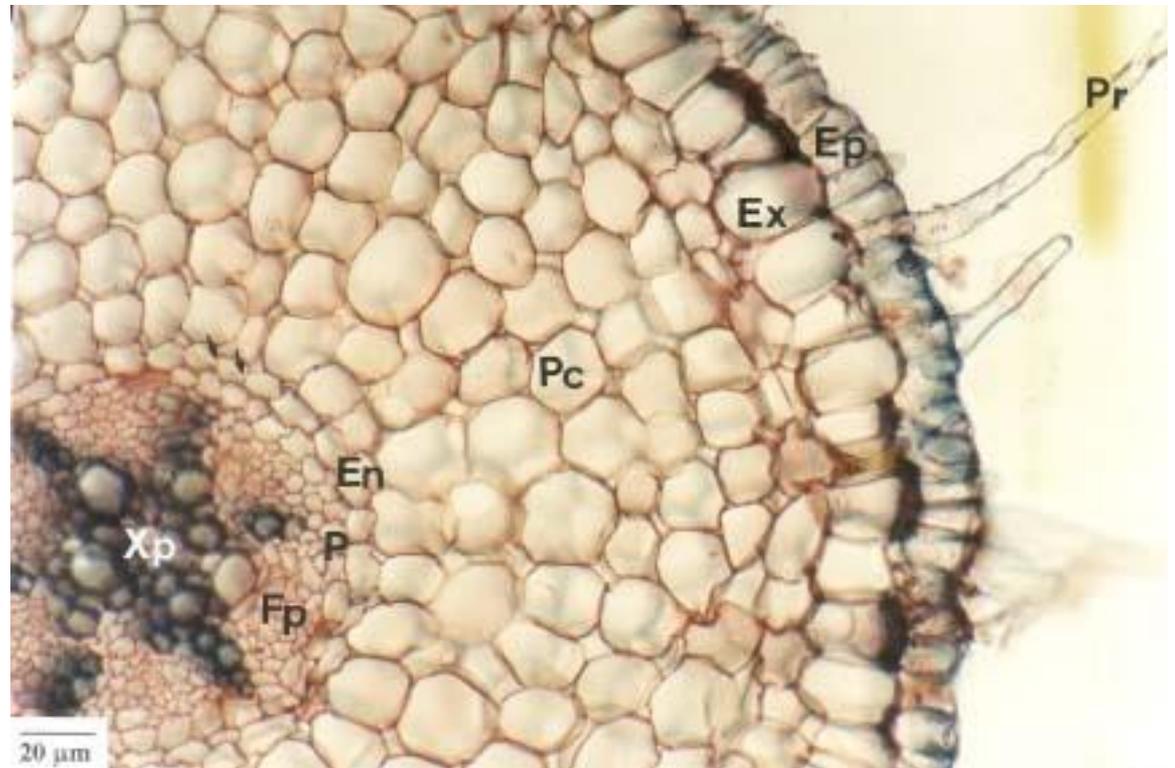
- O corte transversal:
- Dérmico
  - Fundamental
  - Vascular

**Epiderme: unisseriada; pelos radiculares.**

**Córtex: entre a epiderme e o cilindro vascular.**

**Endoderme: seletividade, refluxo .**

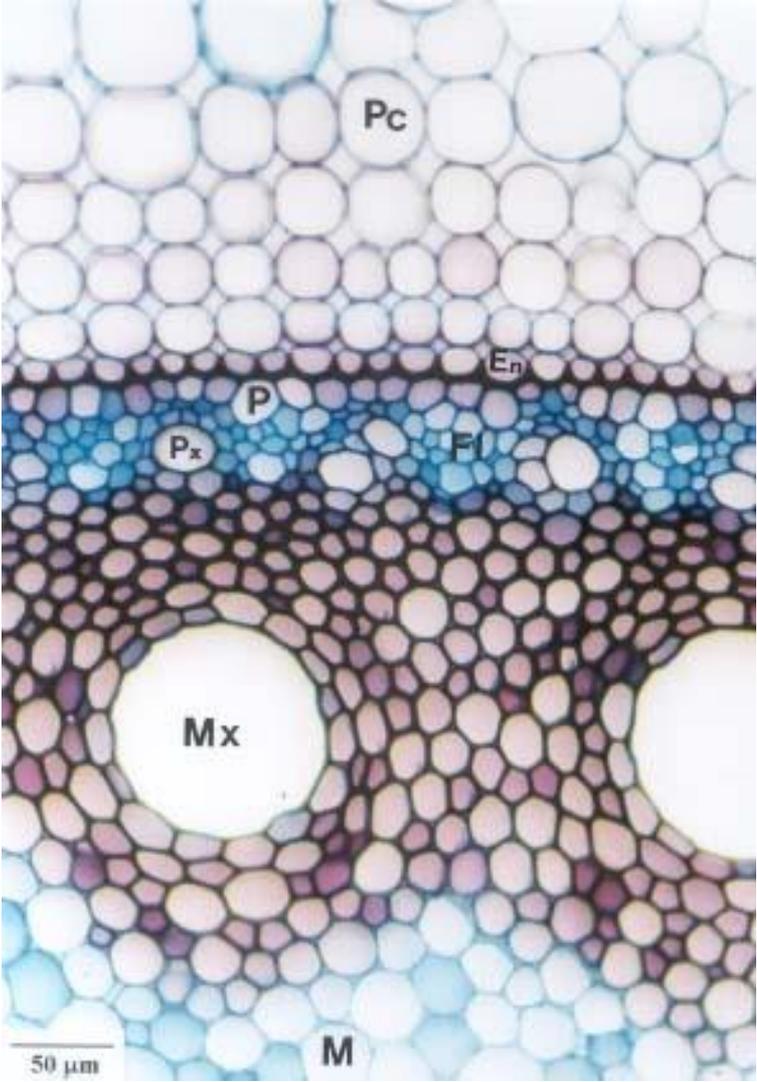
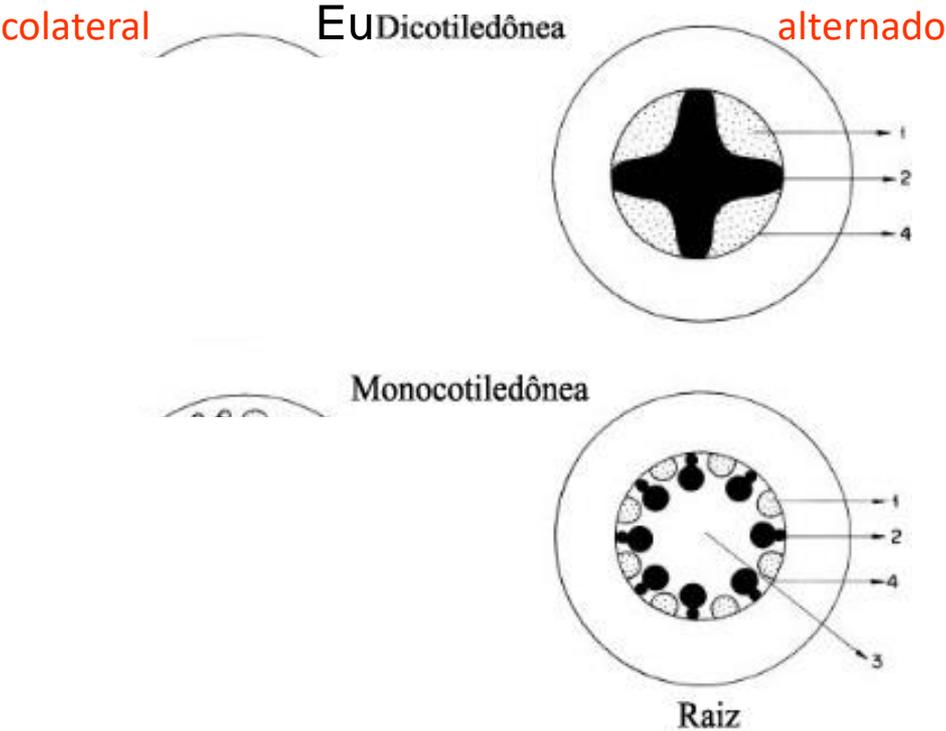
- estrias de Caspary

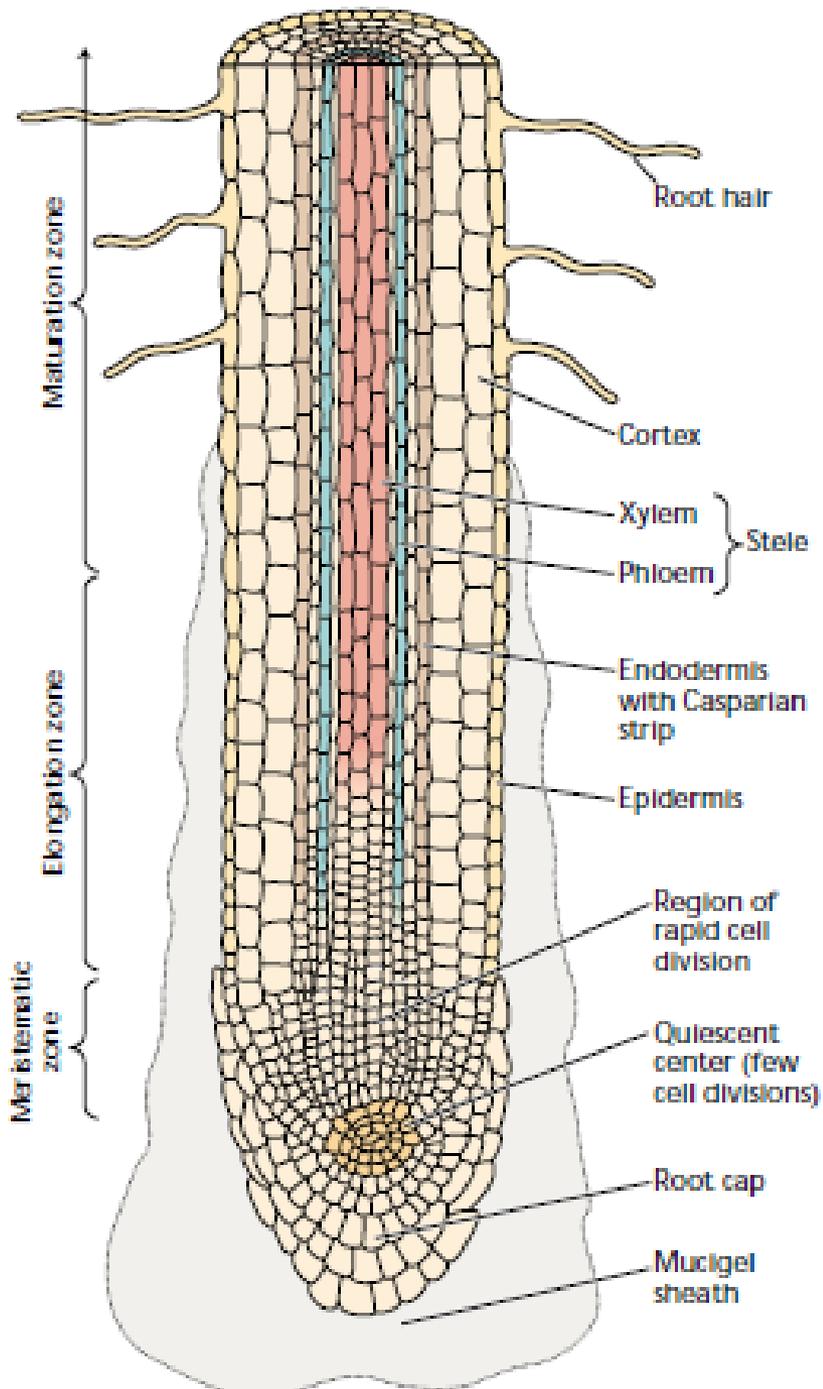


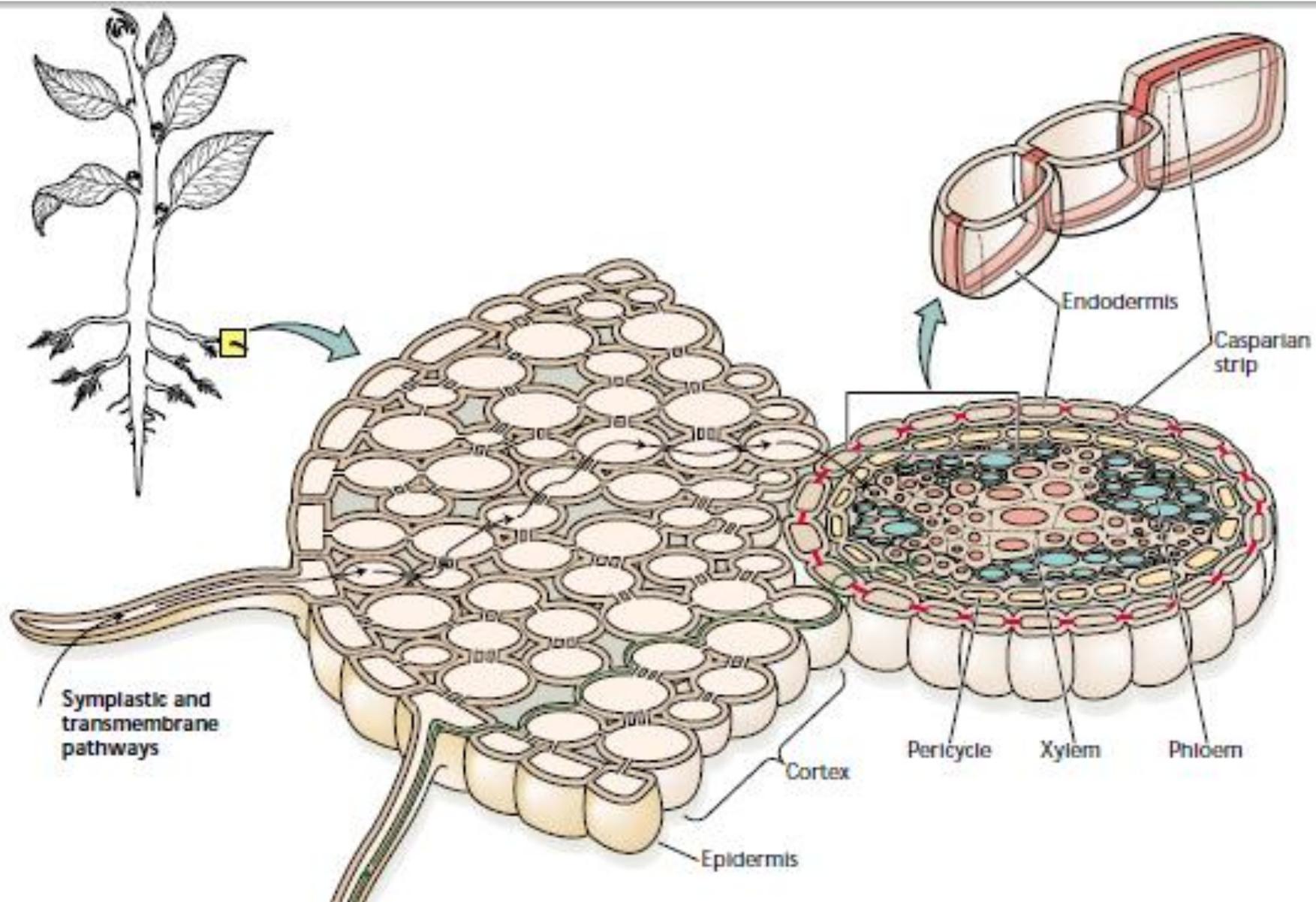
# Cilindro vascular:

- Periciclo
- Tecidos vasculares

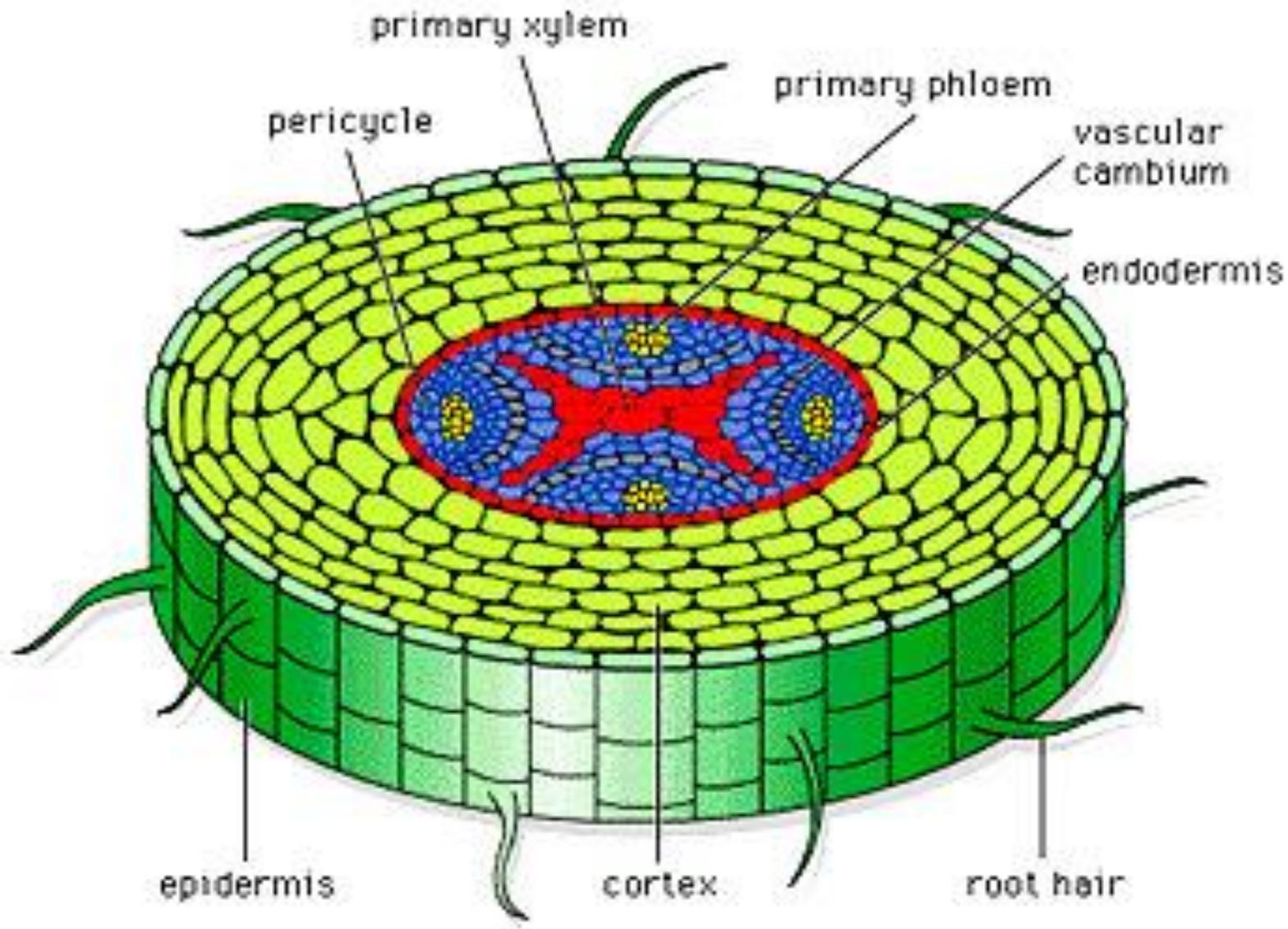
Os tecidos vasculares primários da raiz apresentam arranjo e desenvolvimento distinto do caule:

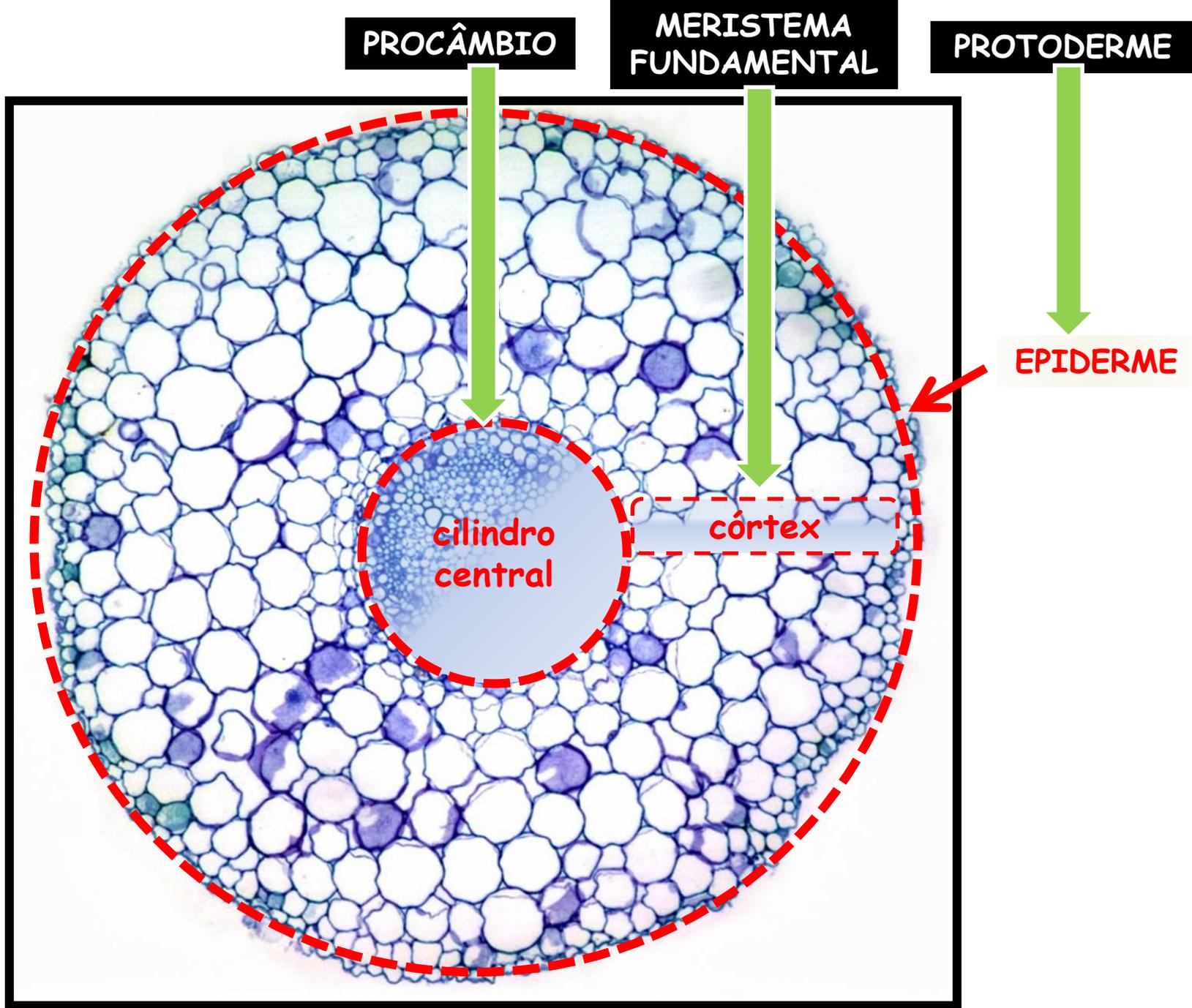






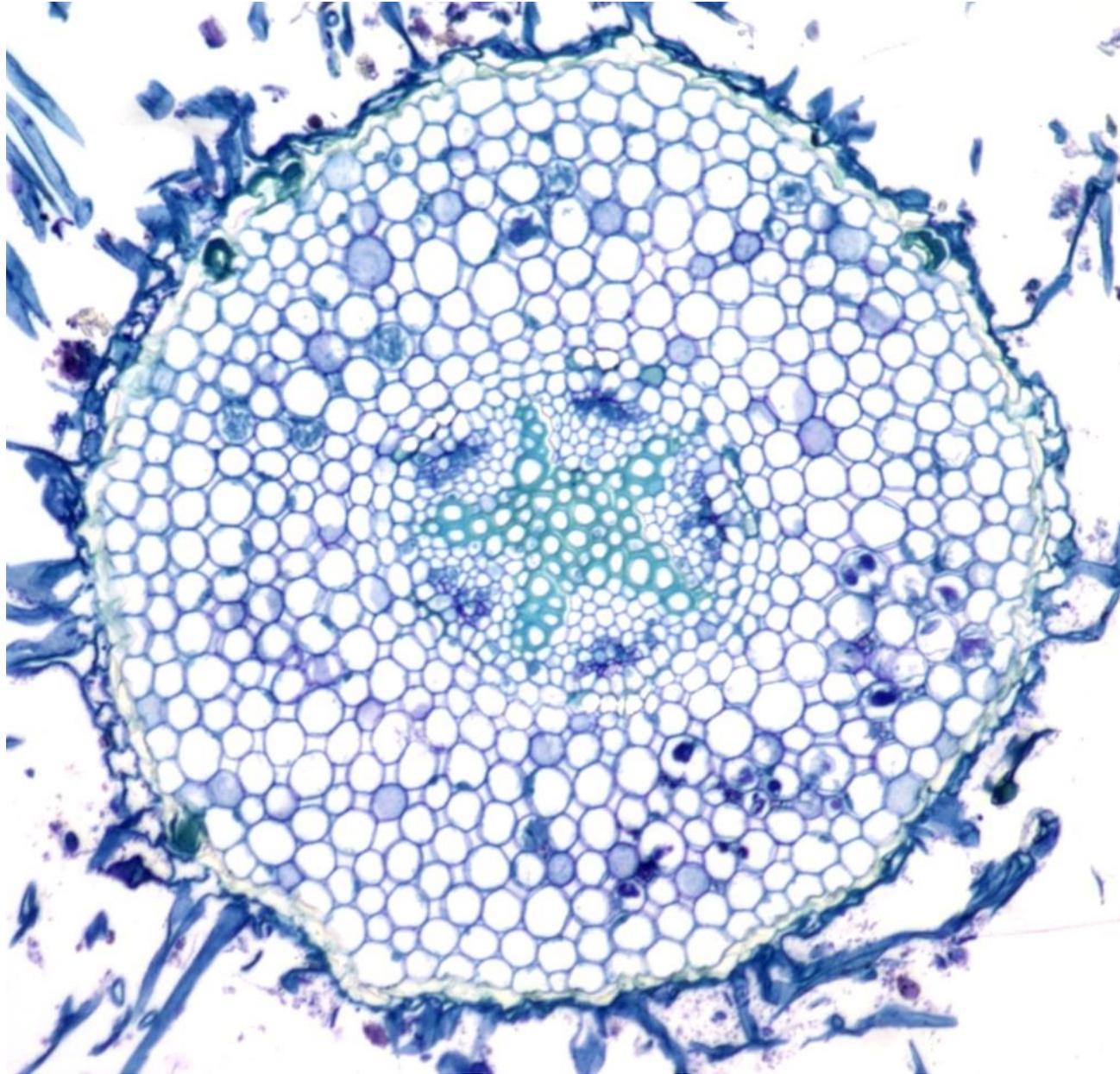
# RAIZ EM CORTE TRANSVERSAL





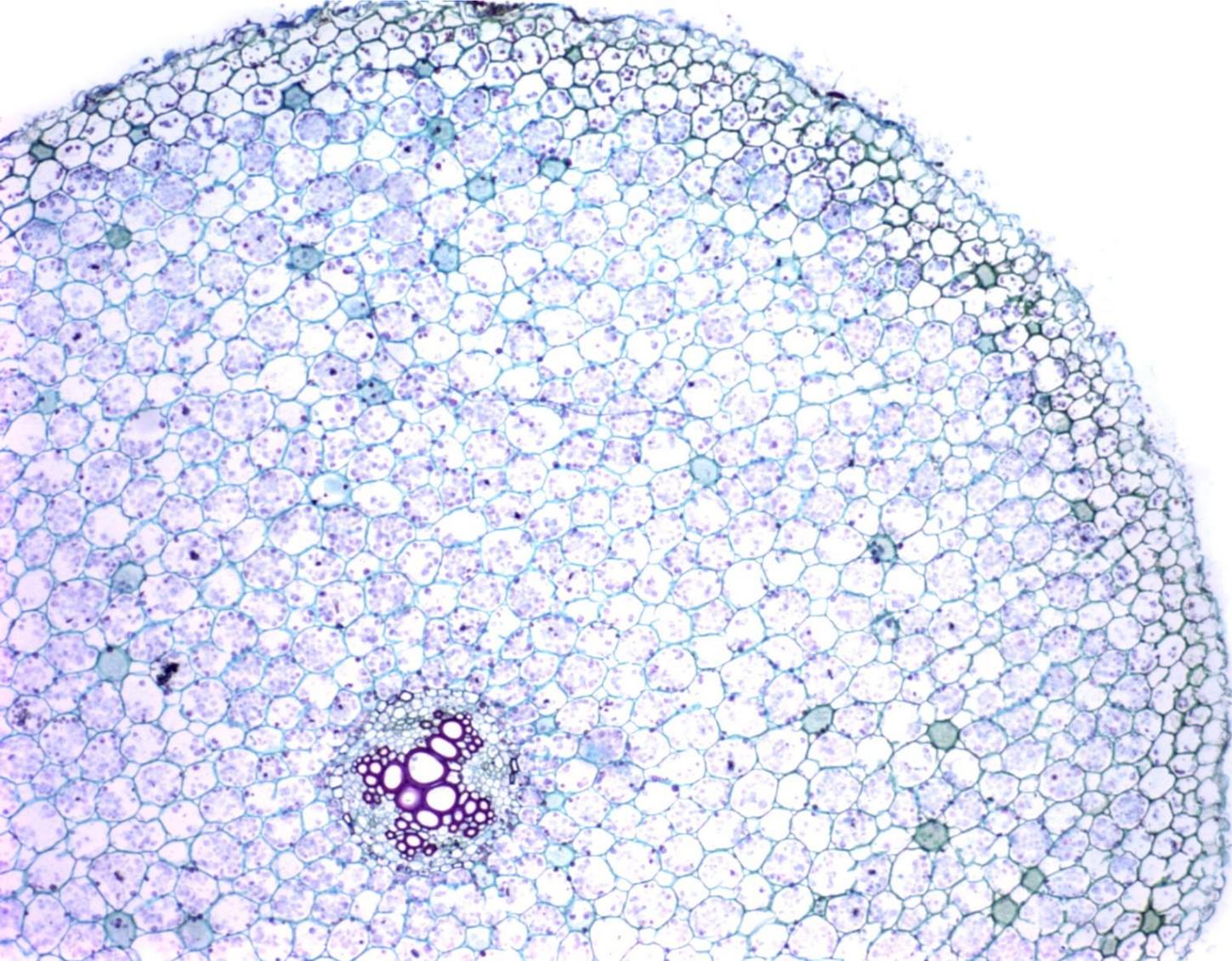
*Phaseolus vulgaris* (Leguminosae)

# CÓRTEX: parênquima de preenchimento



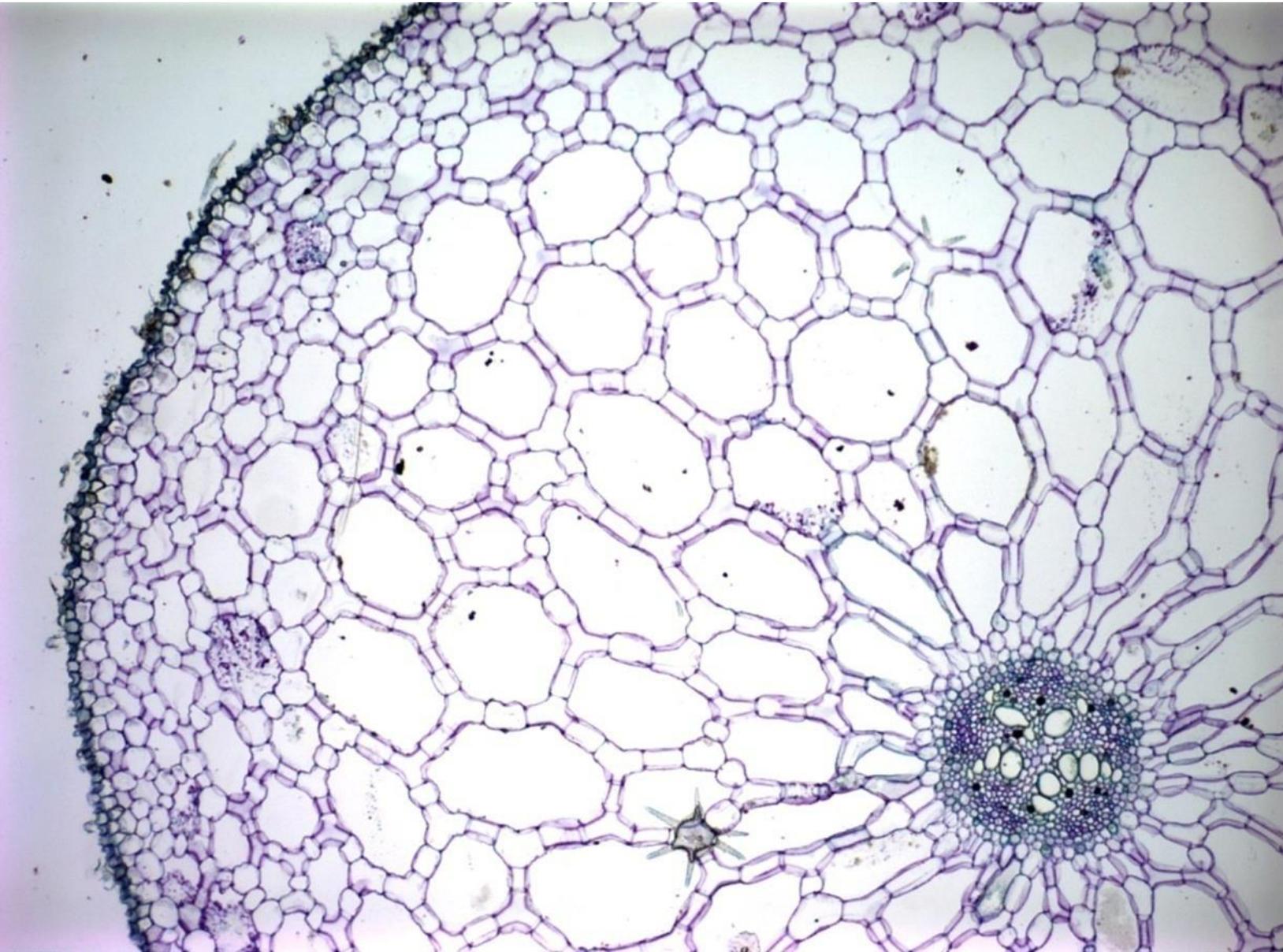
*Tynanthus fasciculatus* (Bignoniaceae)

# CÓRTEX: parênquima de reserva



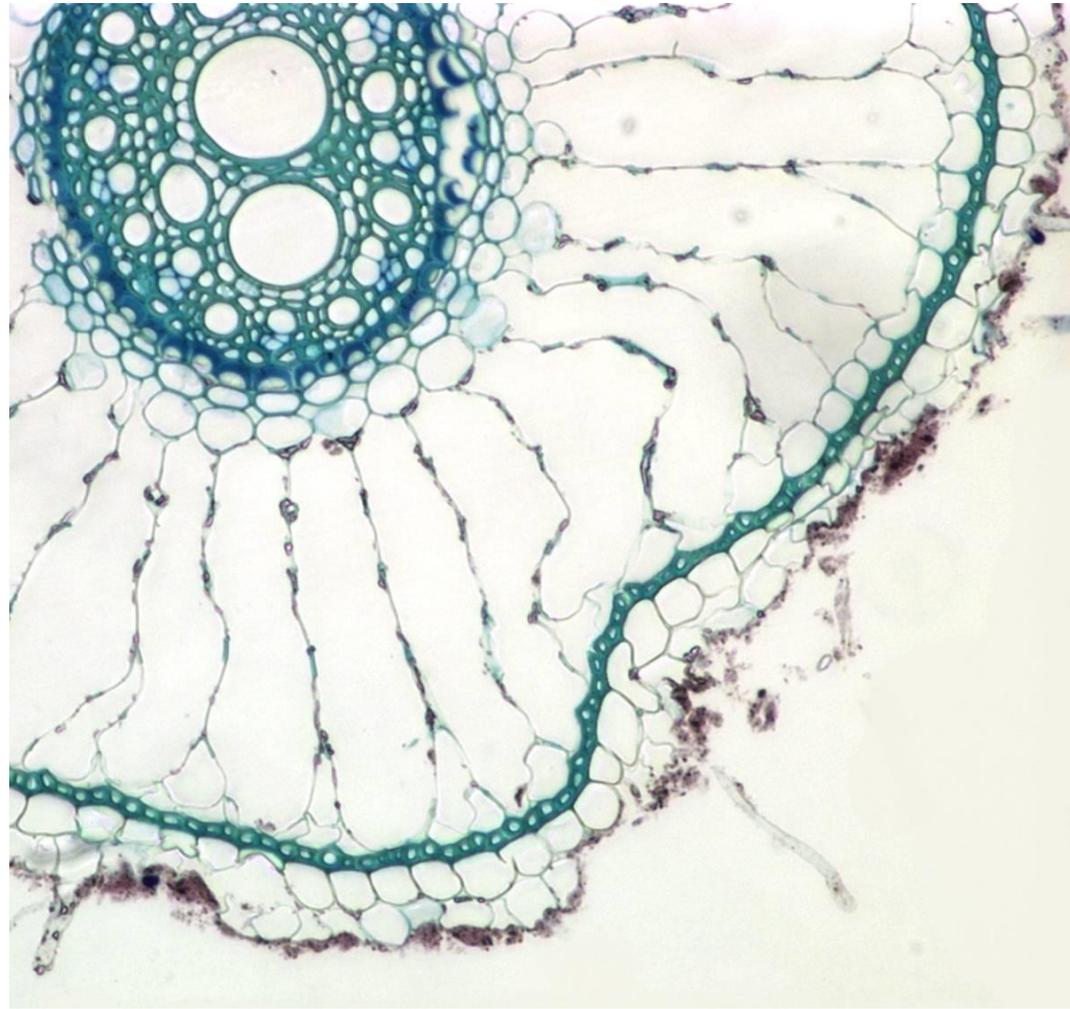
*Ranunculus* sp. (Ranunculaceae)

**CÓRTEX: parênquima aerífero**



*Nymphaea* sp. (Nymphaeaceae)

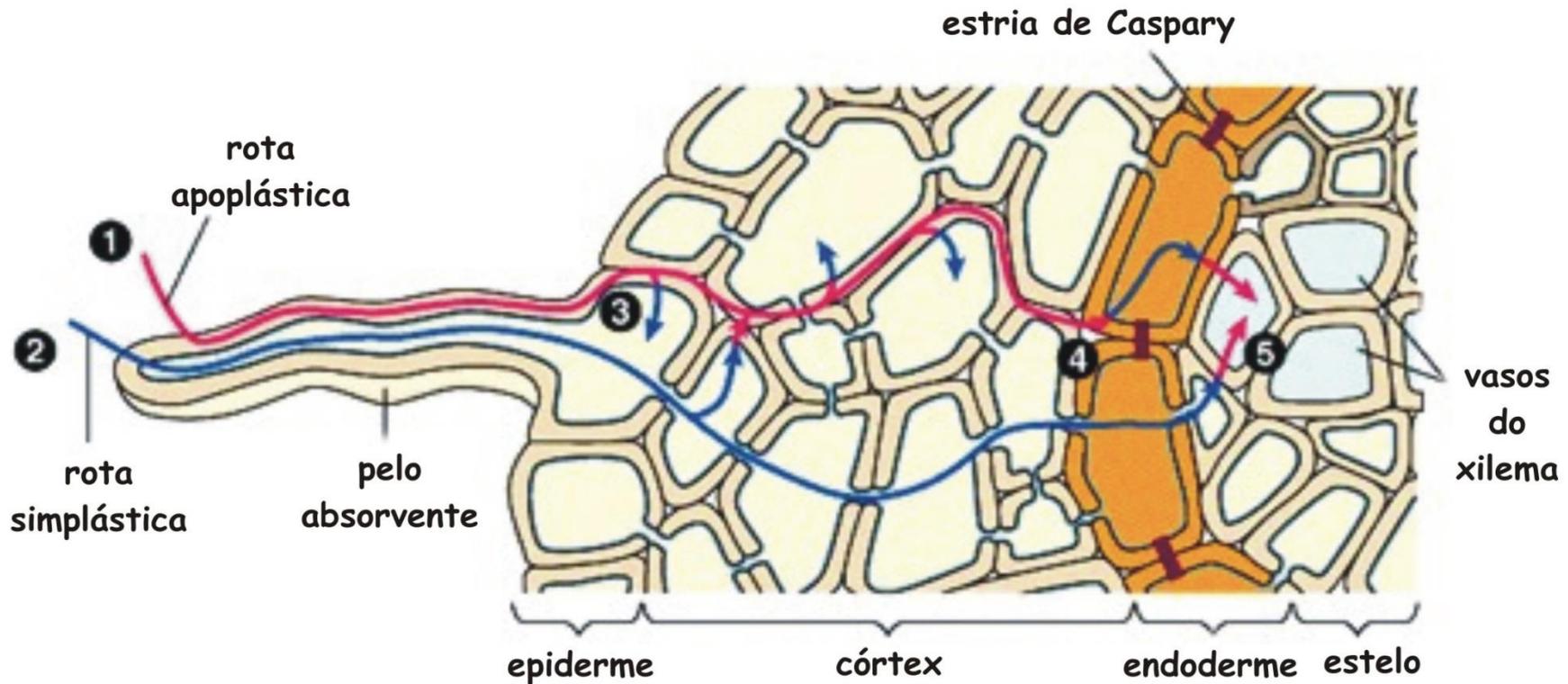
# CÓRTEX: parênquima aerífero



*Oryza sativa* (Poaceae)

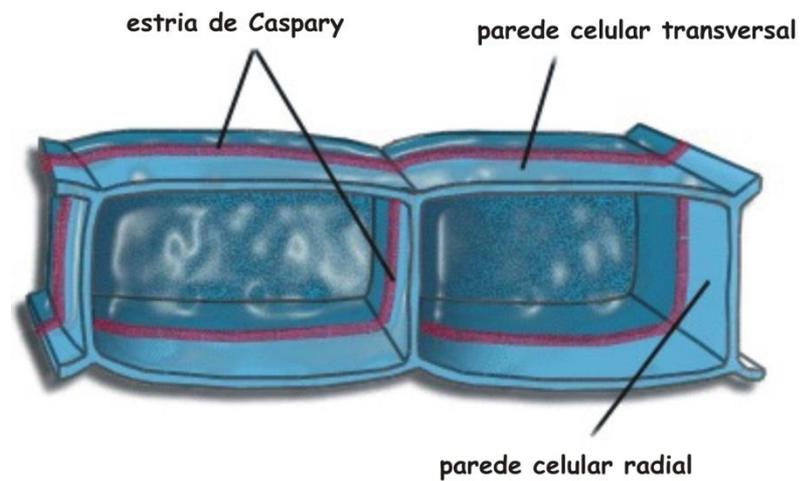
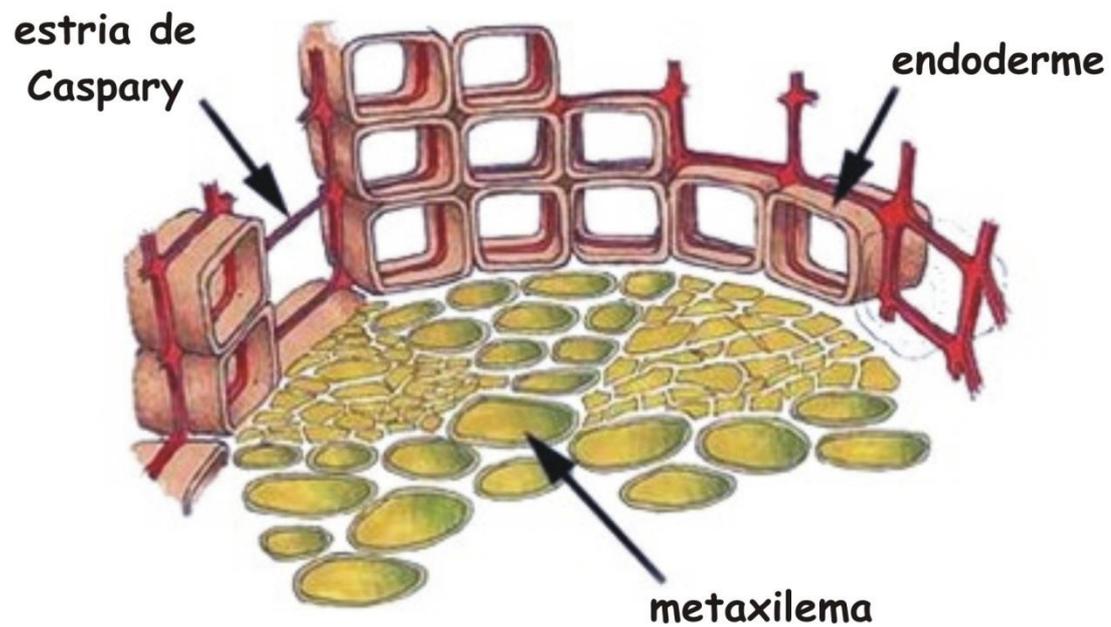
# CÓRTEX: endoderme

Rota apoplástica: via espaços intercelulares e parede celular

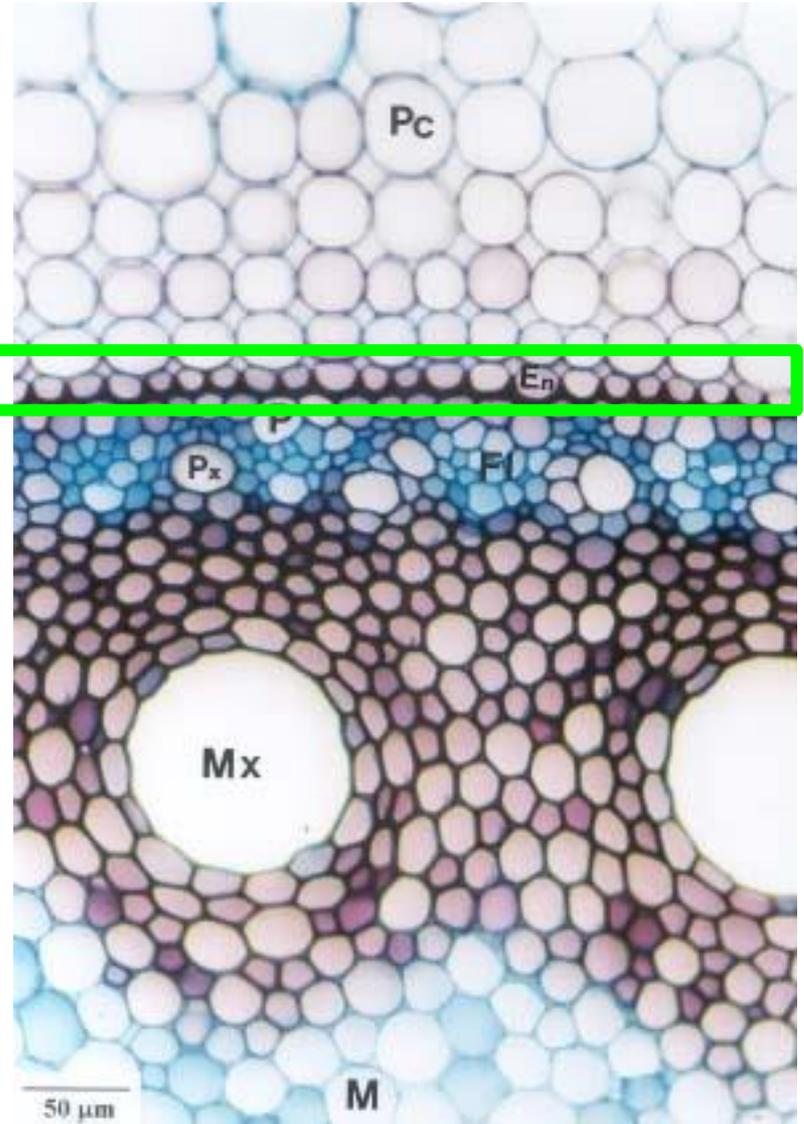
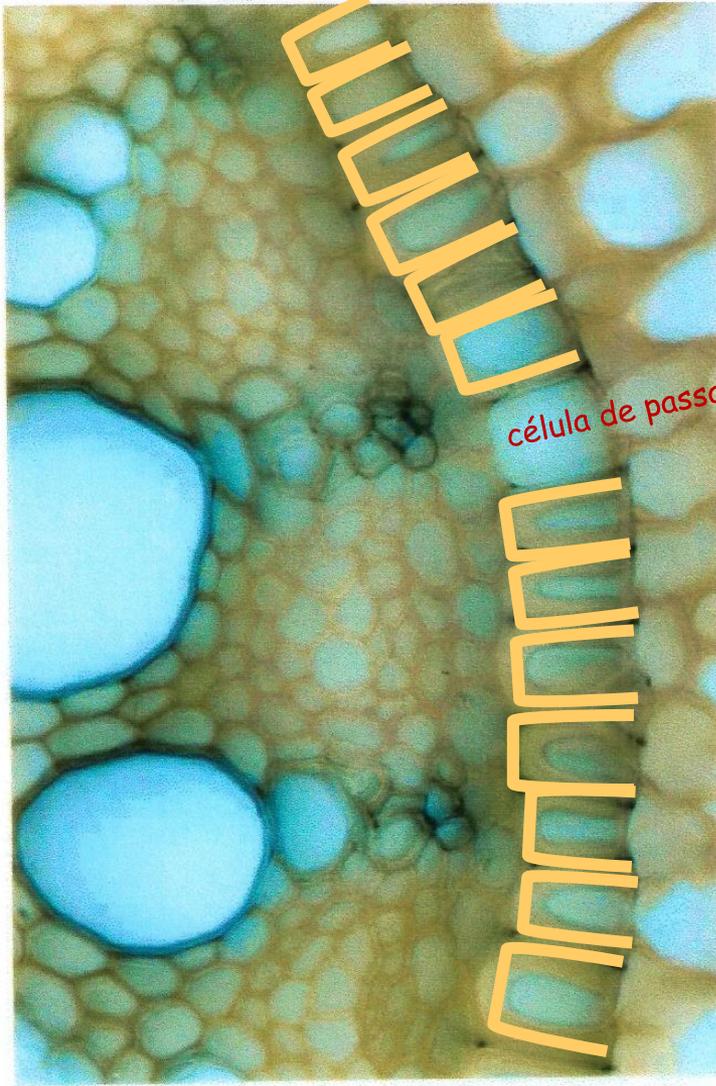


Rota simplástica: através da membrana plasmática ou dos plasmodesmos

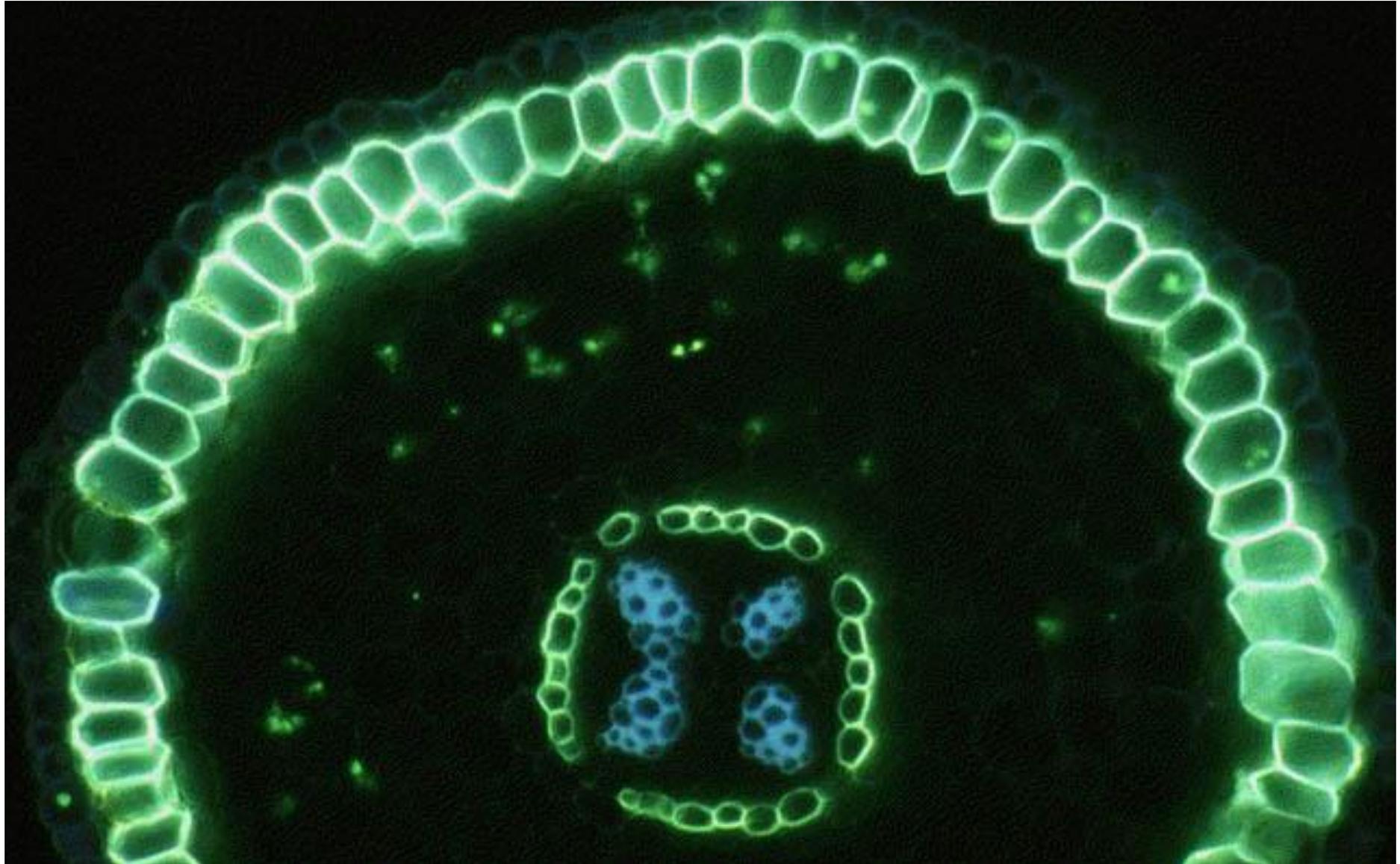
# CÓRTEX: endoderme



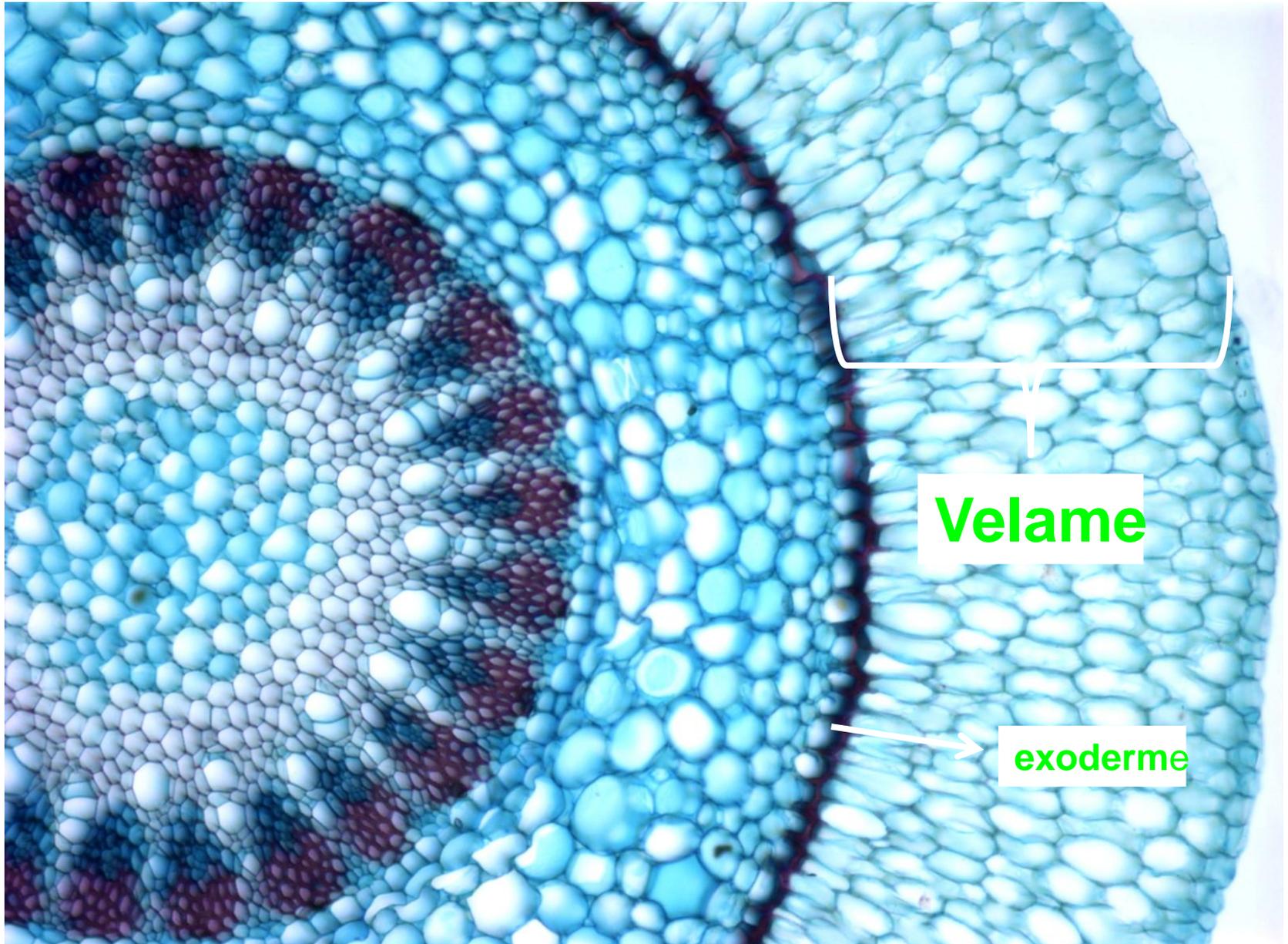
# CÓRTEX: endoderme



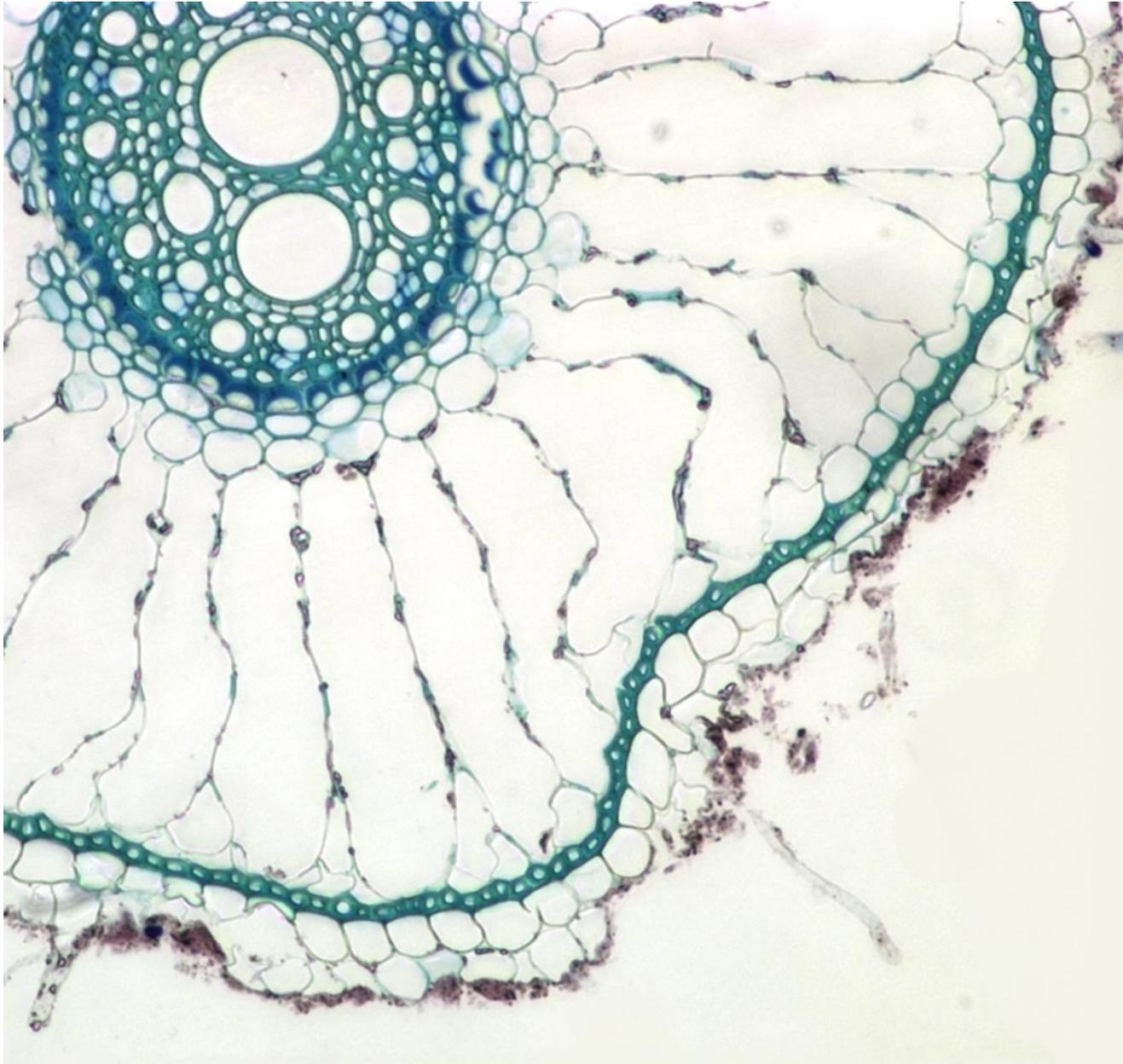
# CÓRTEX: exoderme



# CÓRTEX: exoderme

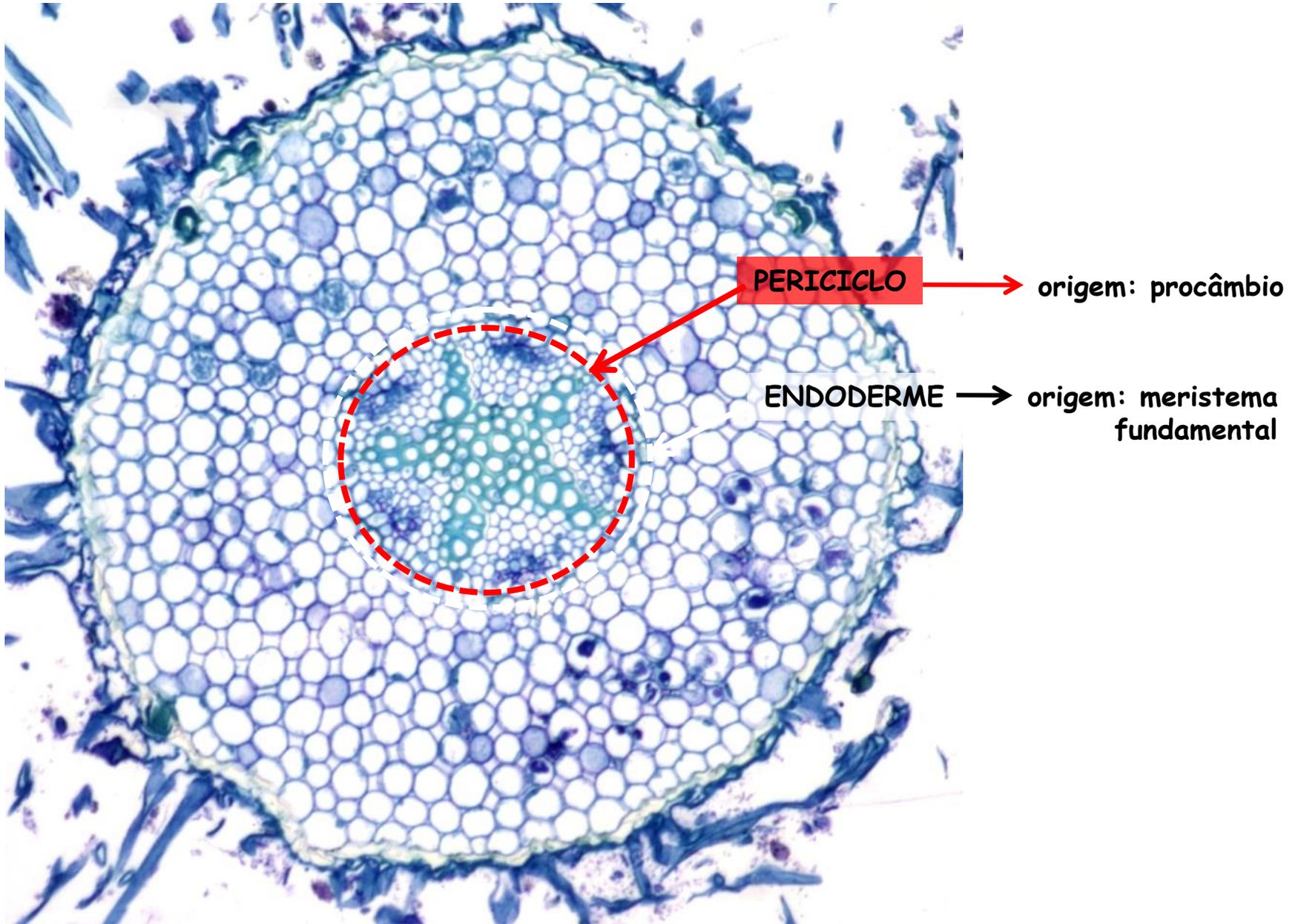


# CÓRTEX: exoderme



*Oryza sativa* (Poaceae)

# ESTELO: periciclo

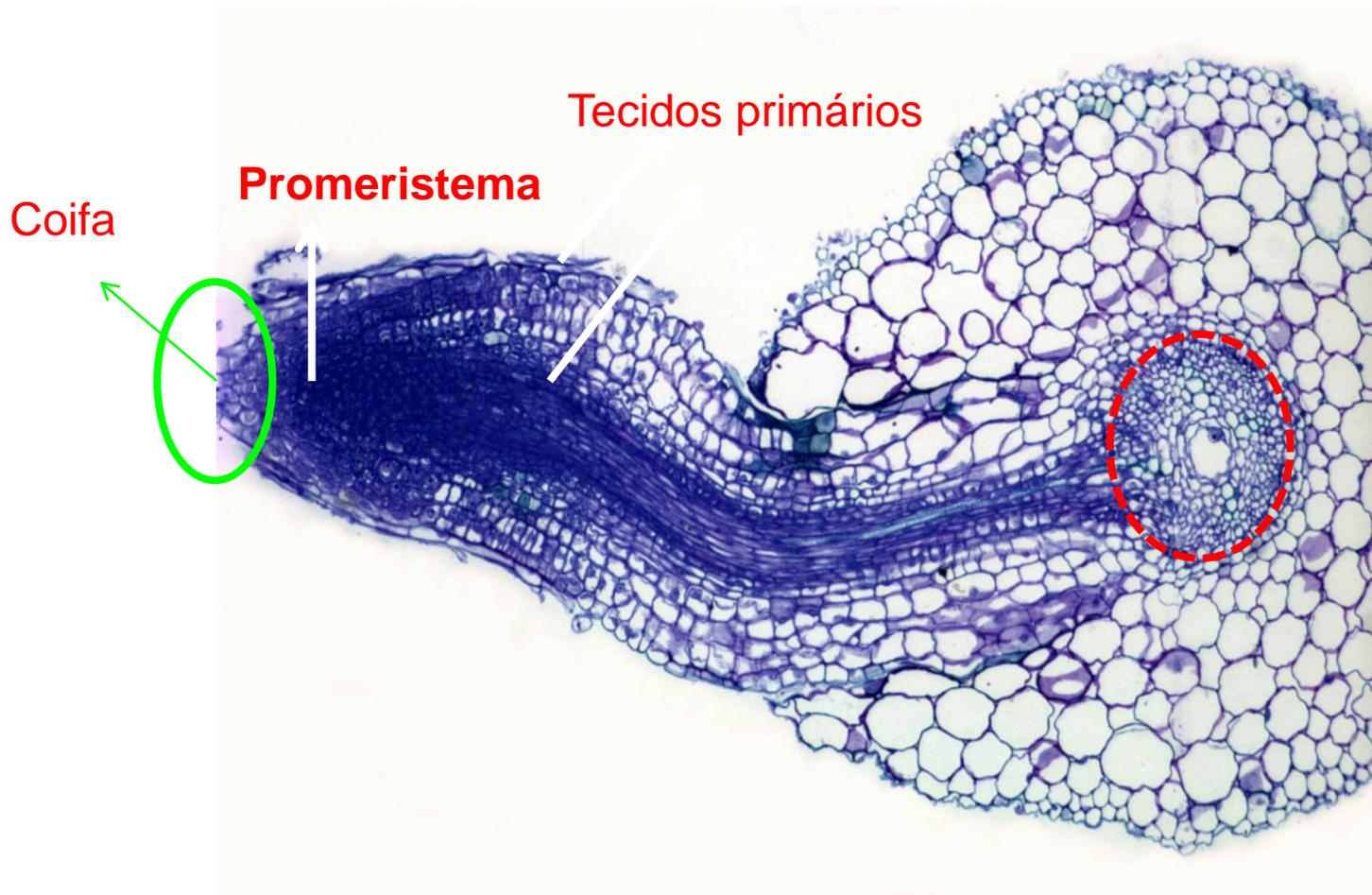


*Phaseolus vulgaris* (Leguminosae)

# ESTELO: periciclo - formação de raízes laterais

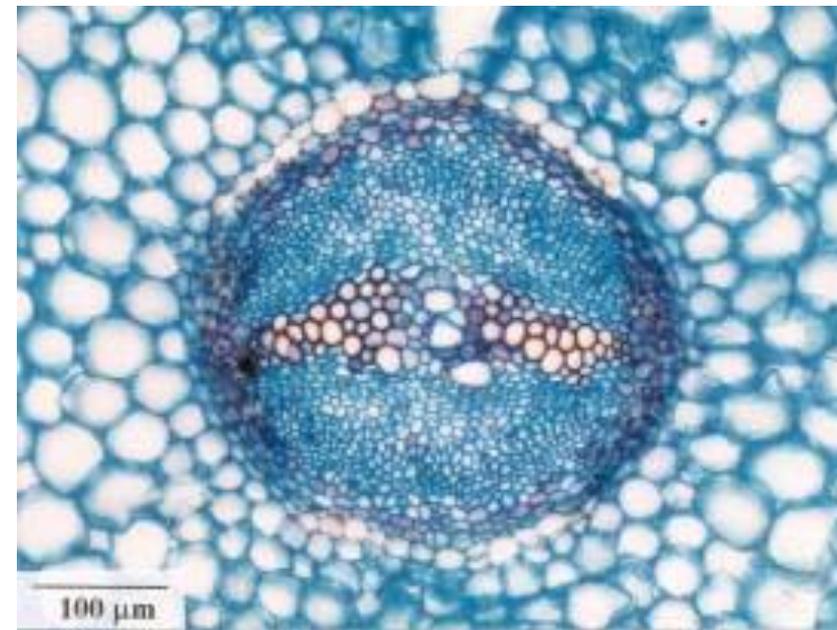
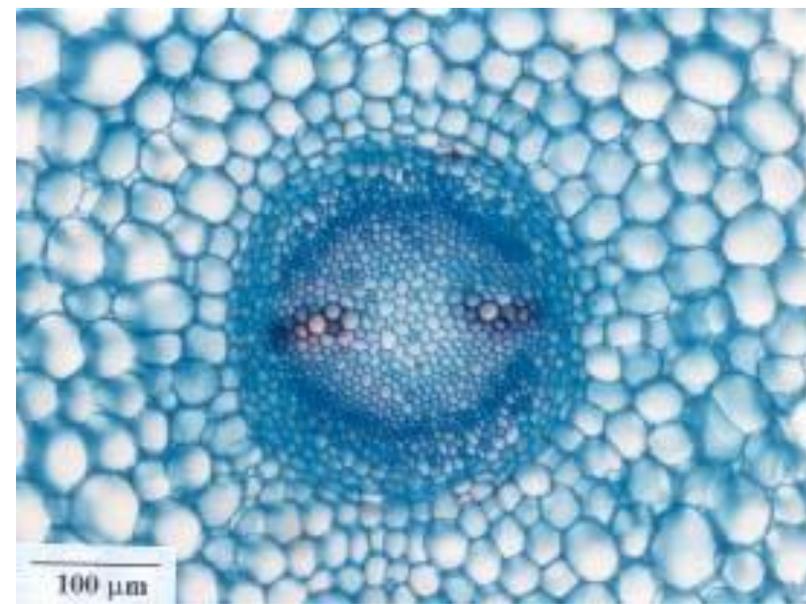
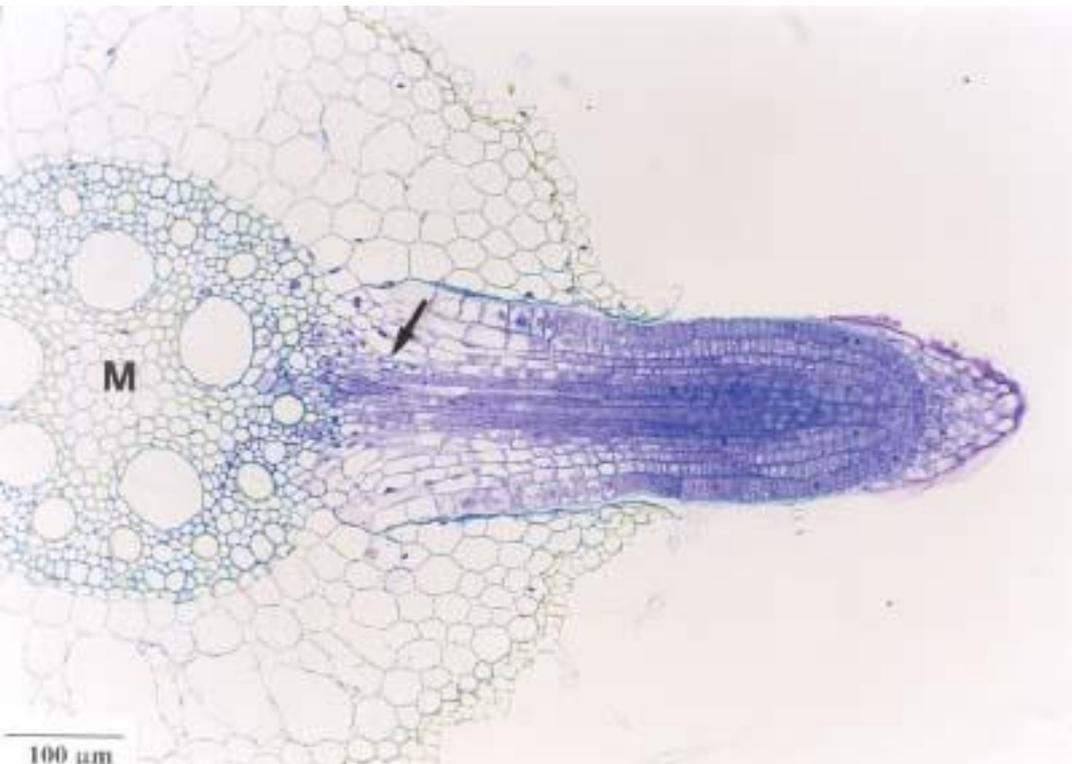
Aparecem na zona de ramificação

Origem endógena (divisões anticlinais e periclinais do per

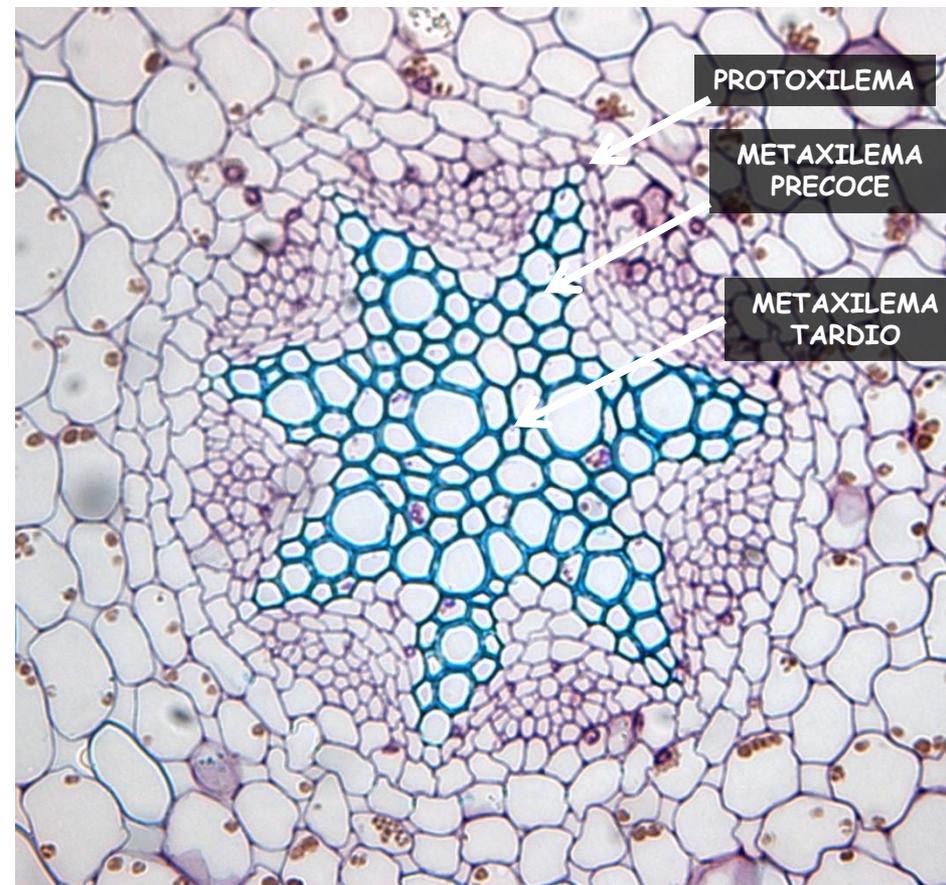
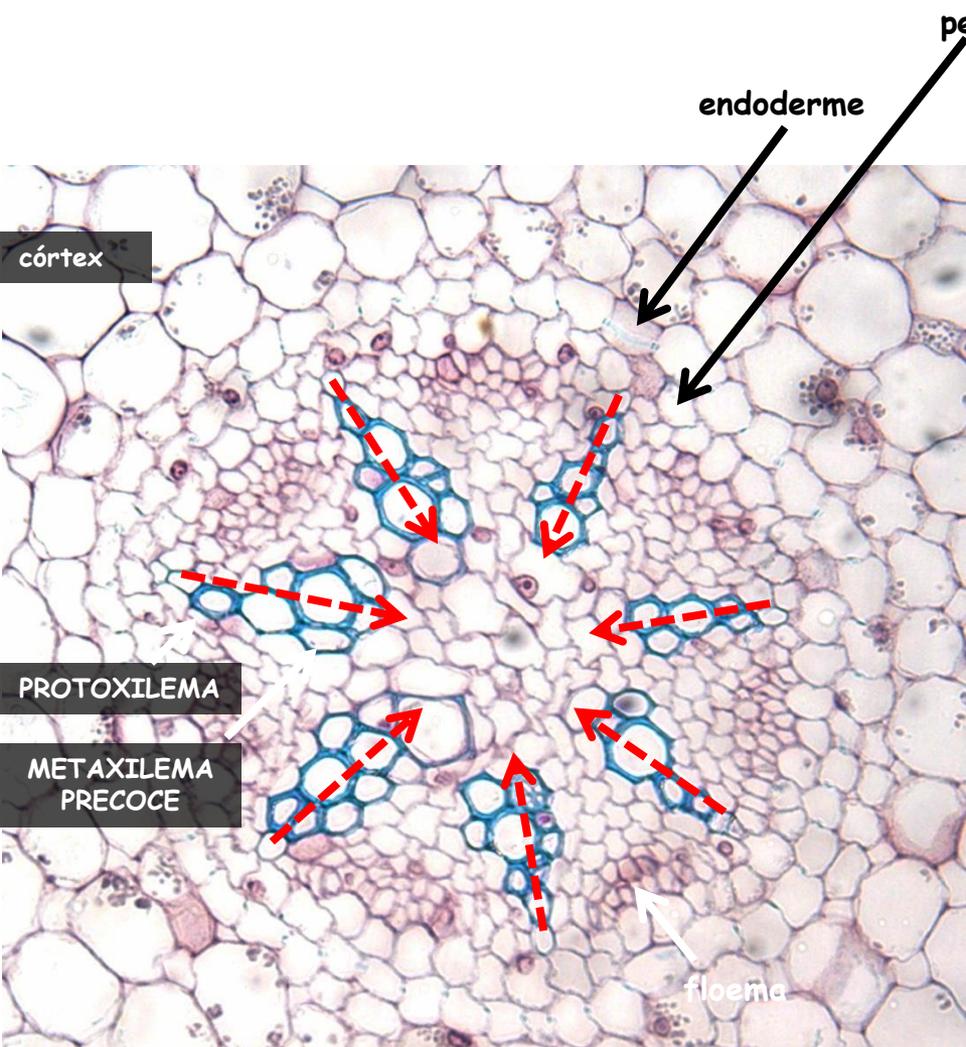


*Phaseolus vulgaris* (Leguminosae)

- Maturação centrípeta (exarco)
- Cilindro vascular: Oco ou sólido
  - diarca; triarca; tetraarca.
  - poliarca.



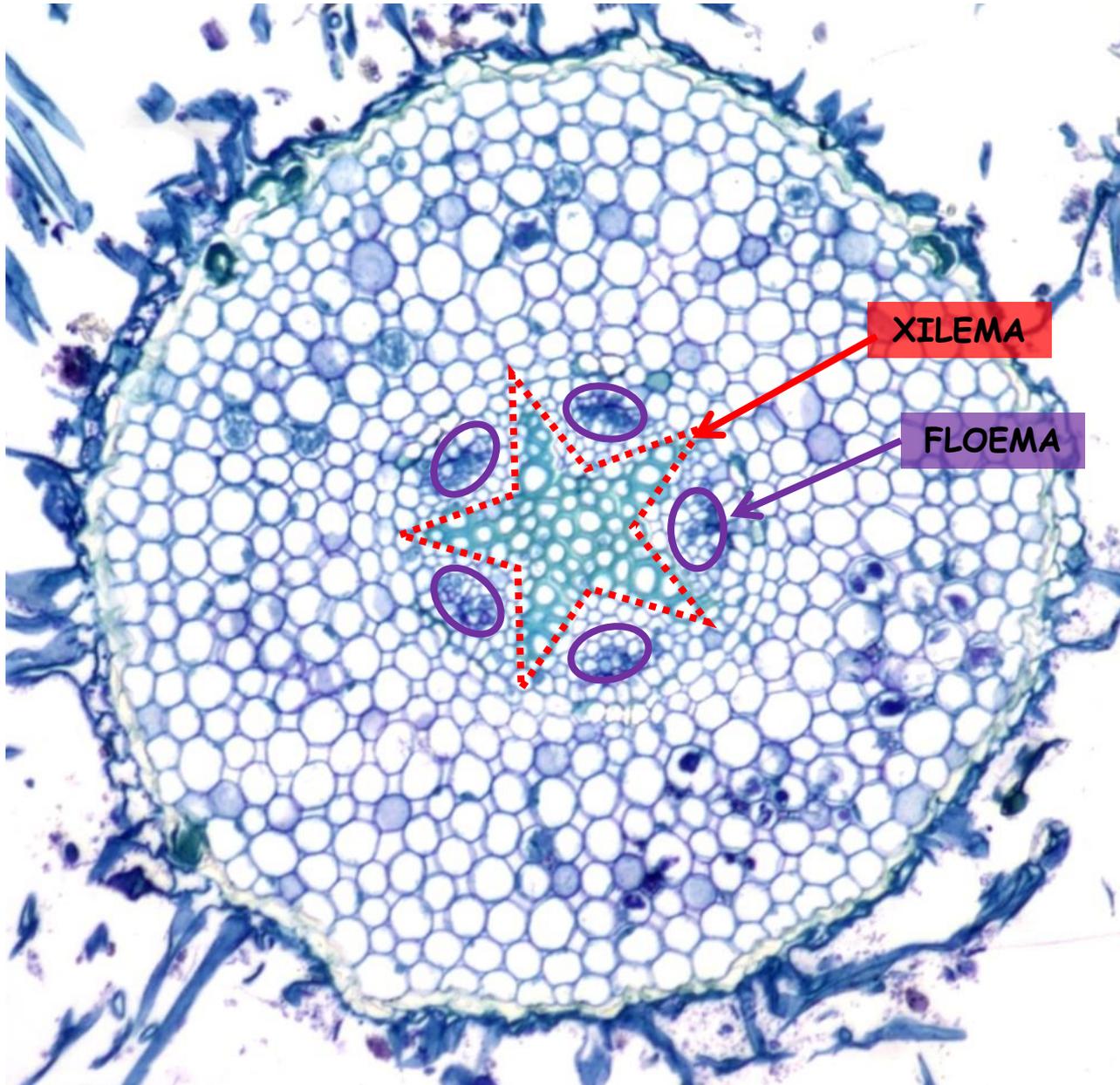
# ESTELO: maturação do xilema centripeta (exarca)



*Bixa orellana* (Bixaceae)

**RAIZ É UM ÓRGÃO EXARCO !**

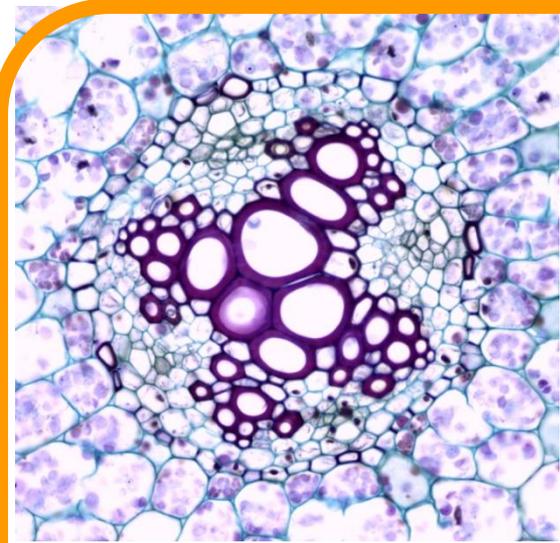
# ESTELO: xilema e floema alternados



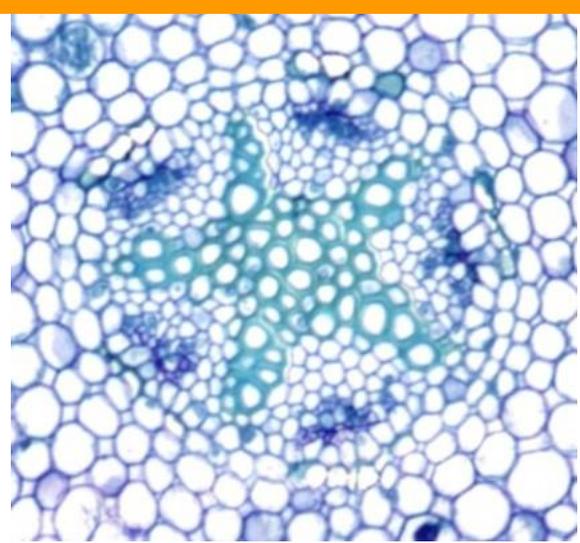
NÃO HÁ  
FORMAÇÃO DE  
FEIXES  
VASCULARES NA  
RAIZ !

Há cordões ou arcos  
do xilema  
alternados com  
floema.

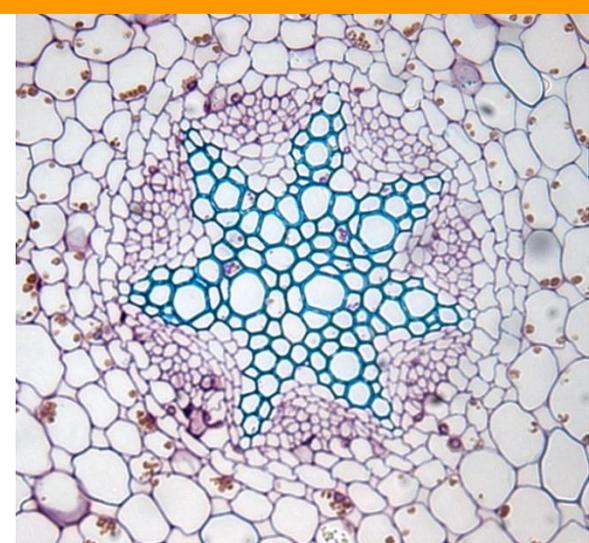
# ESTELO: variações



TETRARCA



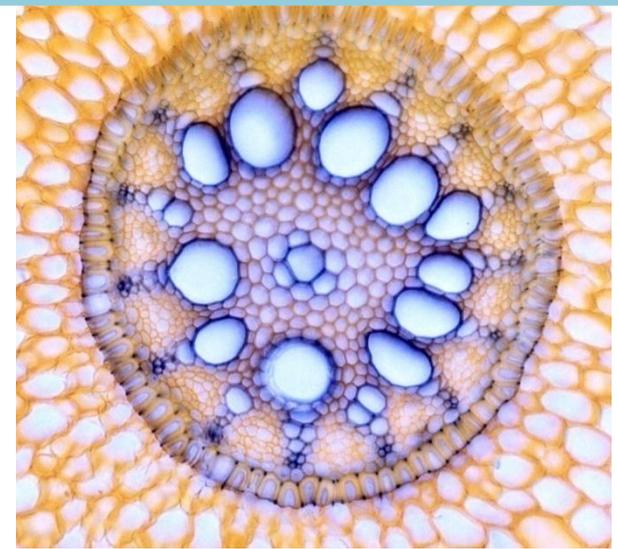
PENTARCA



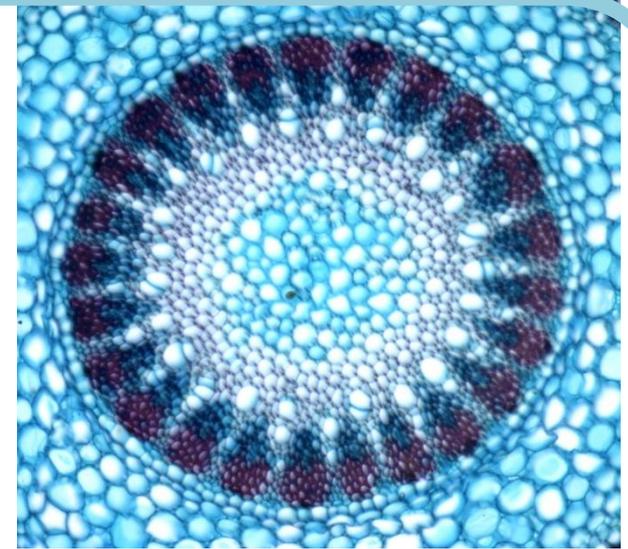
HEPTARCA

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# MONOCOTILEDÔNEAS



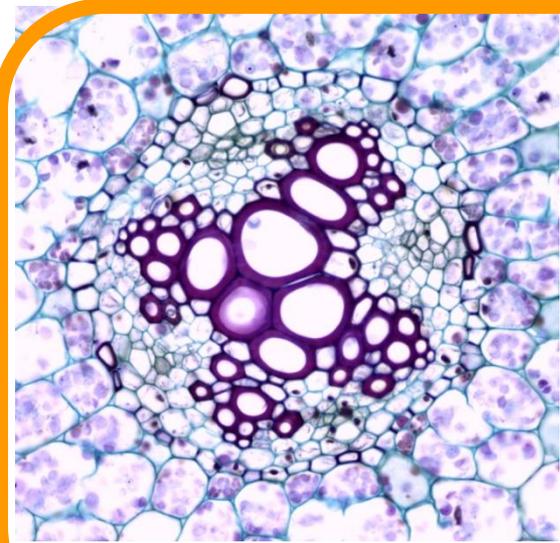
POLIARCA



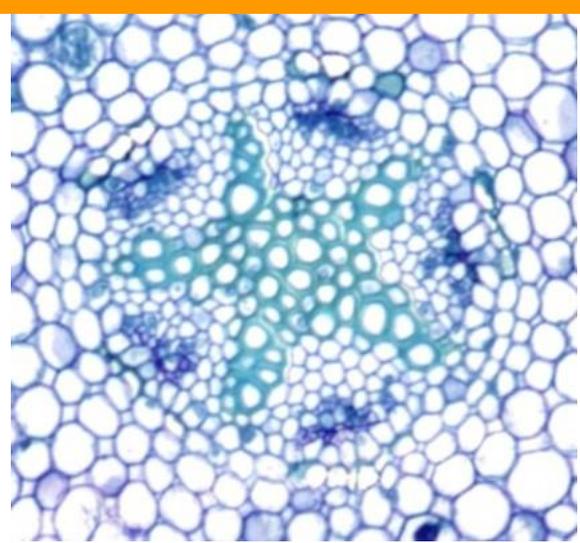
POLIARCA

# ESTELO: variações

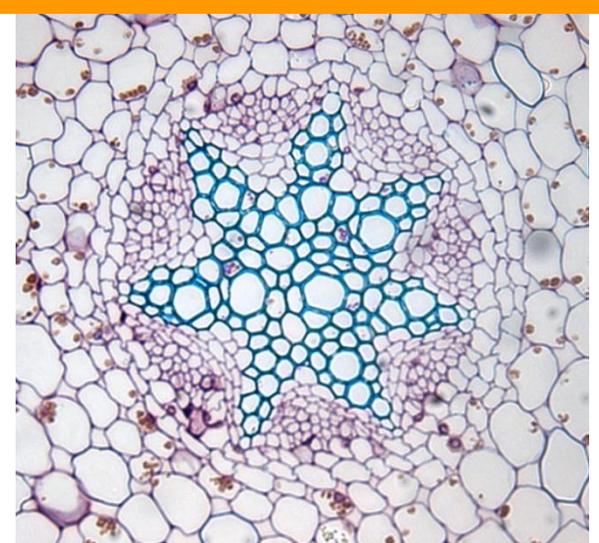
## Classificação dos cordões vasculares



TETRARCA



PENTARCA



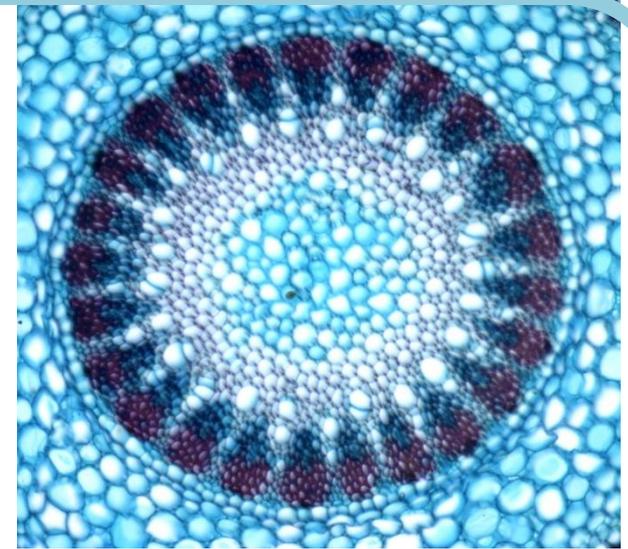
HEPTARCA

PROTOSTELO

**SIFONOSTELO**  
(medula no centro)



POLIARCA



POLIARCA

# RAIZ: crescimento secundário

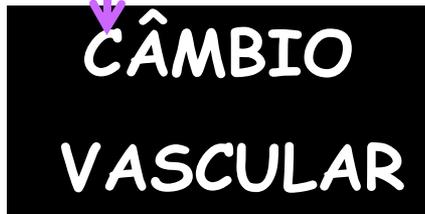




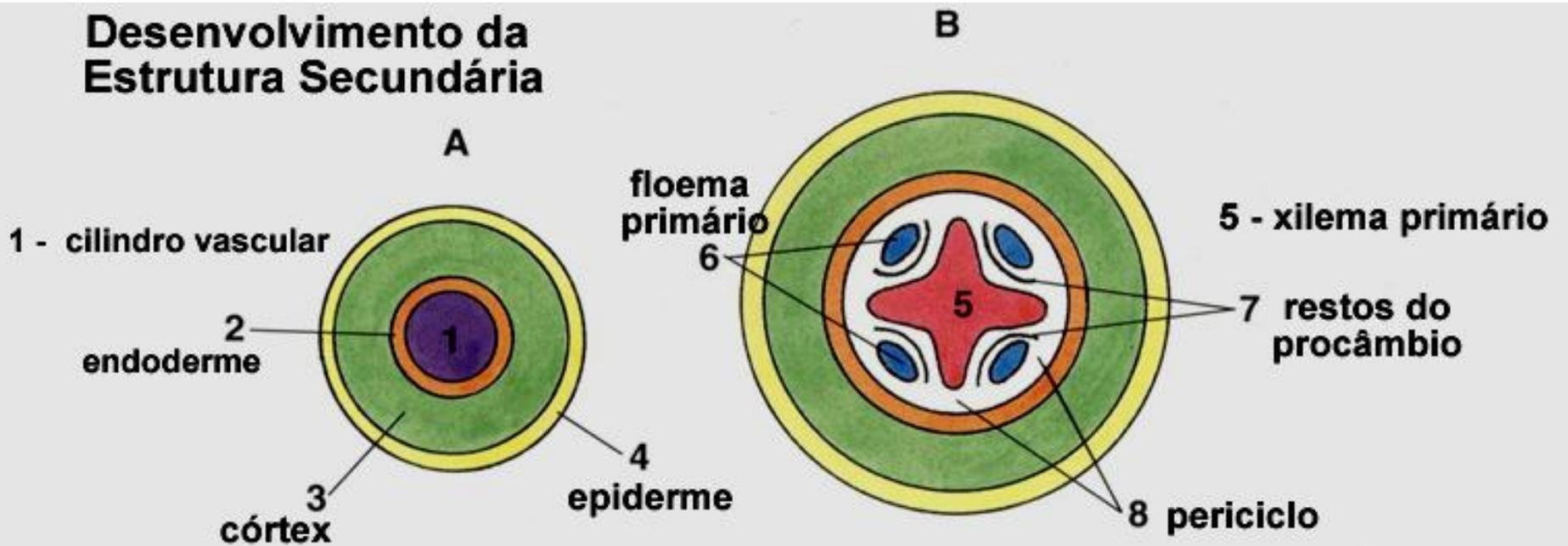
Periciclo

+

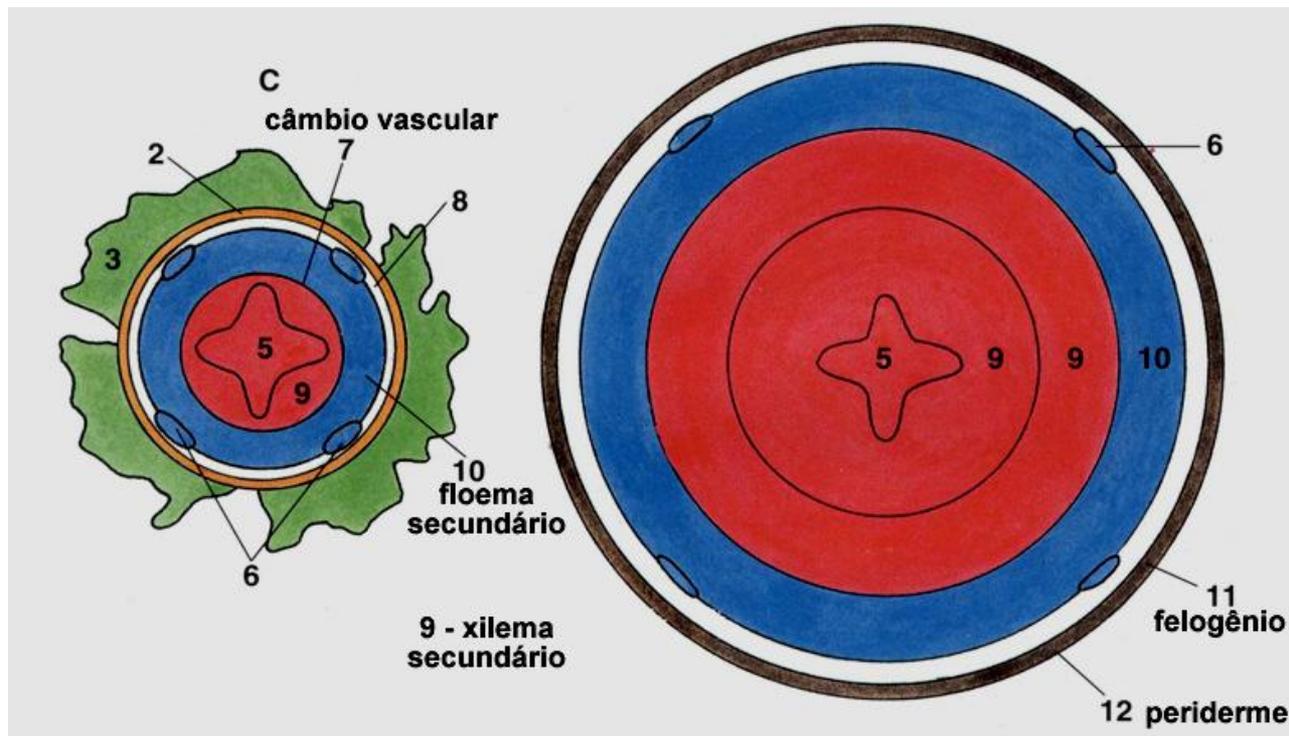
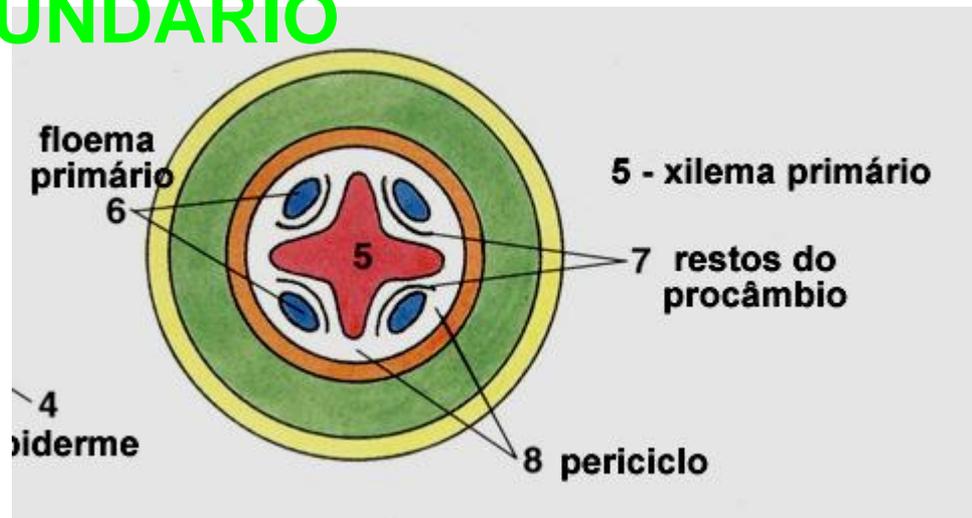
Células procambiais



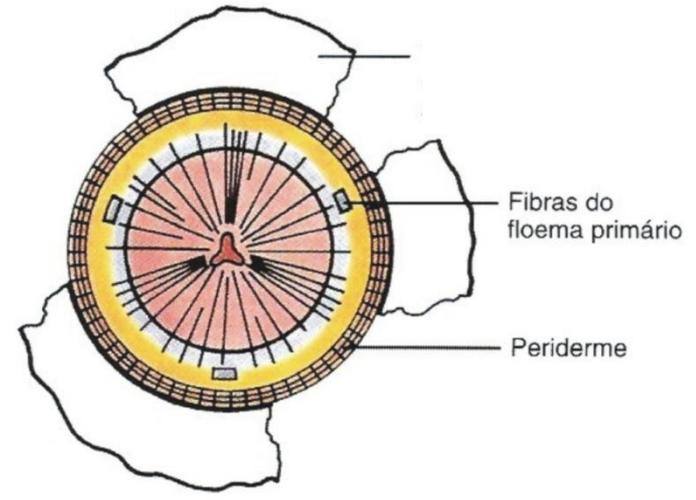
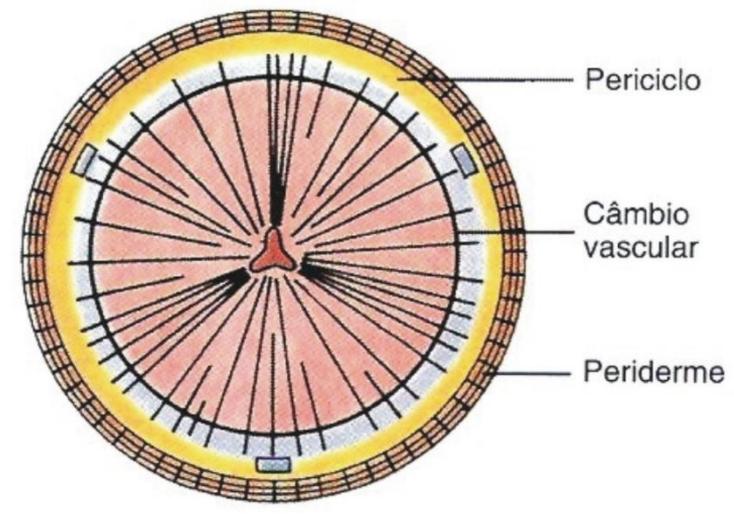
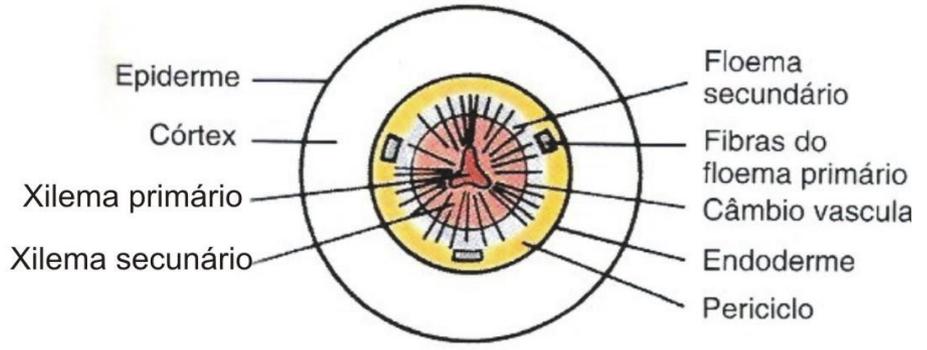
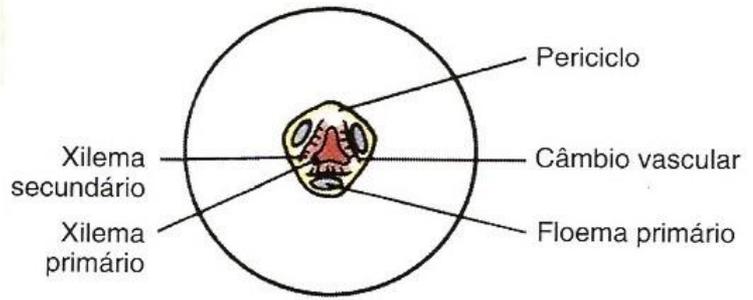
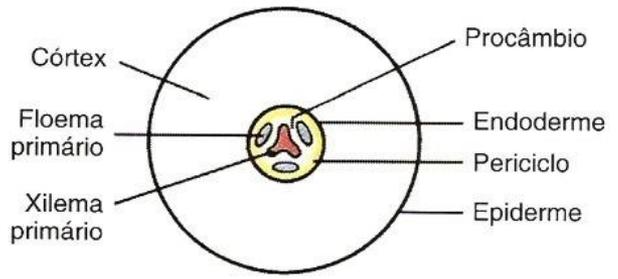
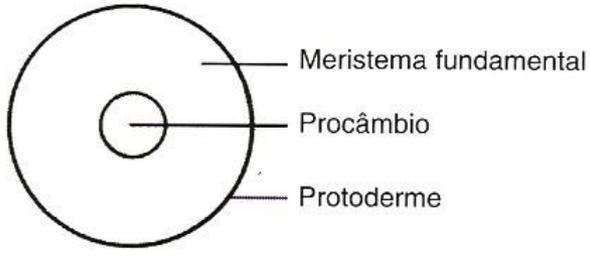
## Desenvolvimento da Estrutura Secundária



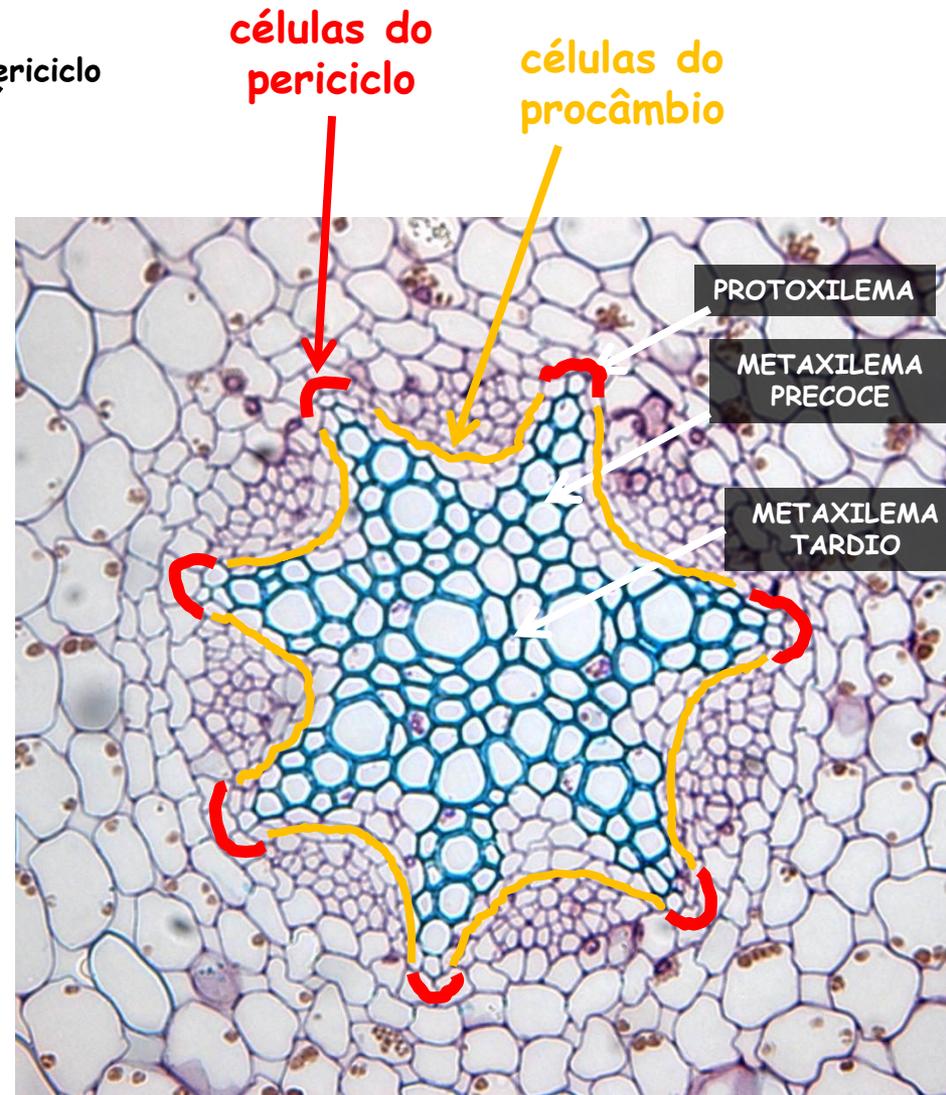
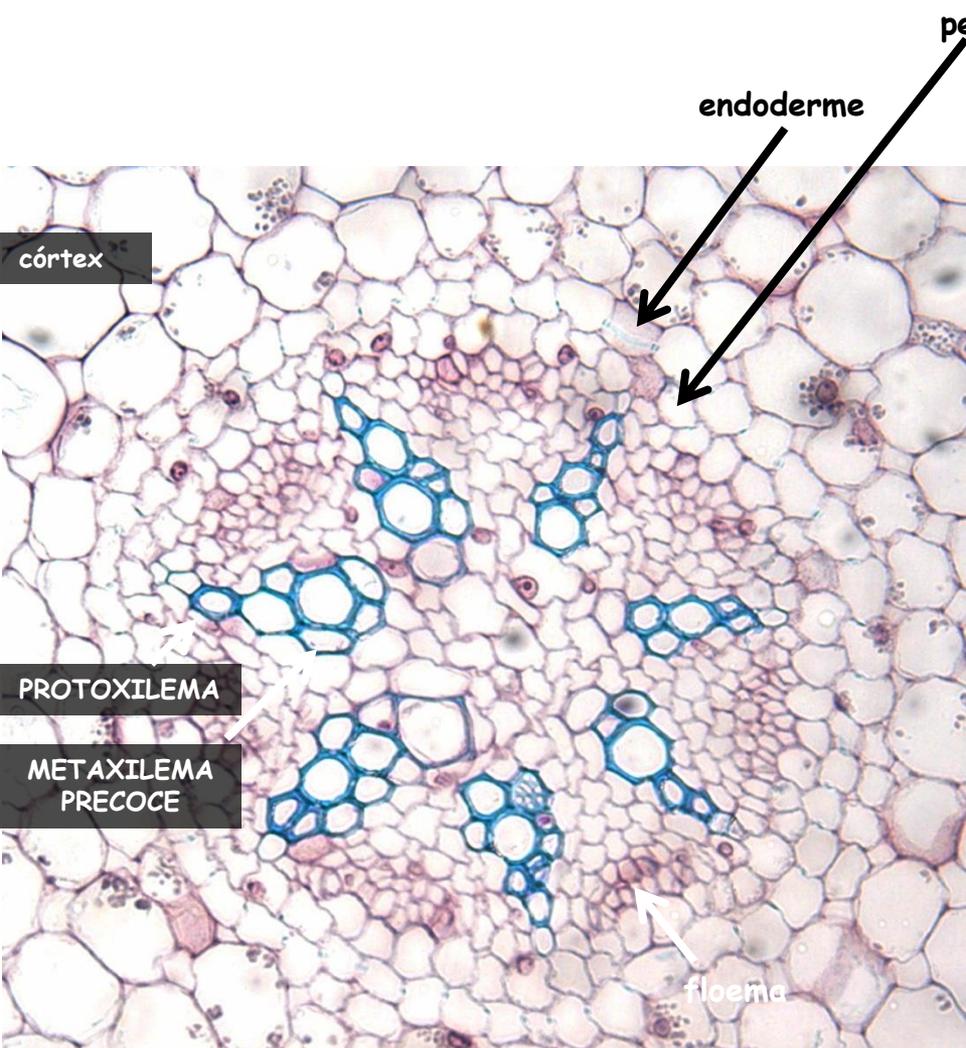
# RAIZ: CORTE CRESCIMENTO SECUNDÁRIO



# RAIZ

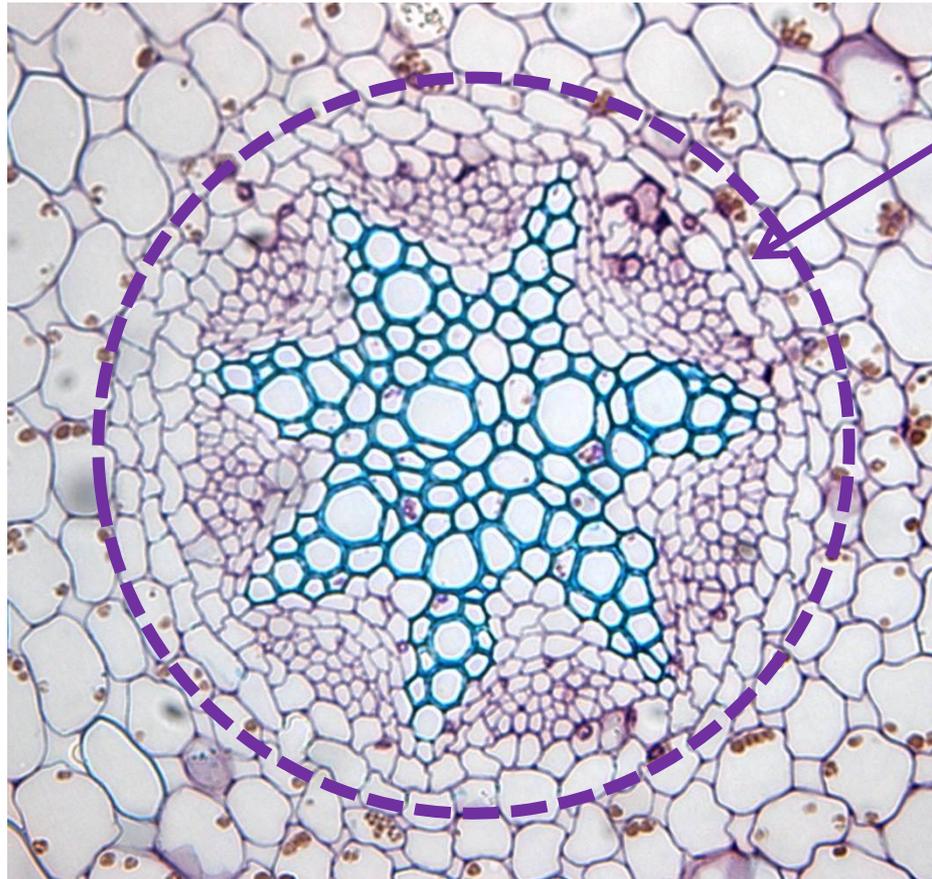


# CÂMBIO VASCULAR



*Bixa orellana* (Bixaceae)

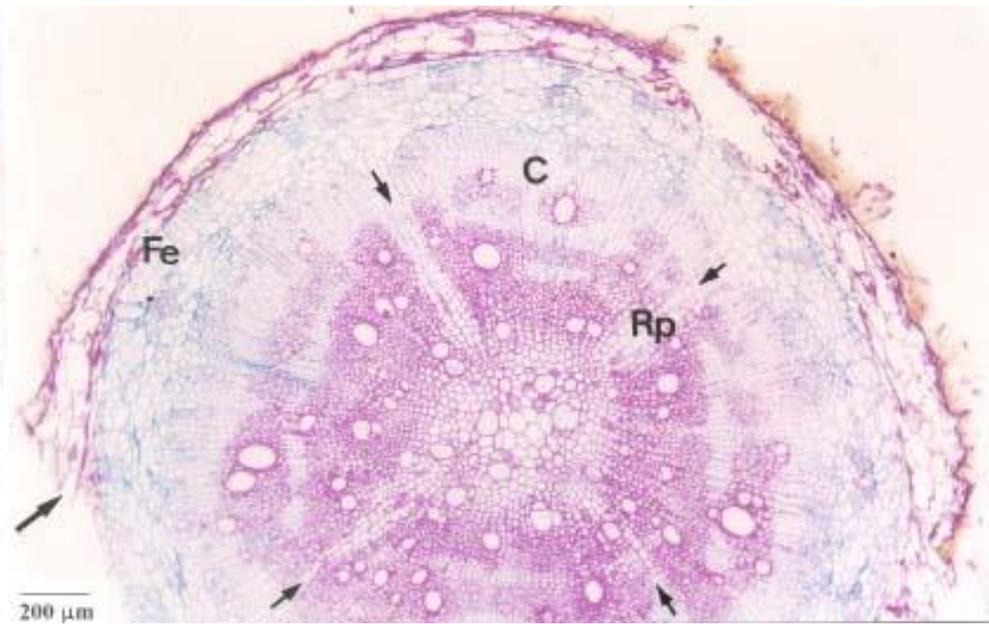
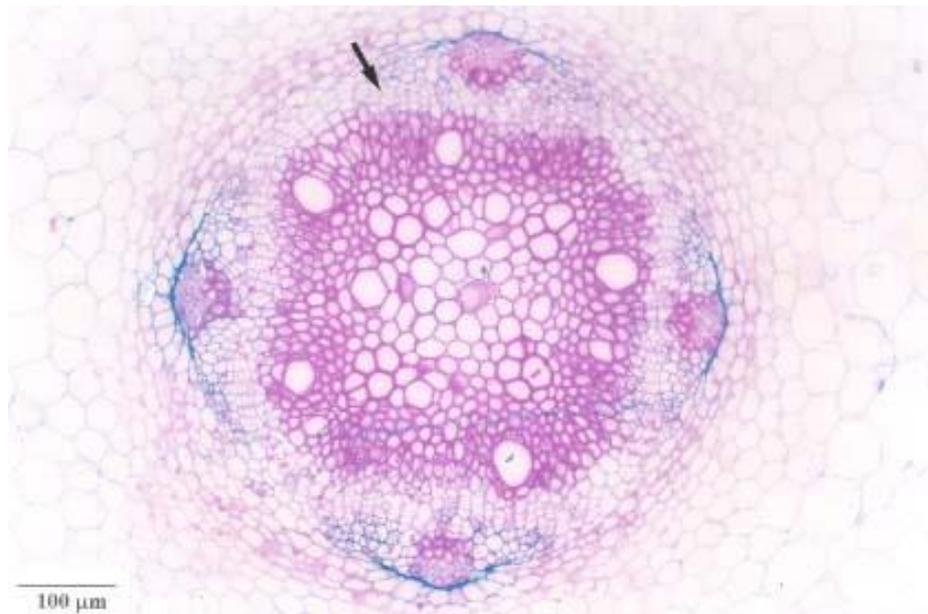
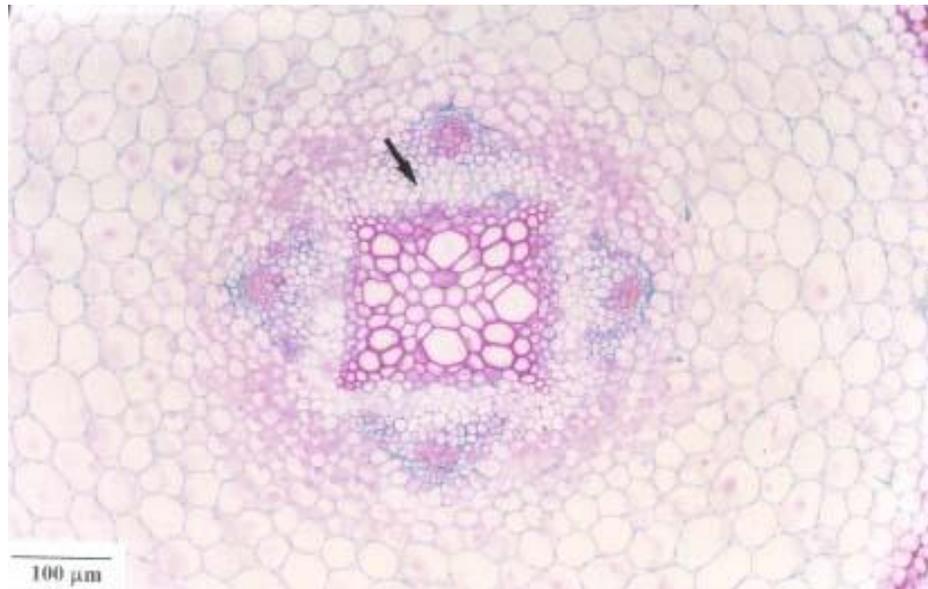
# FELOGÊNIO

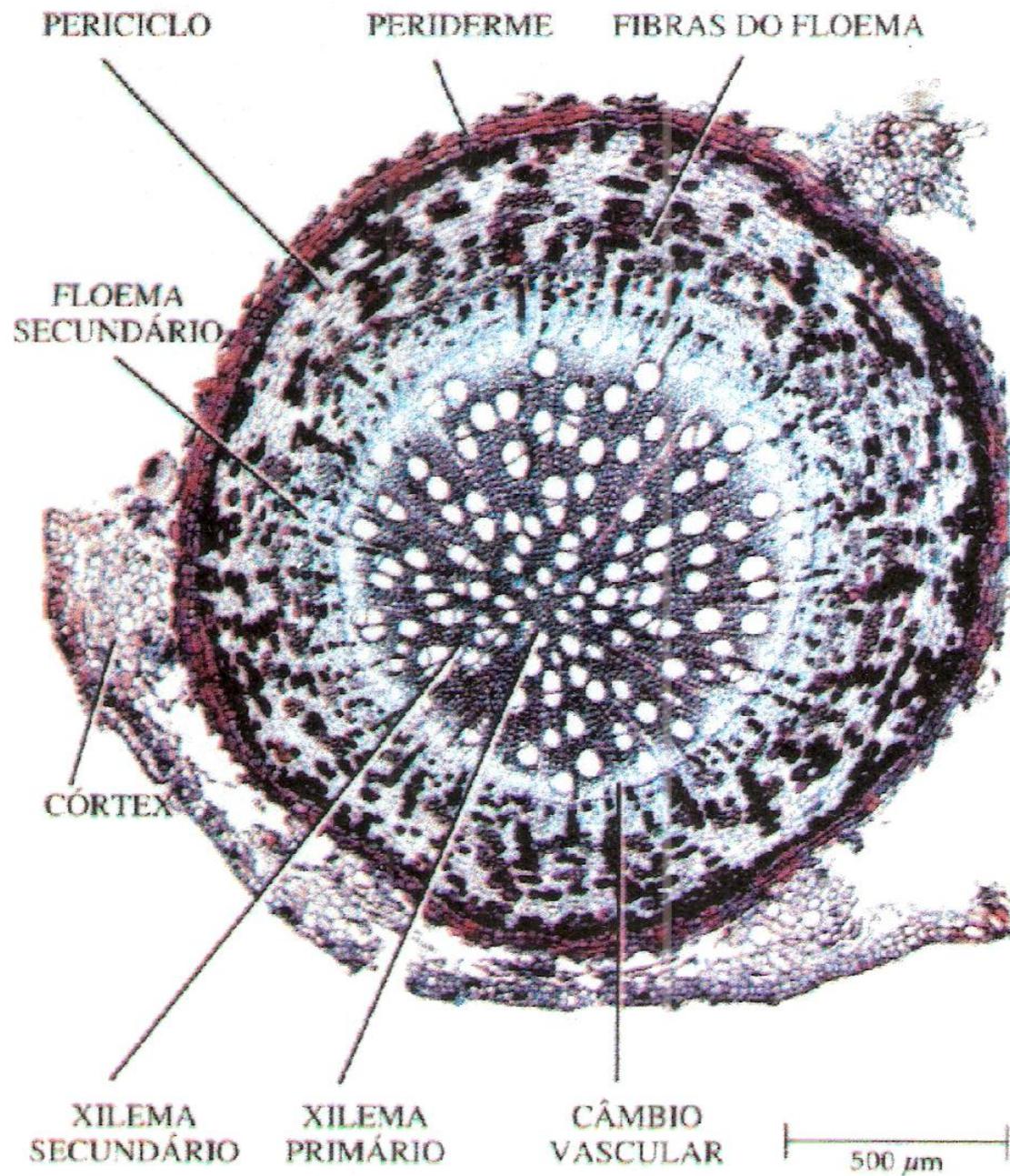


periciclo

## Estrutura Secundária:

- Câmbio vascular
- Felogênio





Corte transversal de raiz de salgueiro (*Salix* sp.)

# CAULE

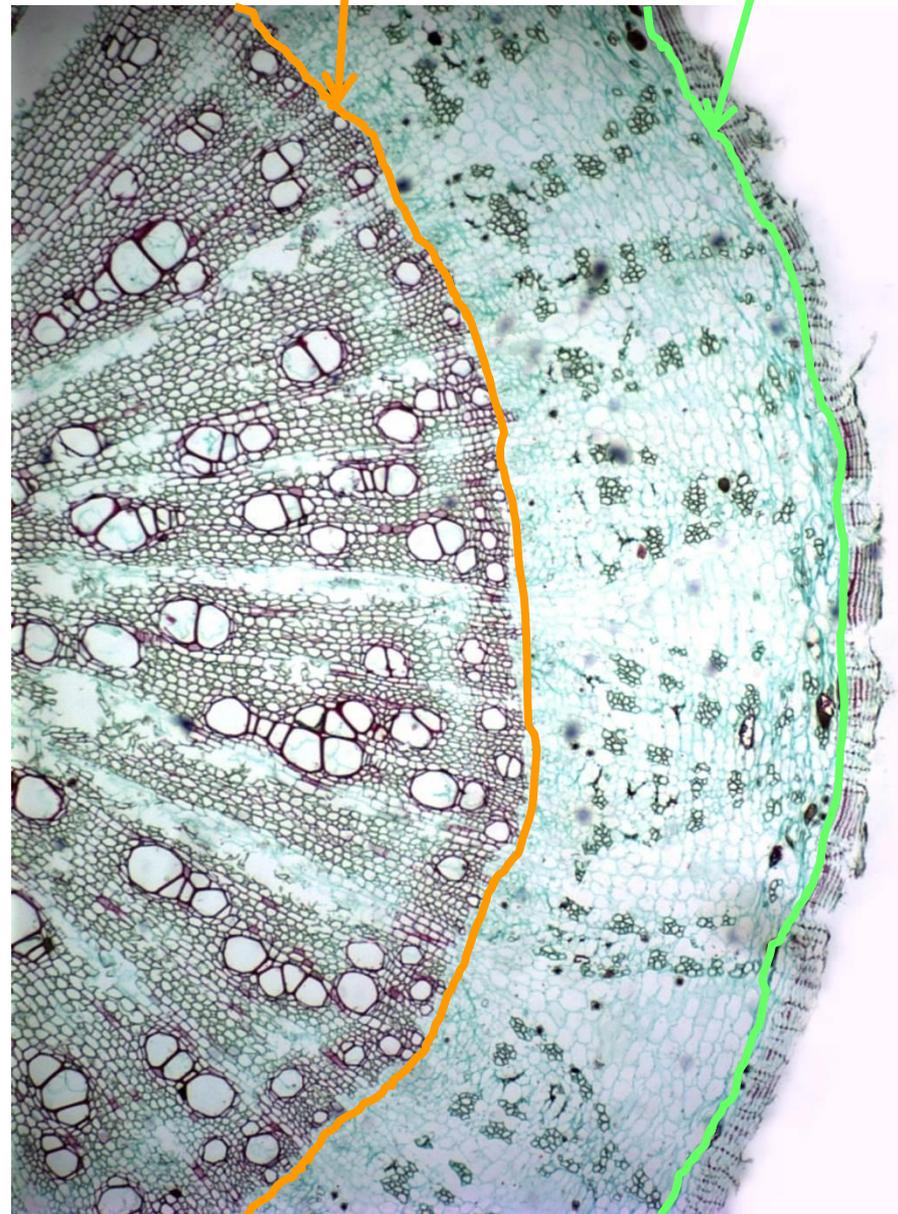
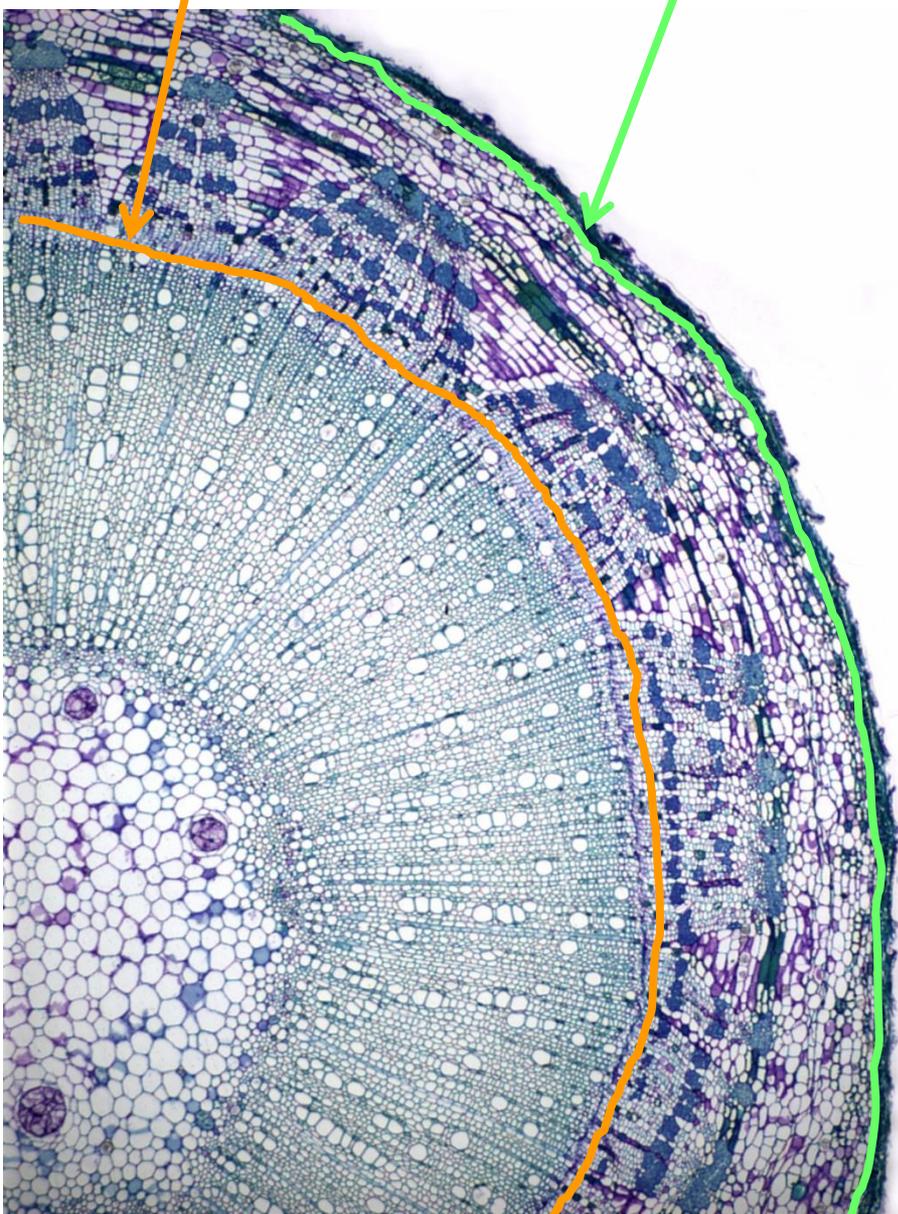
# RAIZ

CÂMBIO VASCULAR

FELOGÊNIO

CÂMBIO VASCULAR

FELOGÊNIO



# Questões:

- 1- Quais as funções da raiz?**
- 2- Qual a importância e função da endoderme?**
- 3- Caracterize anatomicamente o sistema vascular das raízes em crescimento primário.**
- 4- Qual a função da coifa?**