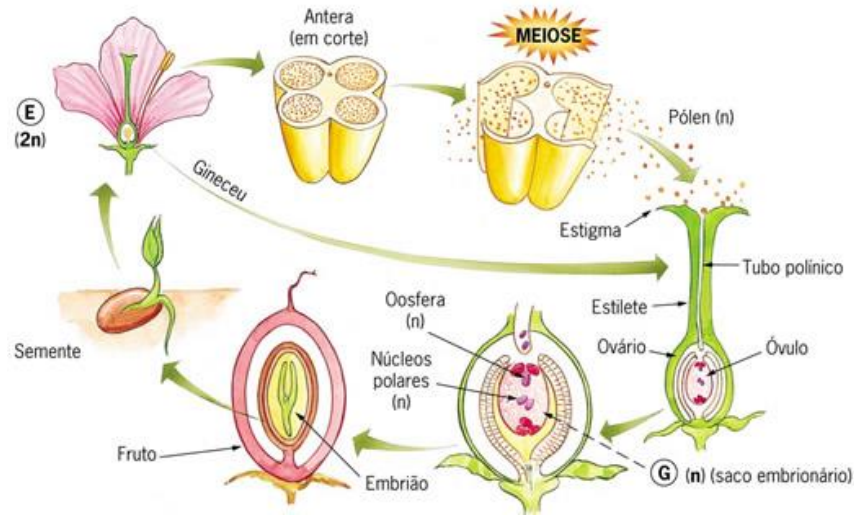
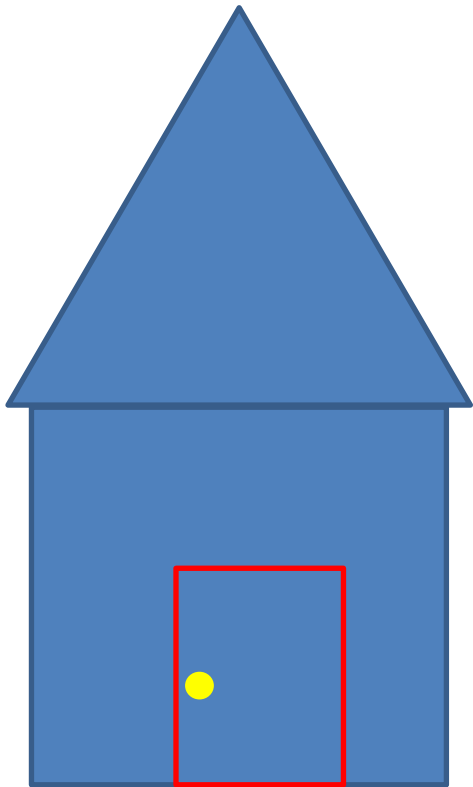
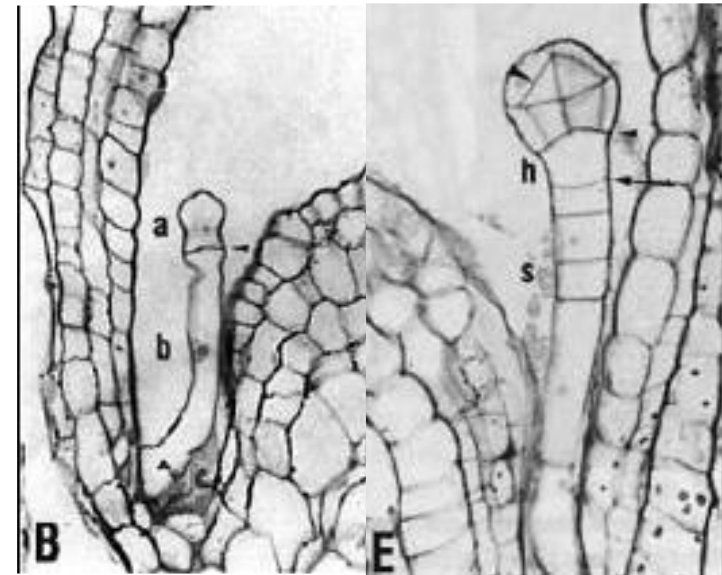
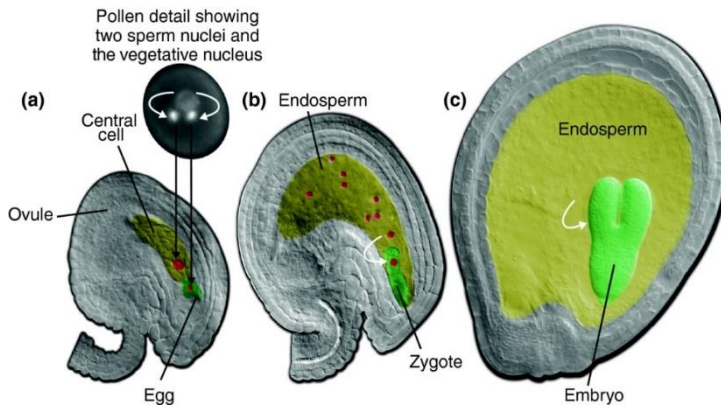


# Teoria da Compartimentalização

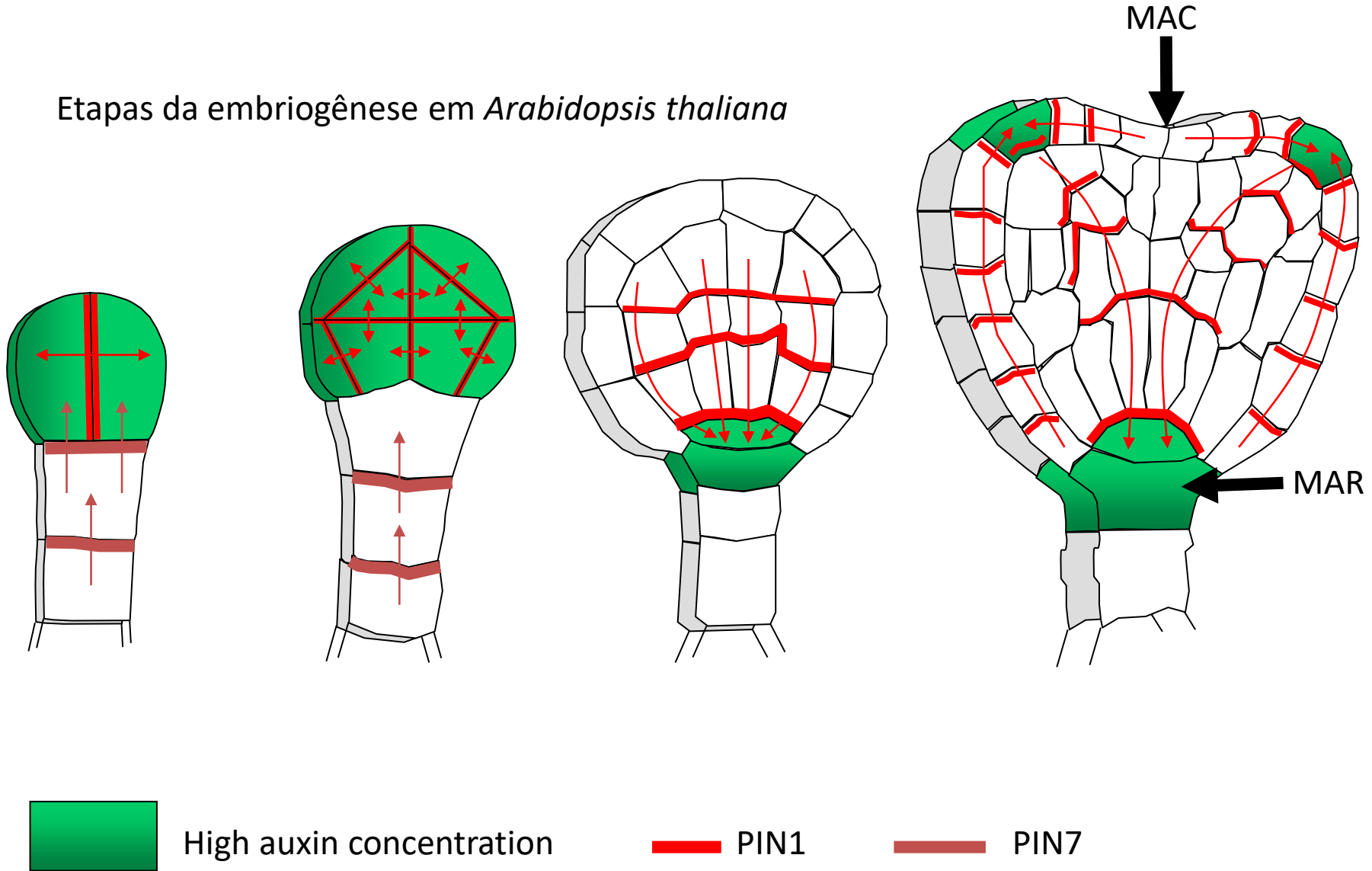


Antonio García-Bellido  
1936-

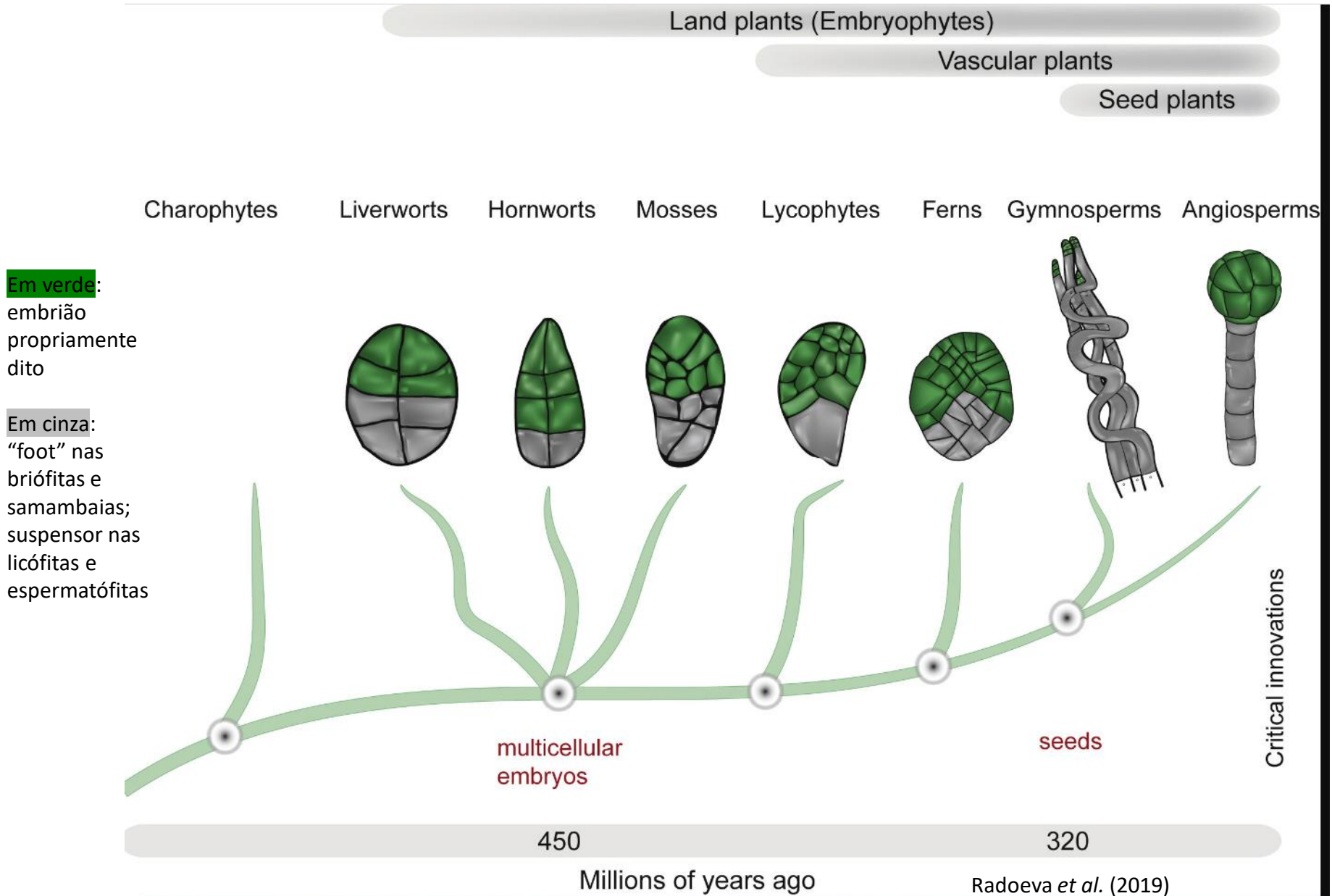


# Aula 03 – Estabelecimento dos meristemas apicais e diferenciação dos tecidos primários

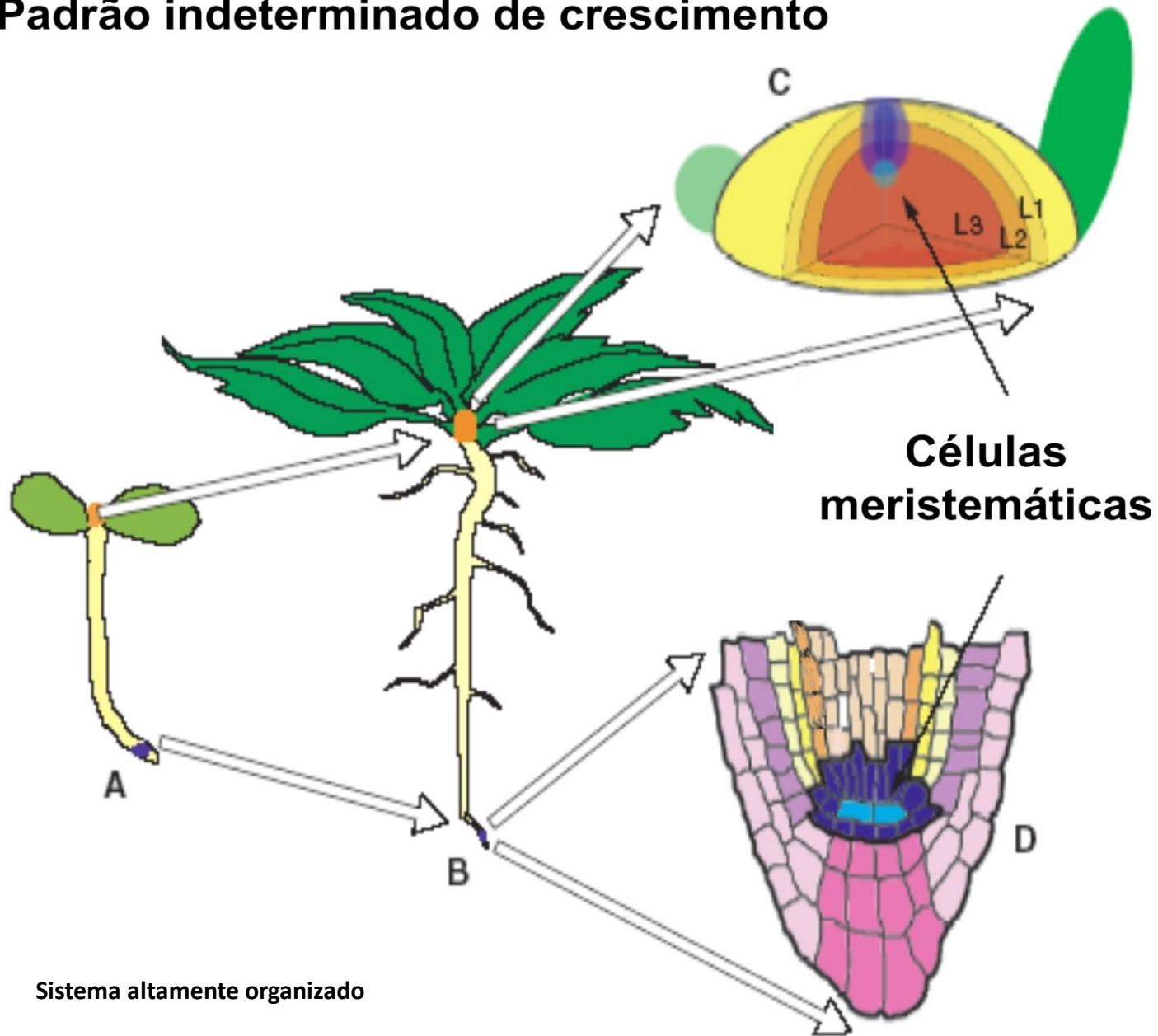
## Etapas da embriogênese em *Arabidopsis thaliana*

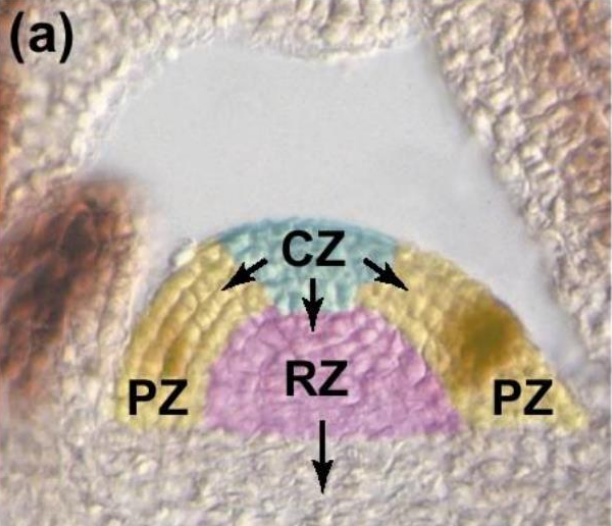


# Diferentes embriões ao longo da evolução das plantas terrestres



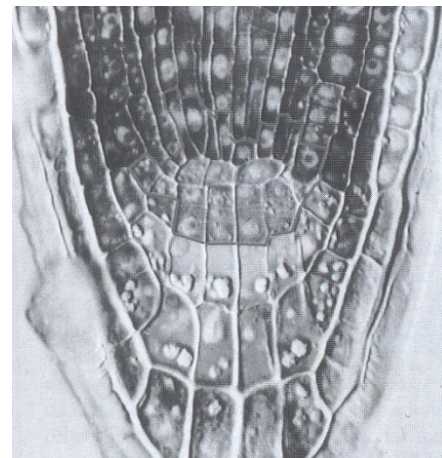
# Padrão indeterminado de crescimento



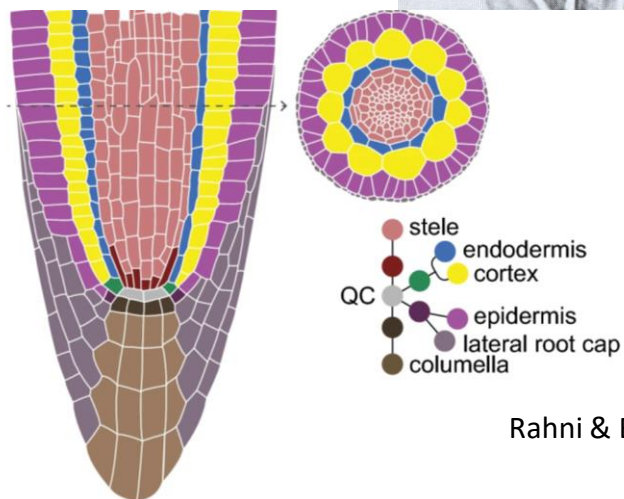


Meristema apical caulinar

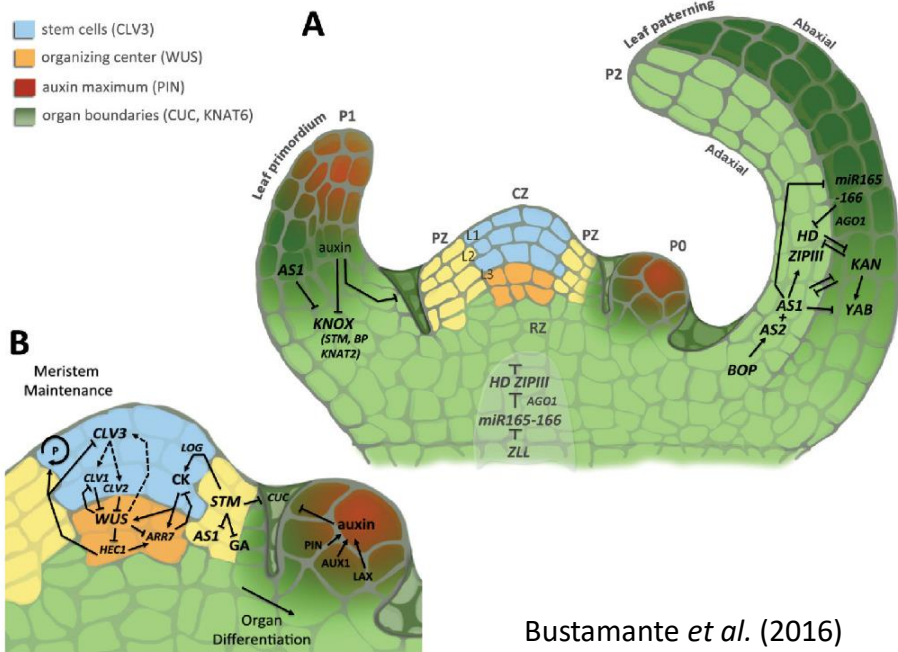
Meristema apical radicular



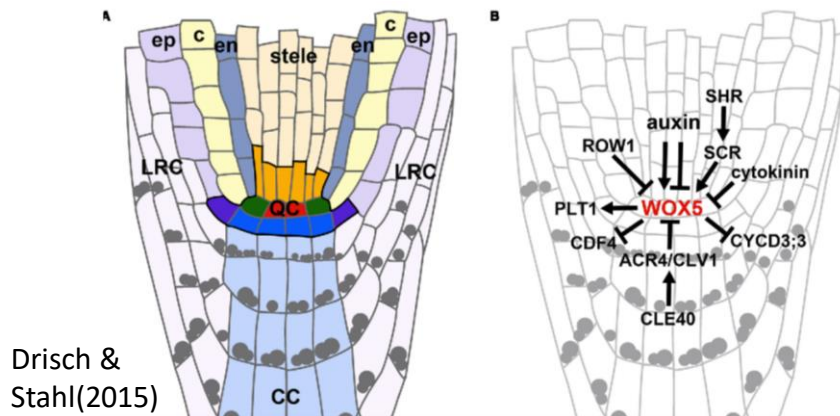
CZ – zona central; PZ – zona periférica; RZ – zona medular



Rahni & Birnbaum (2019)



Bustamante *et al.* (2016)



Drisch & Stahl (2015)

**Meristema apical caulinar vegetativo**  
**x**  
**Meristema apical caulinar reprodutivo**

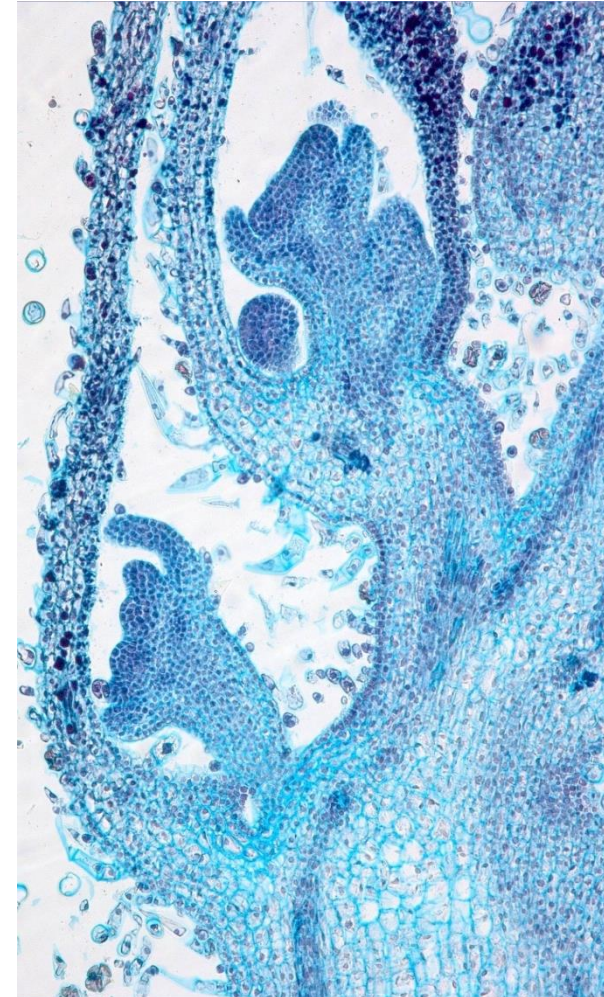
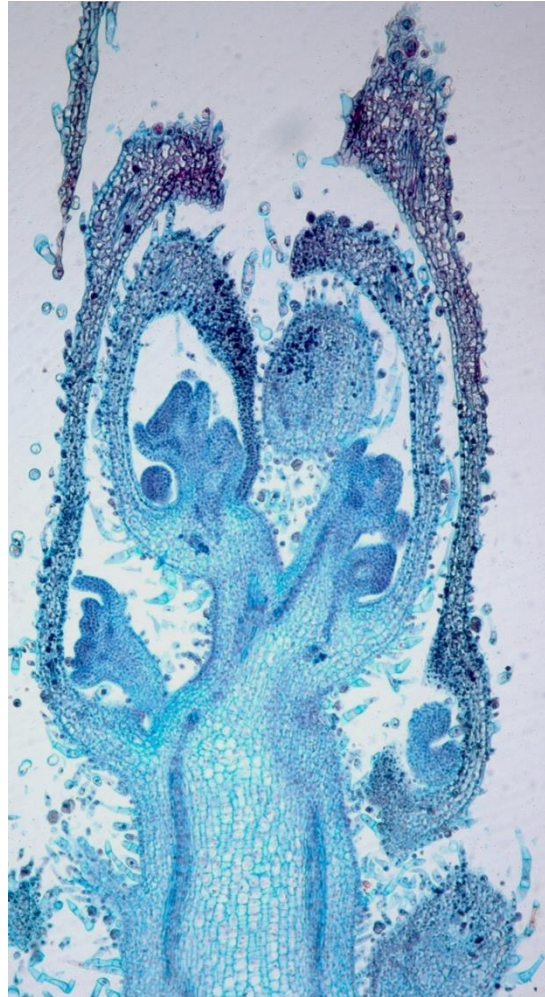


**Cóleus**  
***Plectranthus* sp,**  
**Lamiaceae**  
**Eudicotiledônea**

# Meristema reprodutivo



Cóleus  
*Plectranthus* sp,  
Lamiaceae  
Eudicotiledônea



# Atividade do meristema apical caulinar

## *Pinus longaeva* (cerca de 5000 anos!!!)





# Exemplos de plantas de vida curta

*Petroselinum crispum* – salsinha – 2 anos

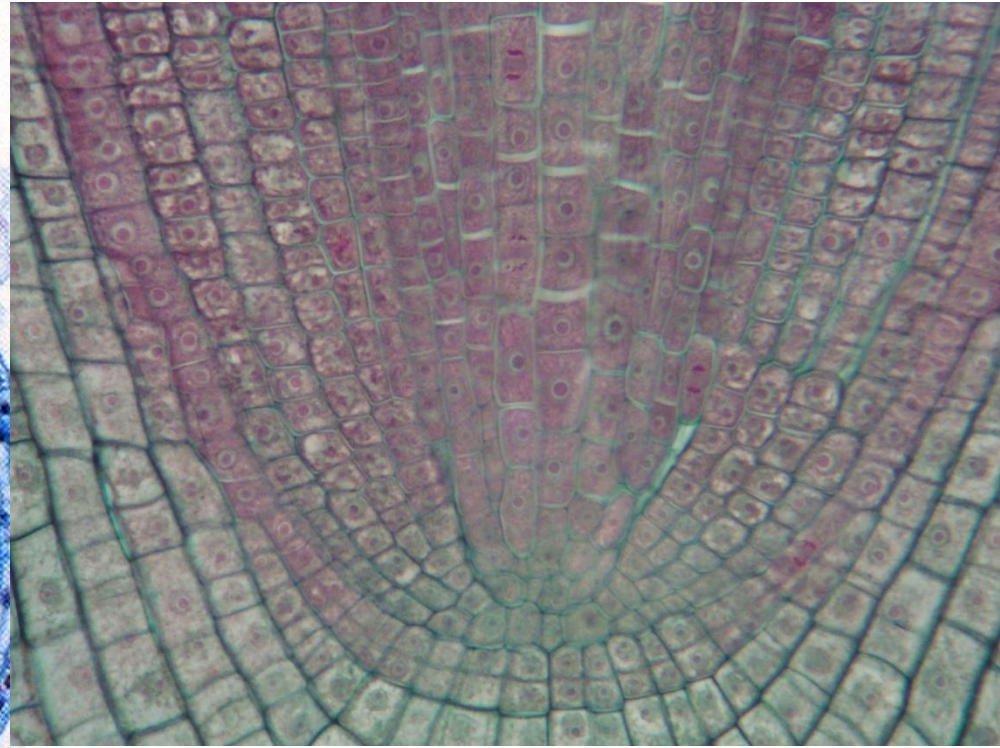
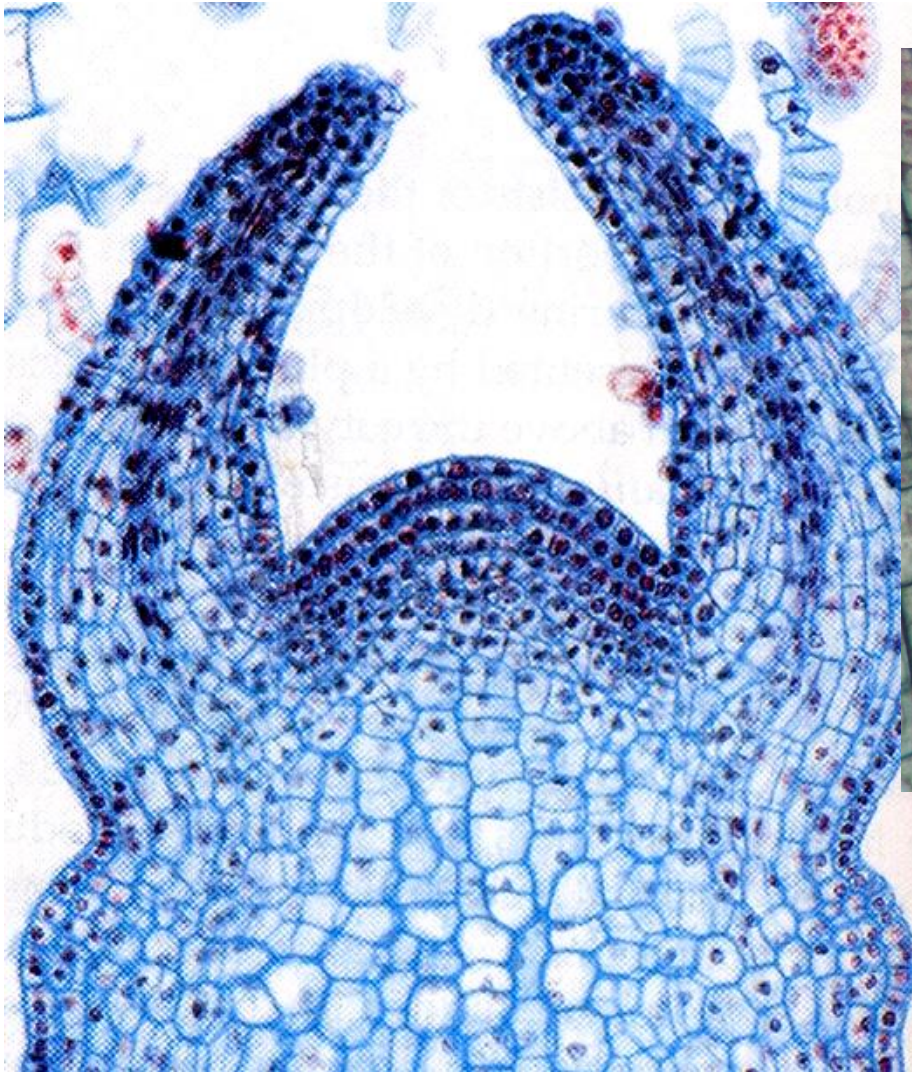


*Brassica rapa* – canola ( 5 semanas)



Meristema apical caulinar

Meristema apical radicular

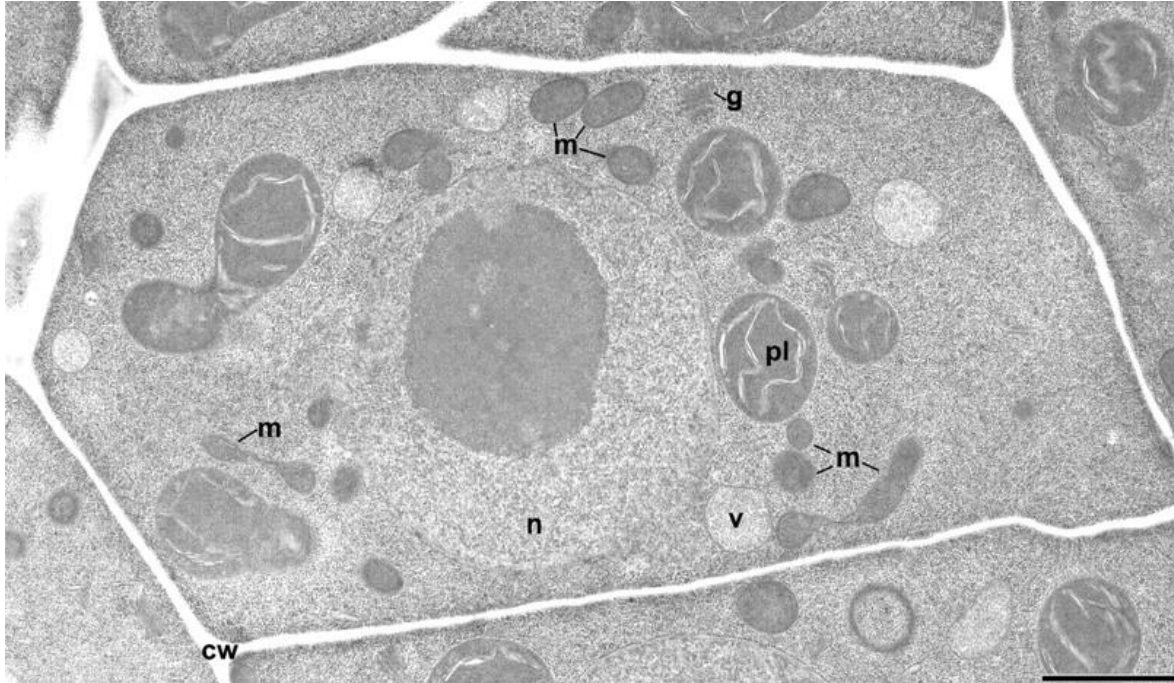


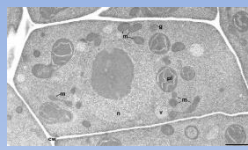
Melo-de-Pinna & Cruz (2020)

Melo-de-Pinna & Menezes (2003)

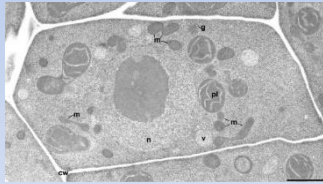
# Célula meristemática

Citoplasma denso e núcleo proeminente

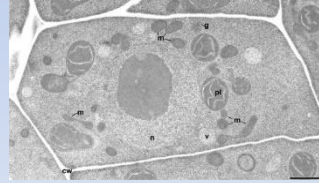




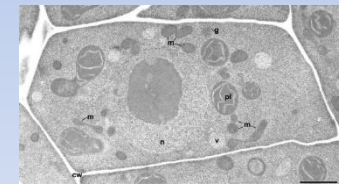
Promeristema (baixa atividade mitótica)



protoderme



Meristema fundamental



procâmbio

Tecidos meristemáticos apicais ou primários: derivadas do promeristema com intensa atividade mitótica

Epiderme

Sistema de revestimento

Periciclo, xilema e floema primários

Sistema vascular

Tecidos fundamentais:  
parênquima, colênquima e  
esclerênquima

Sistema fundamental ou de preenchimento

# TIPOS CELULARES

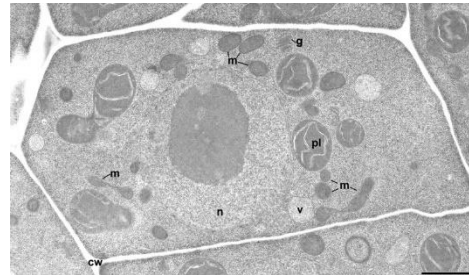
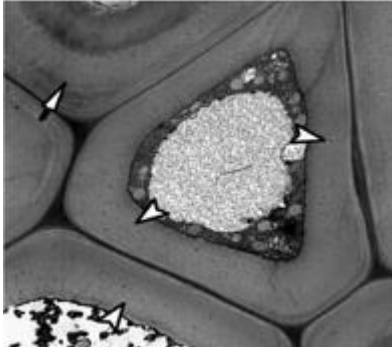
## Diferenciação estrutural a partir de uma célula meristemática

Célula condutora do floema

Plantas  
vasculares

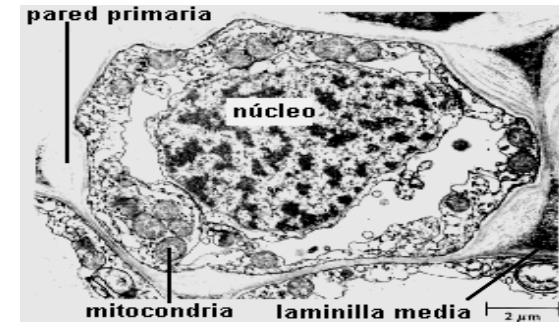
Célula condutora do xilema

Célula esclerenquimática

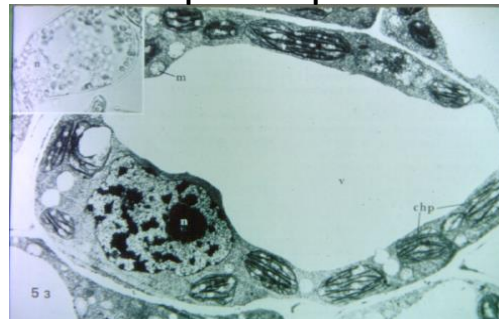


Célula dos tecidos meristemáticos

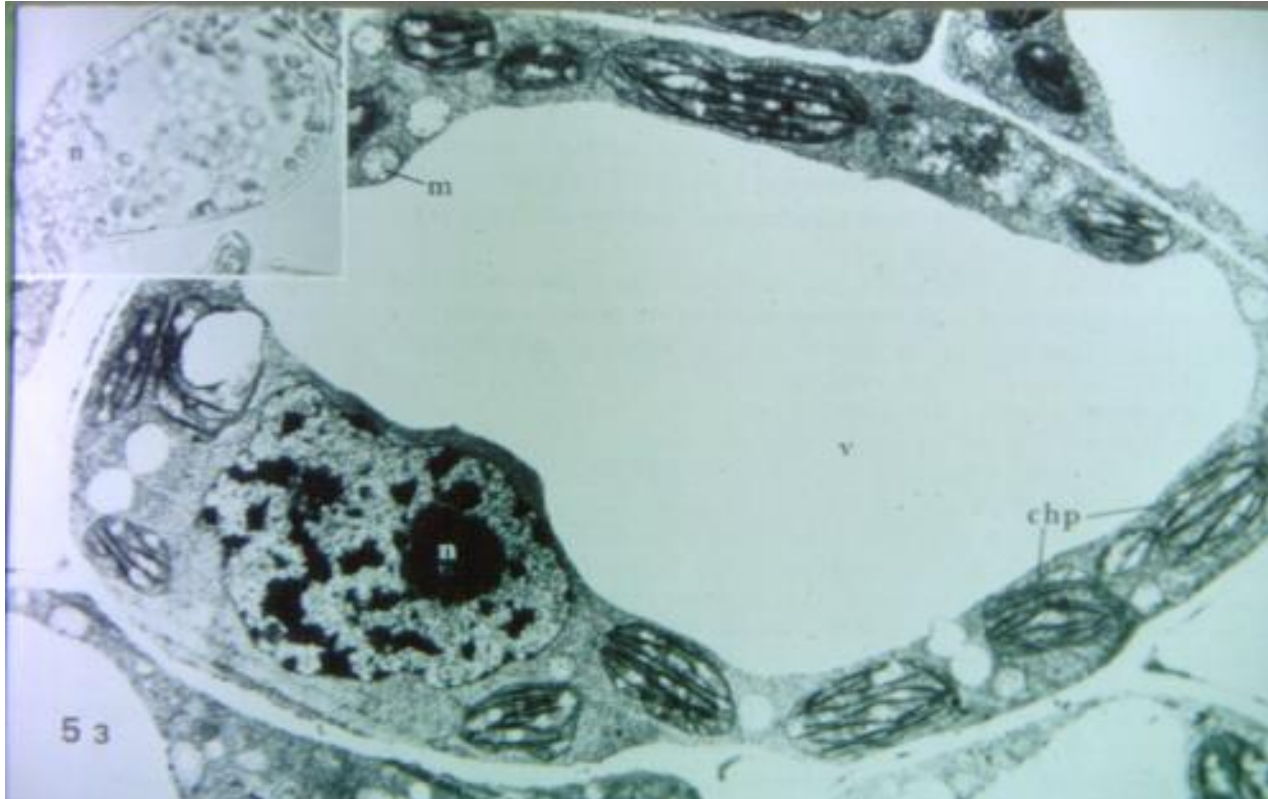
Célula colenquimática



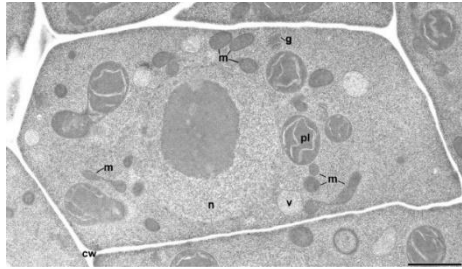
Célula parenquimática



**CÉLULA PARENQUIMÁTICA - pode fazer parte dos três sistemas (revestimento, fundamental e vascular)**

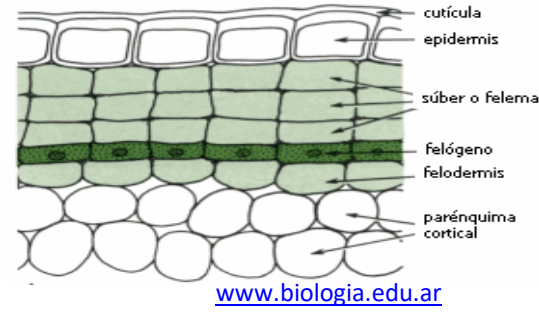
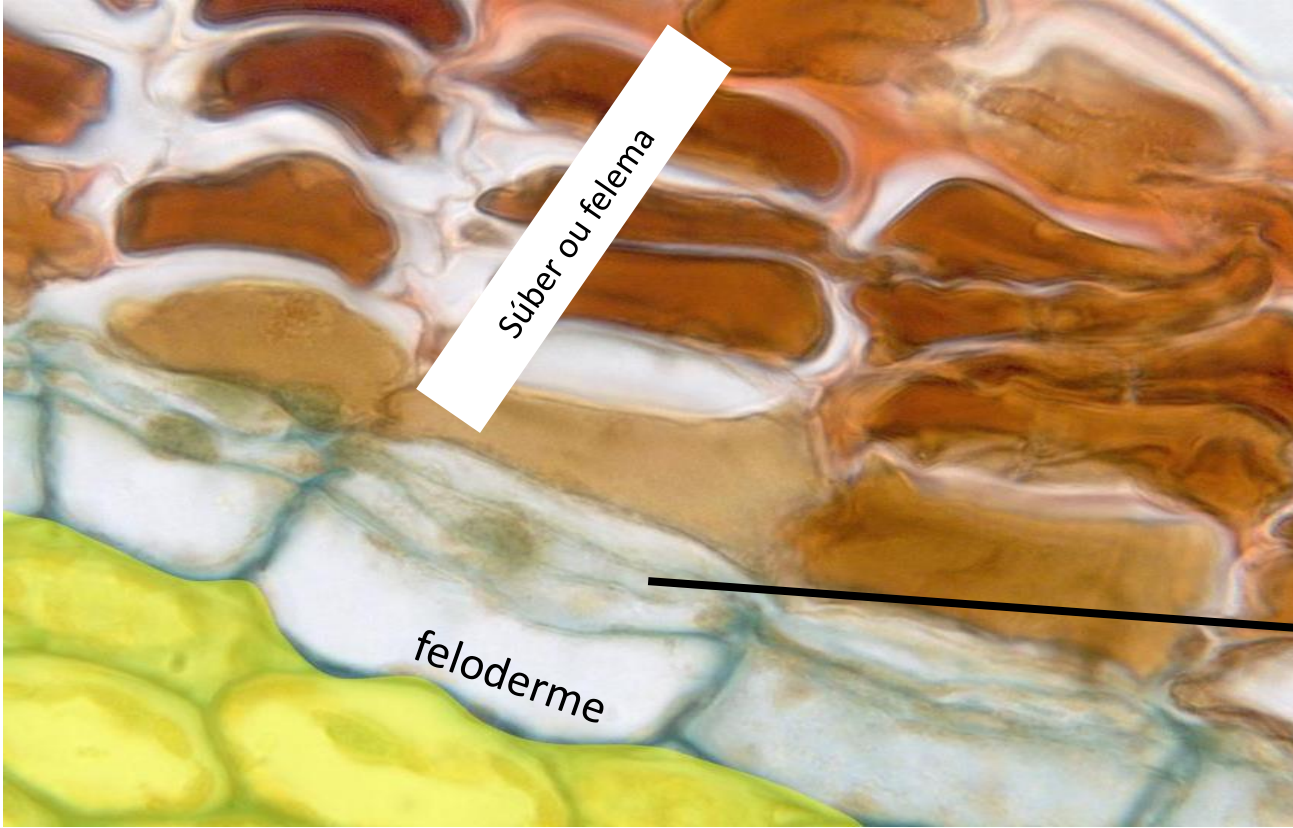
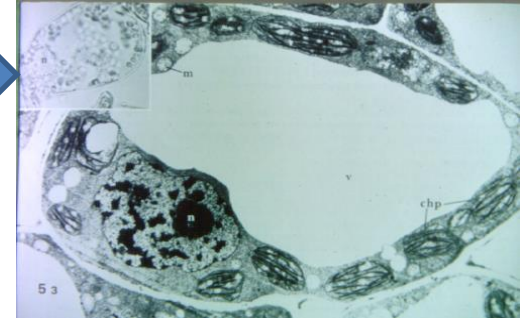


Célula com parede primária não espessada !!



Cél. meristemática → Cél. parenquimática

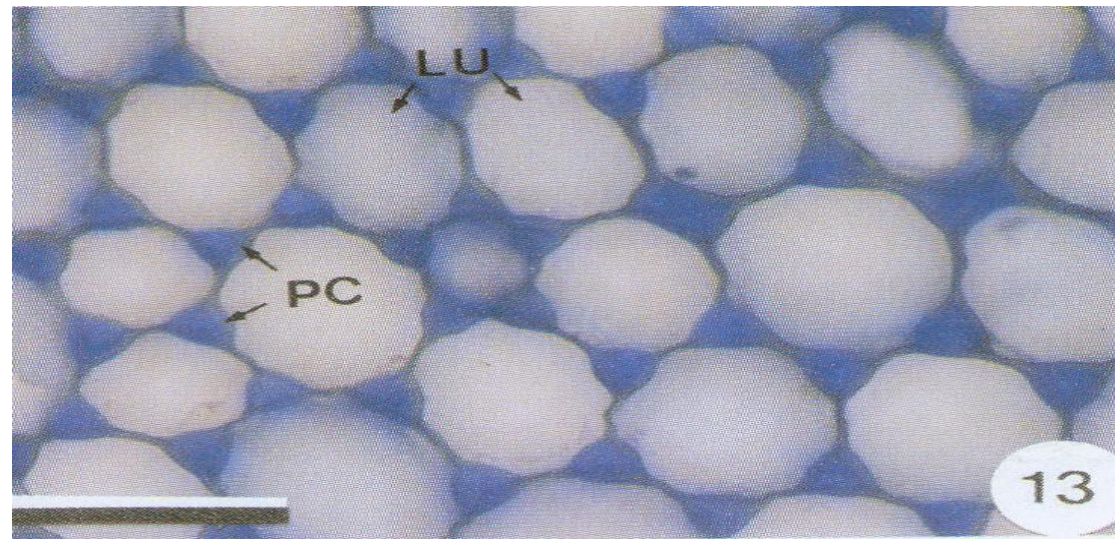
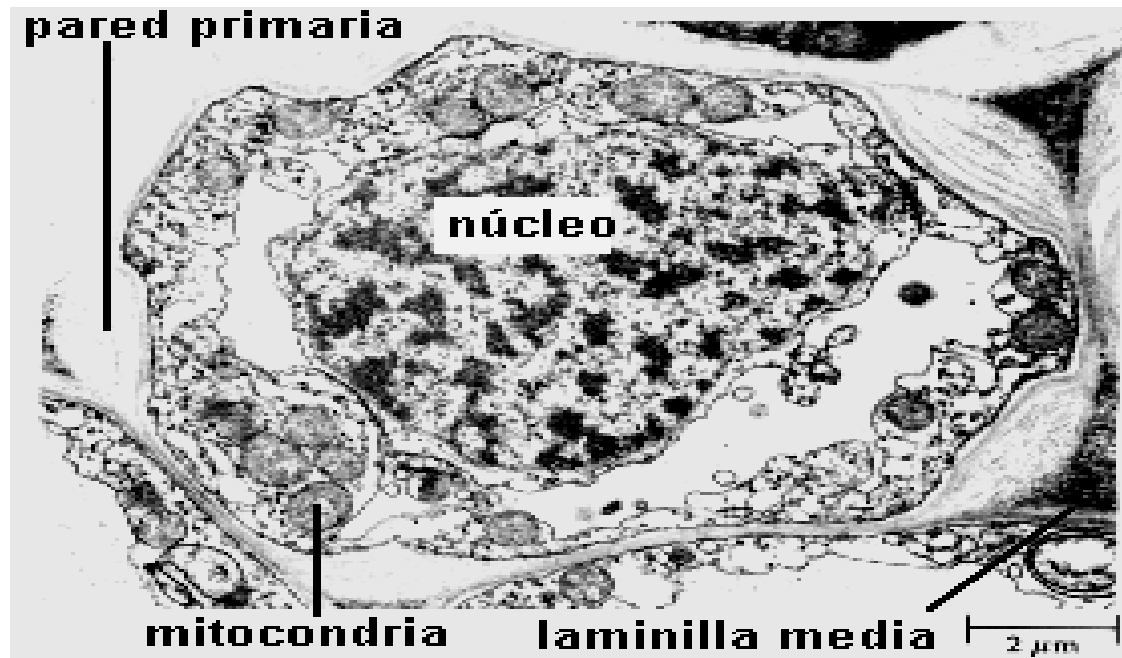
Cél. meristemática ← Cél. parenquimática



Periderme constituída por felogênio, súber e feloderme

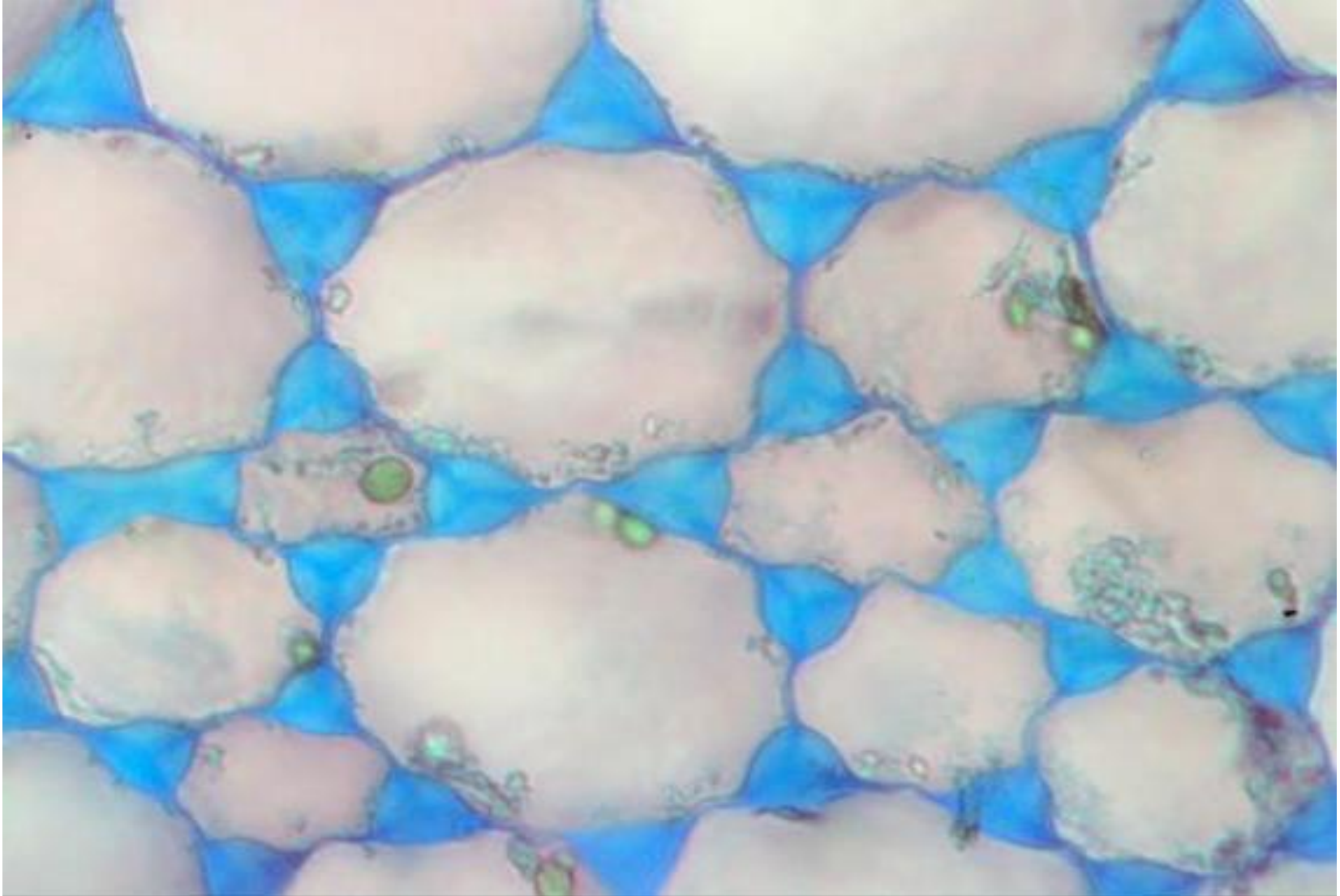
**Felogênio:** tecido meristemático que dará origem ao súber e feloderme.

# Célula Colenquimática - normalmente presente no sistema fundamental

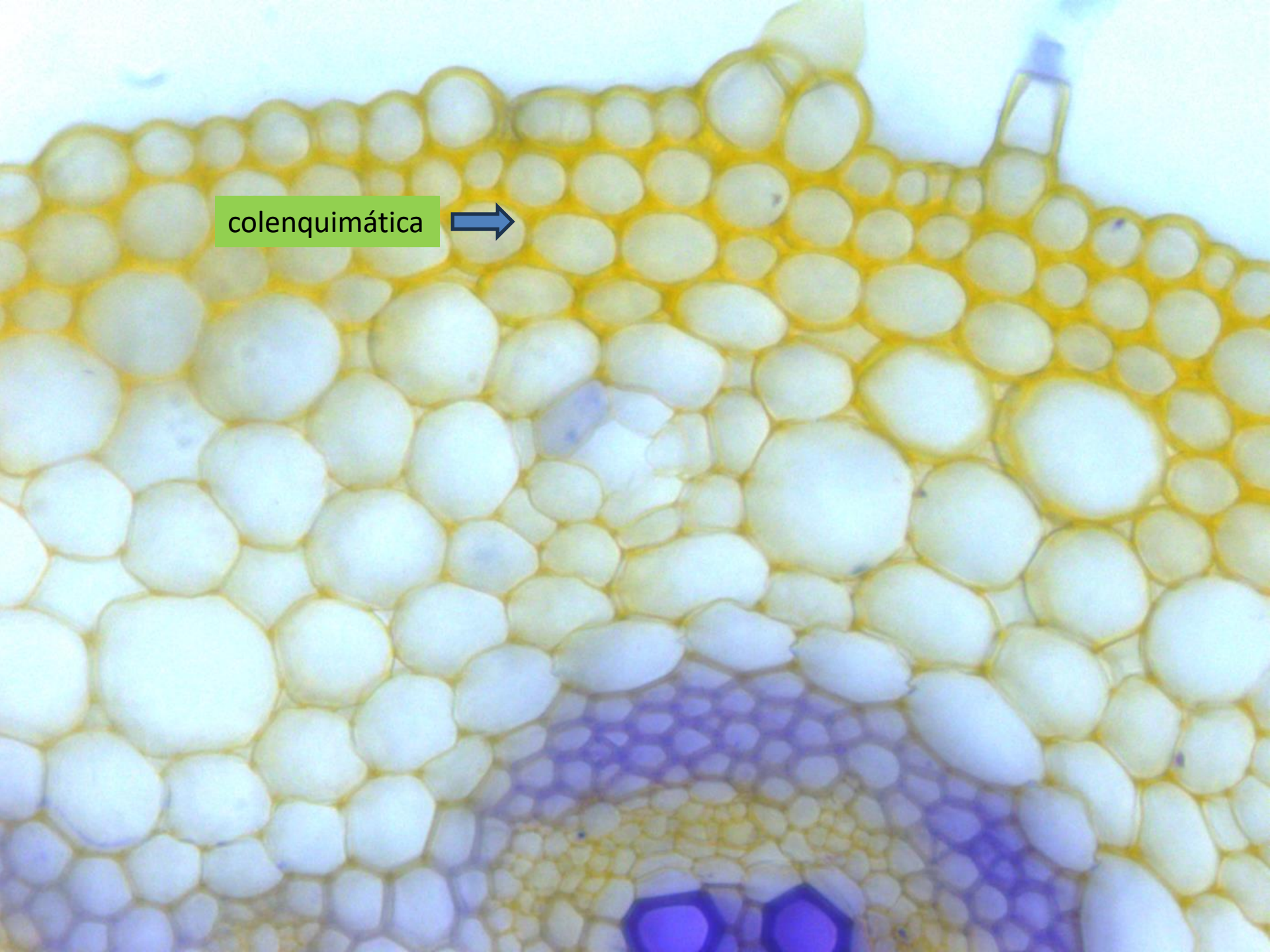




Espessamento irregular de parede primária!!!



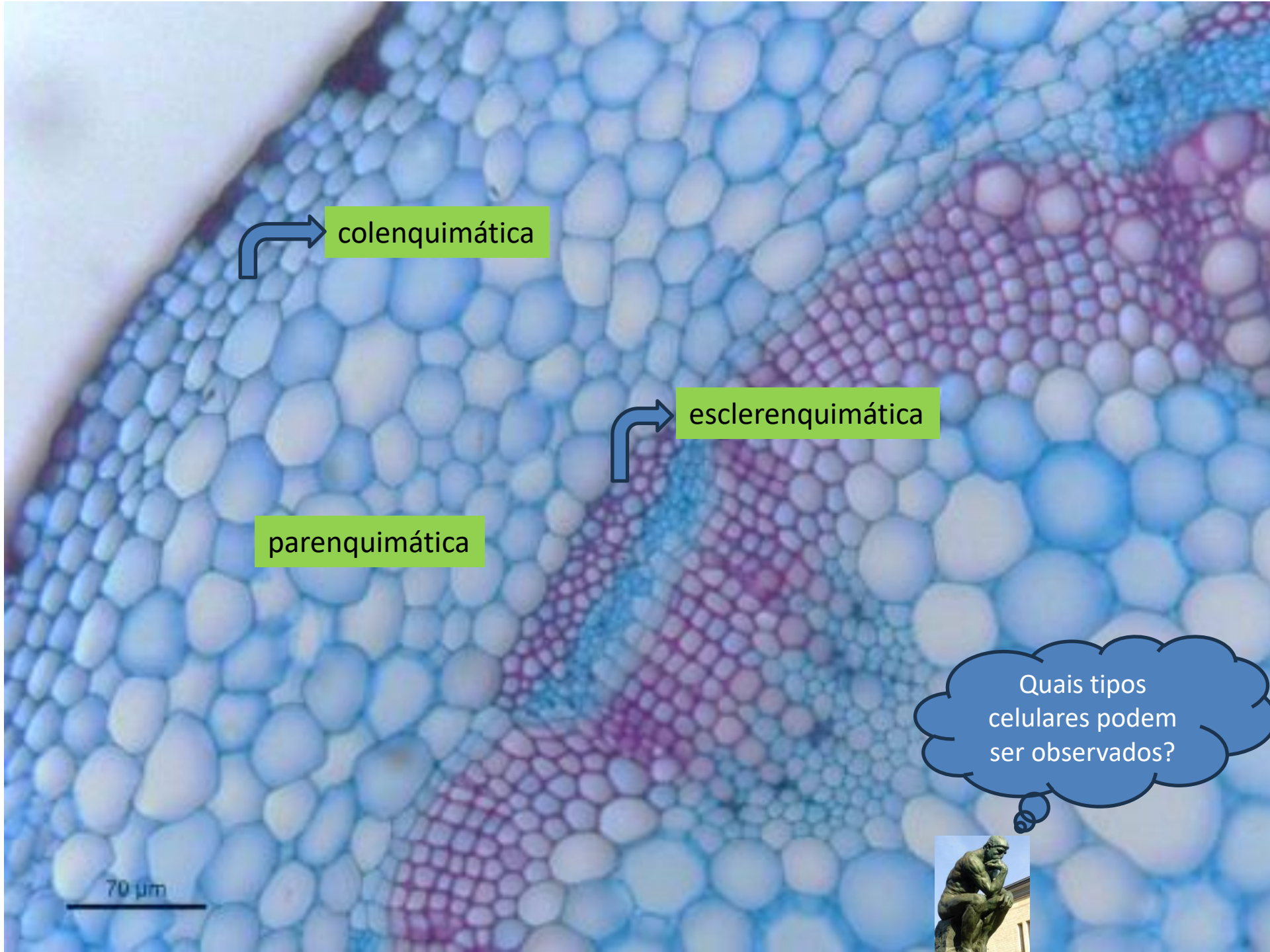
colenquimática



**CÉLULA ESCLERENQUIMÁTICA - pode fazer parte dos três sistemas (revestimento, fundamental e vascular)**



Célula com parede primária e secundária !!!



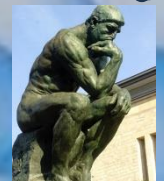
colenquimática



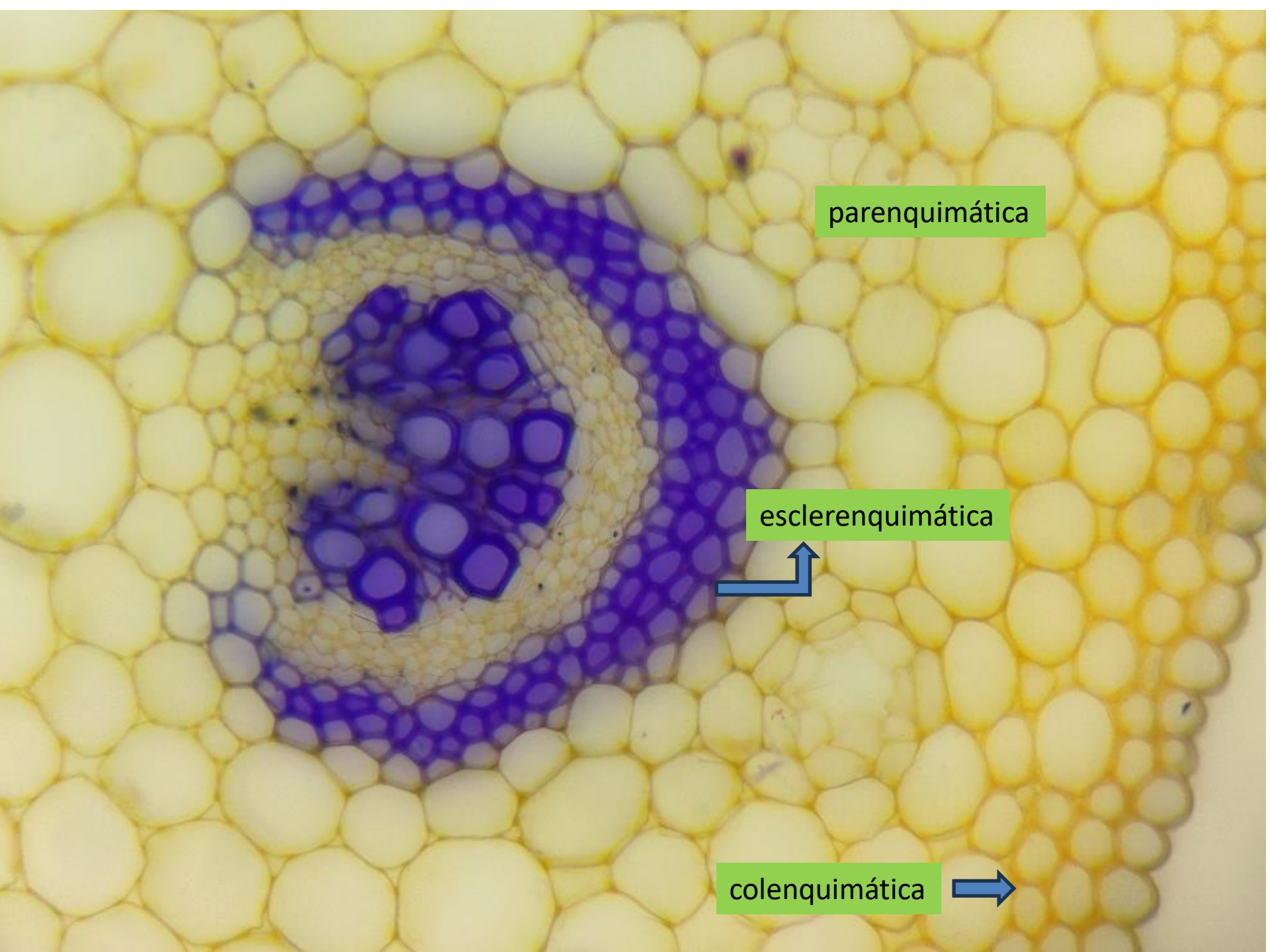
esclerenquimática

parenquimática

Quais tipos celulares podem ser observados?

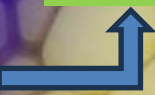


70  $\mu$ m



parenquimática

esclerenquimática

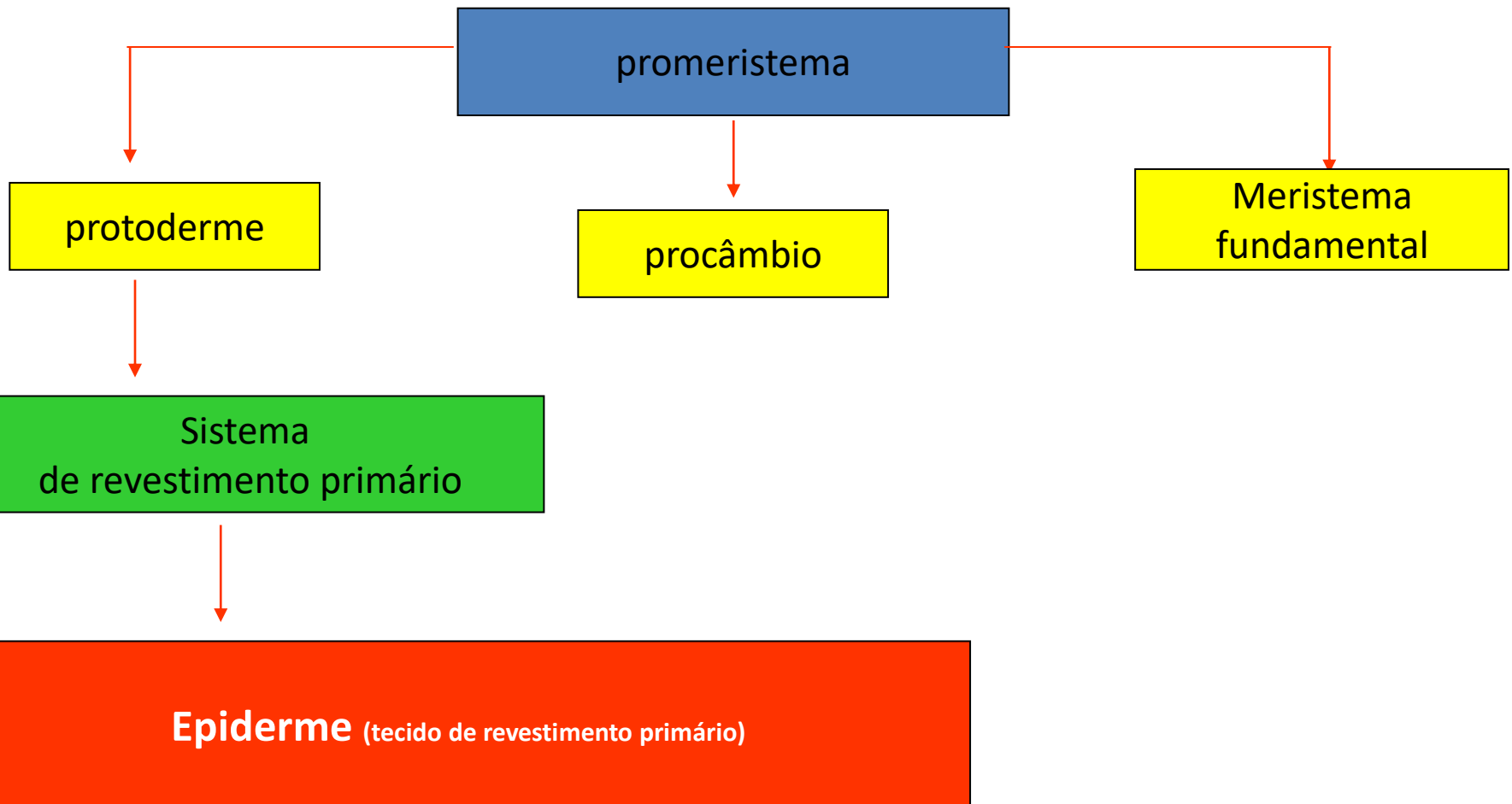


colenquimática



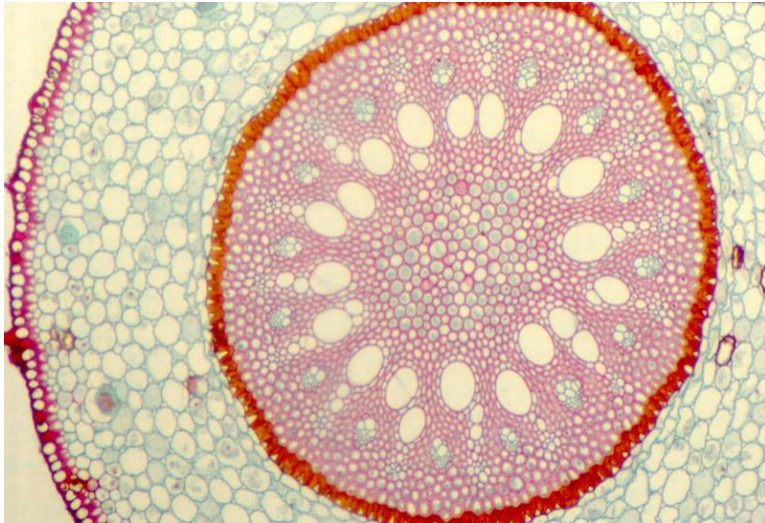
# Os tecidos do corpo primário

Formados a partir da diferenciação dos tecidos meristemáticos



# EPIDERME COM UMA SÓ CAMADA - UNISSERIADA

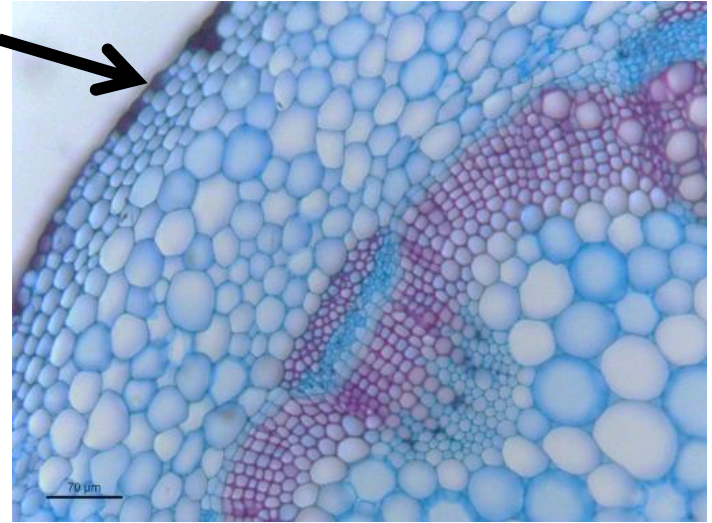
Corte transversal de uma raiz



epiderme

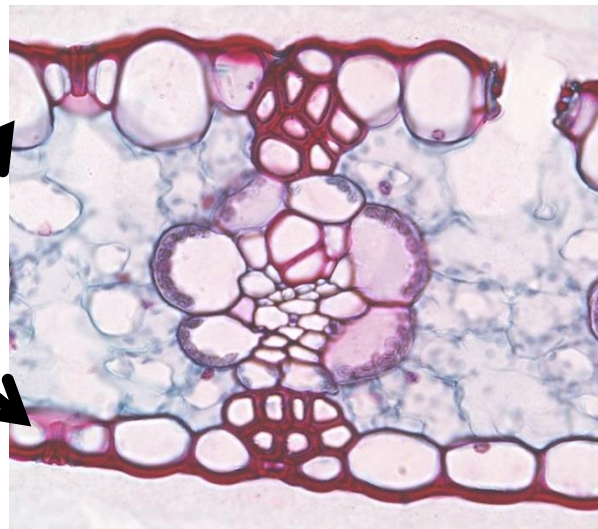
Corte transversal de um caule

epiderme



Corte transversal de uma folha

epiderme

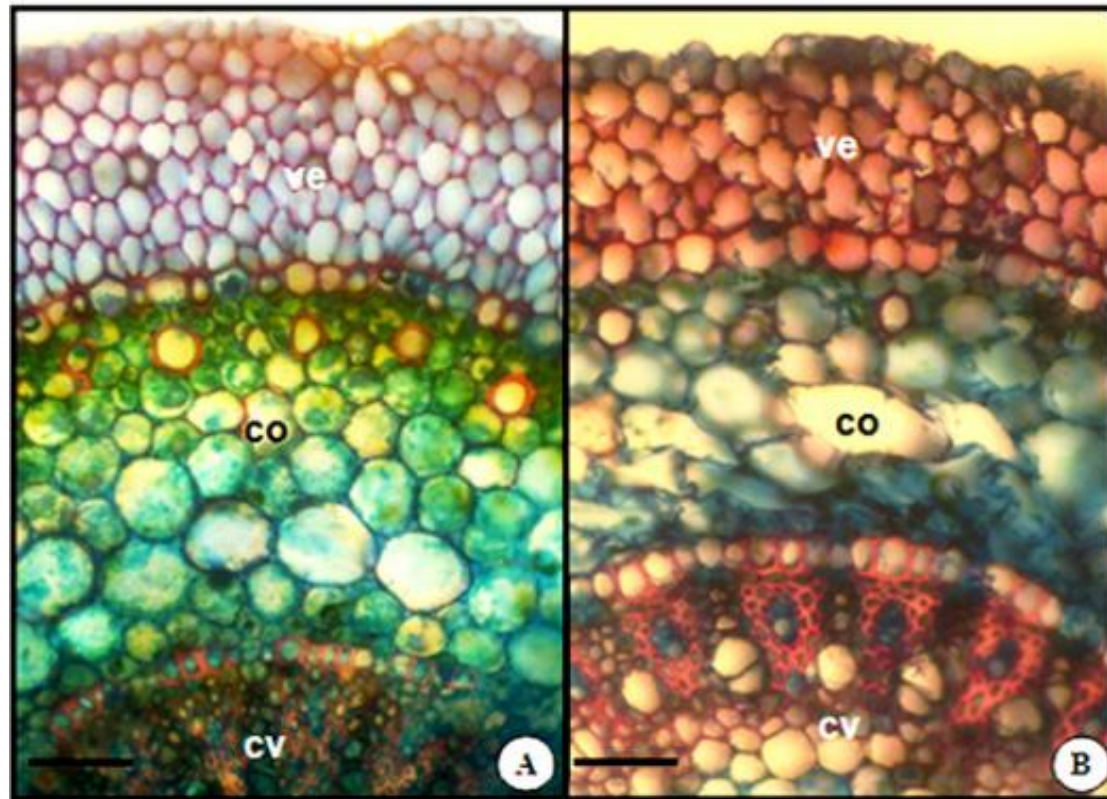




## Sistema de revestimento formado por células mortas

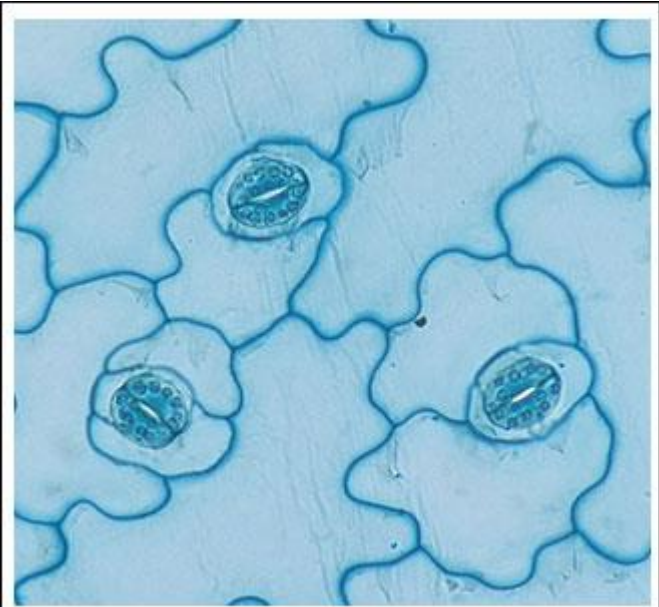
**Velame:** epiderme formada por células mortas com espessamento de parede primária. Pode ser uma única camada ou multisseriada.

ISSN 1806-7409 - <http://www.naturczaonlinc.com.br>

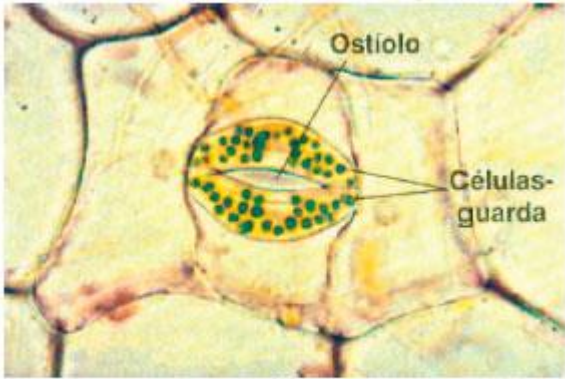




# Estômatos: estrutura formada por duas células-guarda e um ostíolo

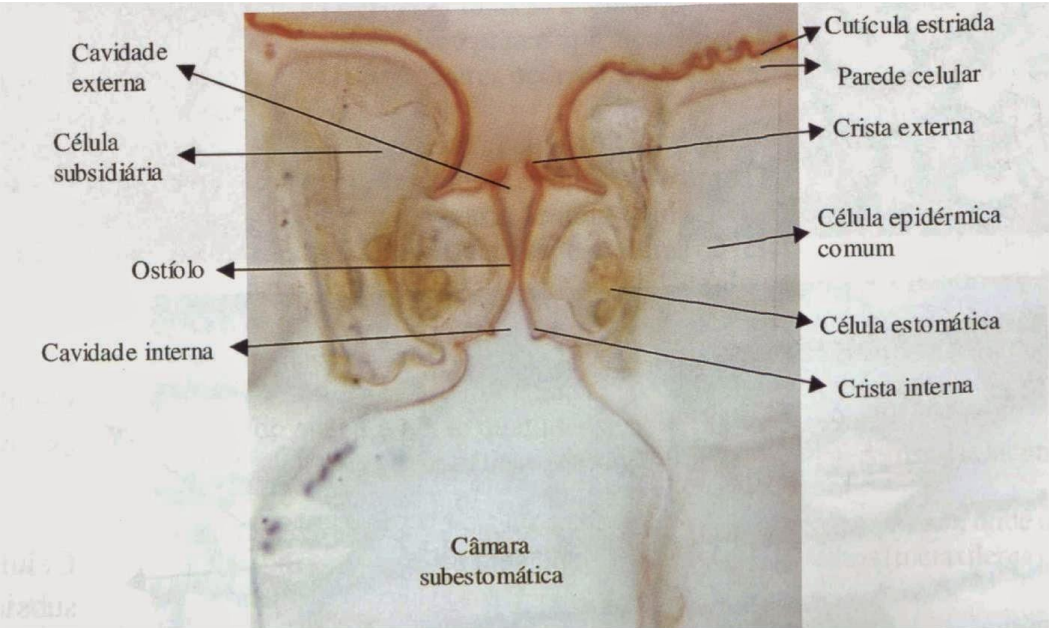


© Image by John Addis



Vista frontal do estômato

(Adaptado de: AMABIS, J. M.; MARTHO, G. R. *Biologia dos Organismos*. São Paulo: Moderna. 2004. v. 2, p. 232.)



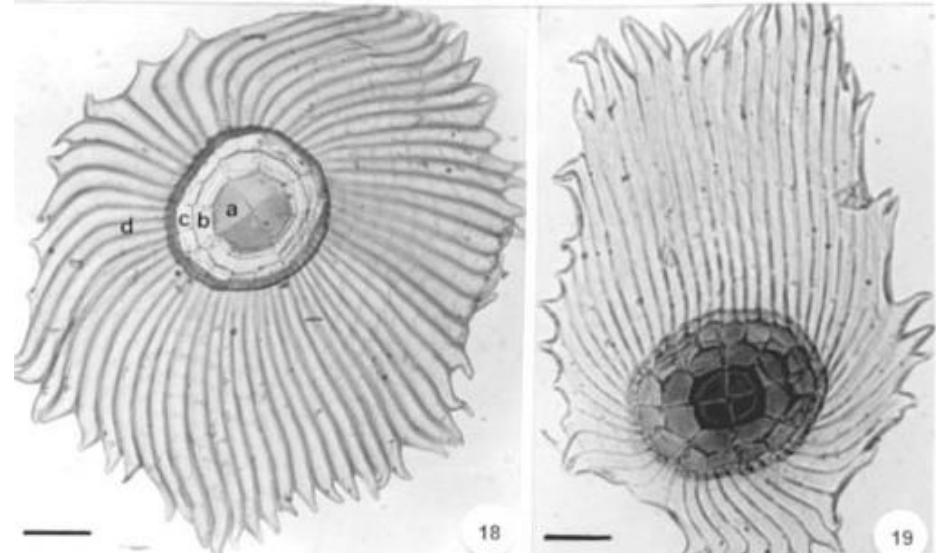
Secção transversal do órgão

Tricoma: estrutura uni ou pluricelular formada a partir da protoderme

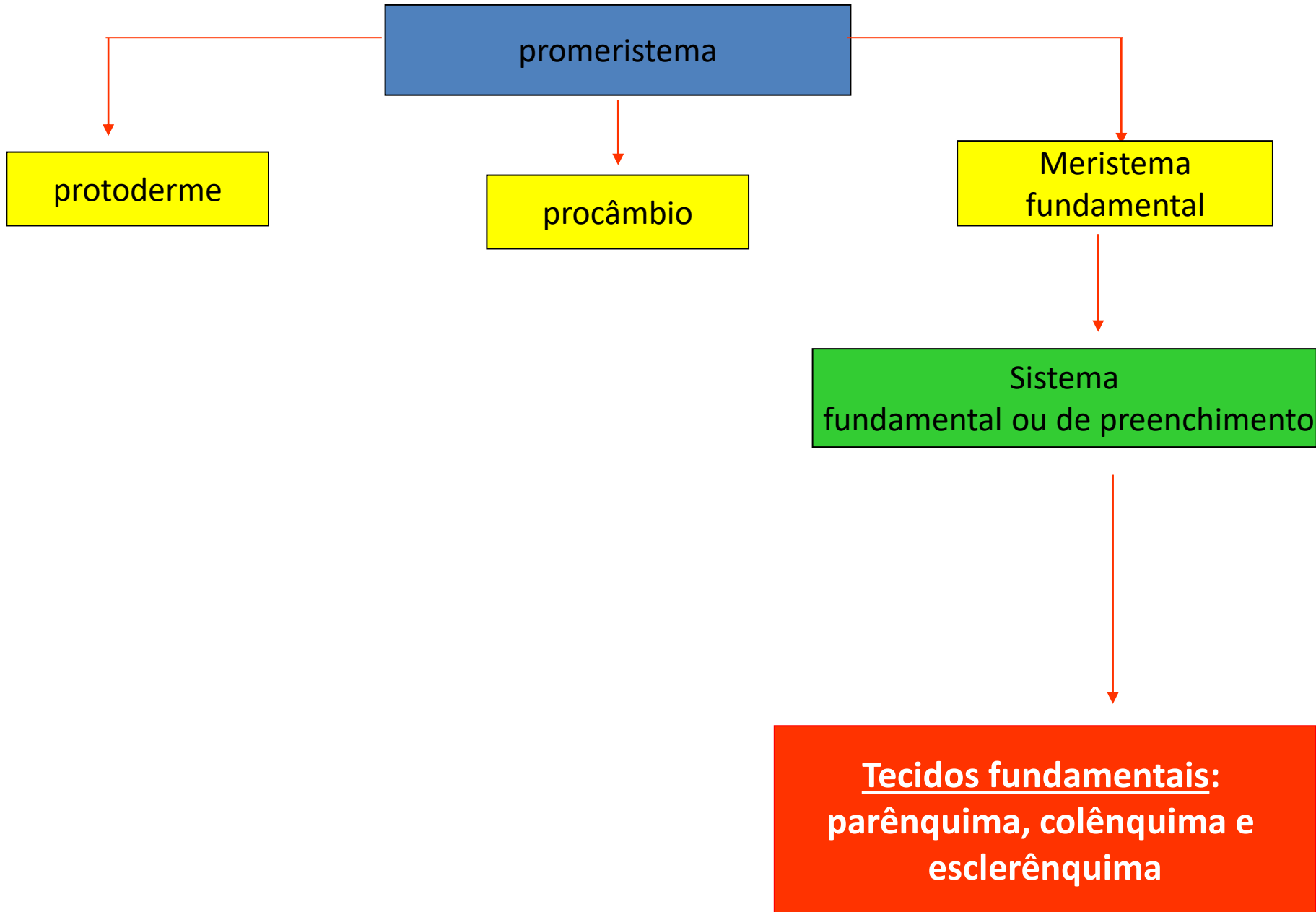
Tricomas secretores



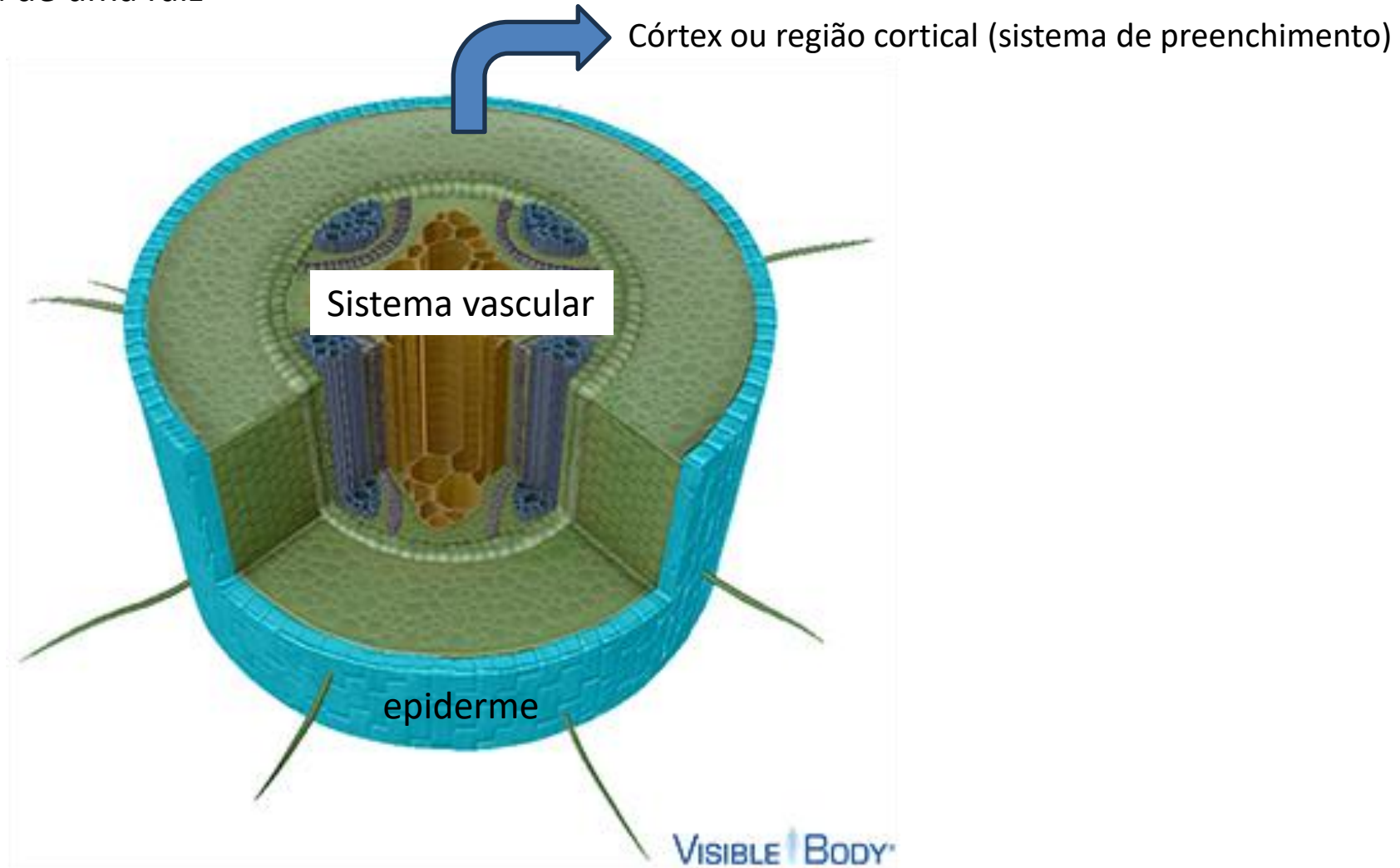
Tricomas não secretores



Tricomas peltados em Bromeliaceae



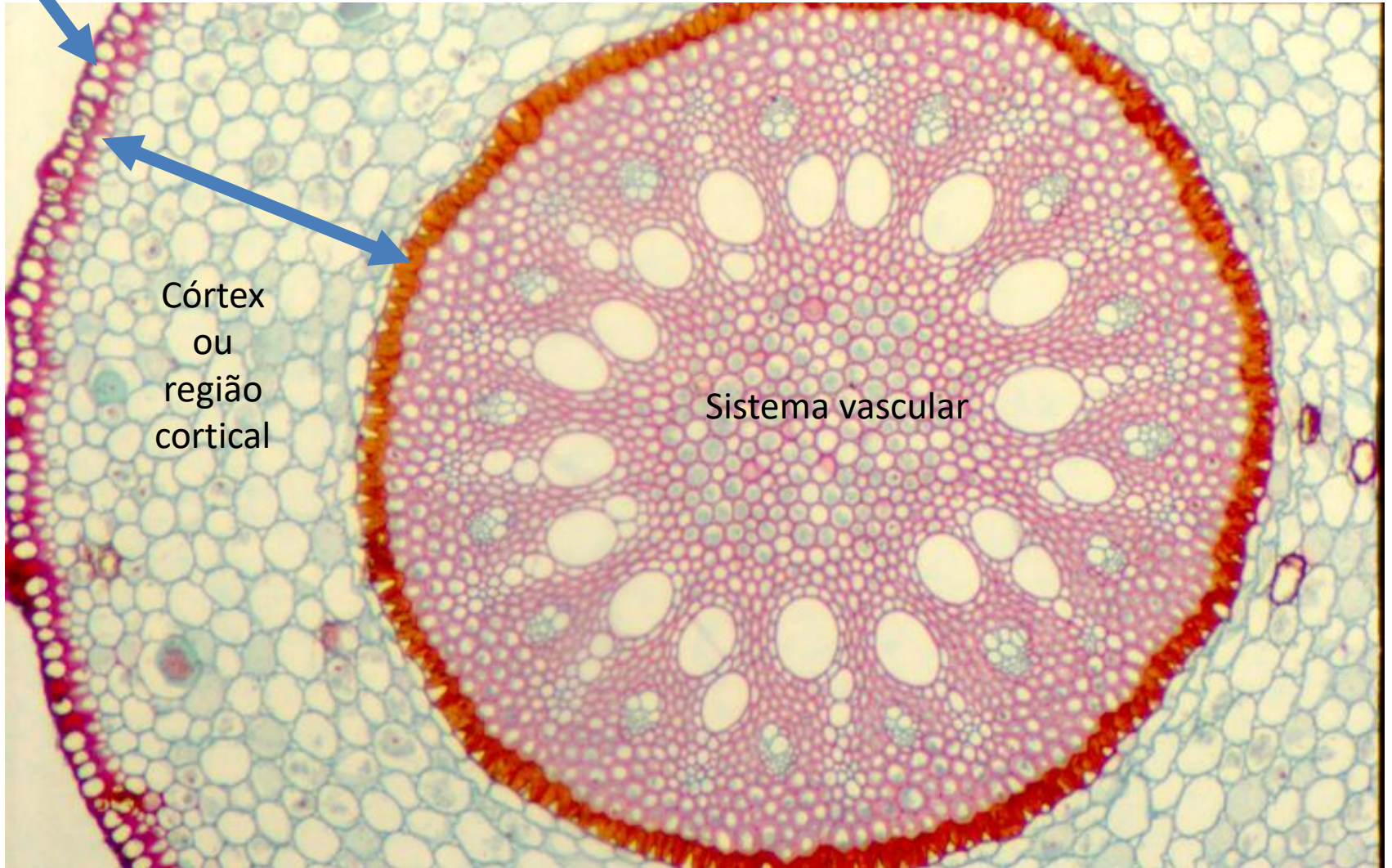
## Esquema de uma raiz

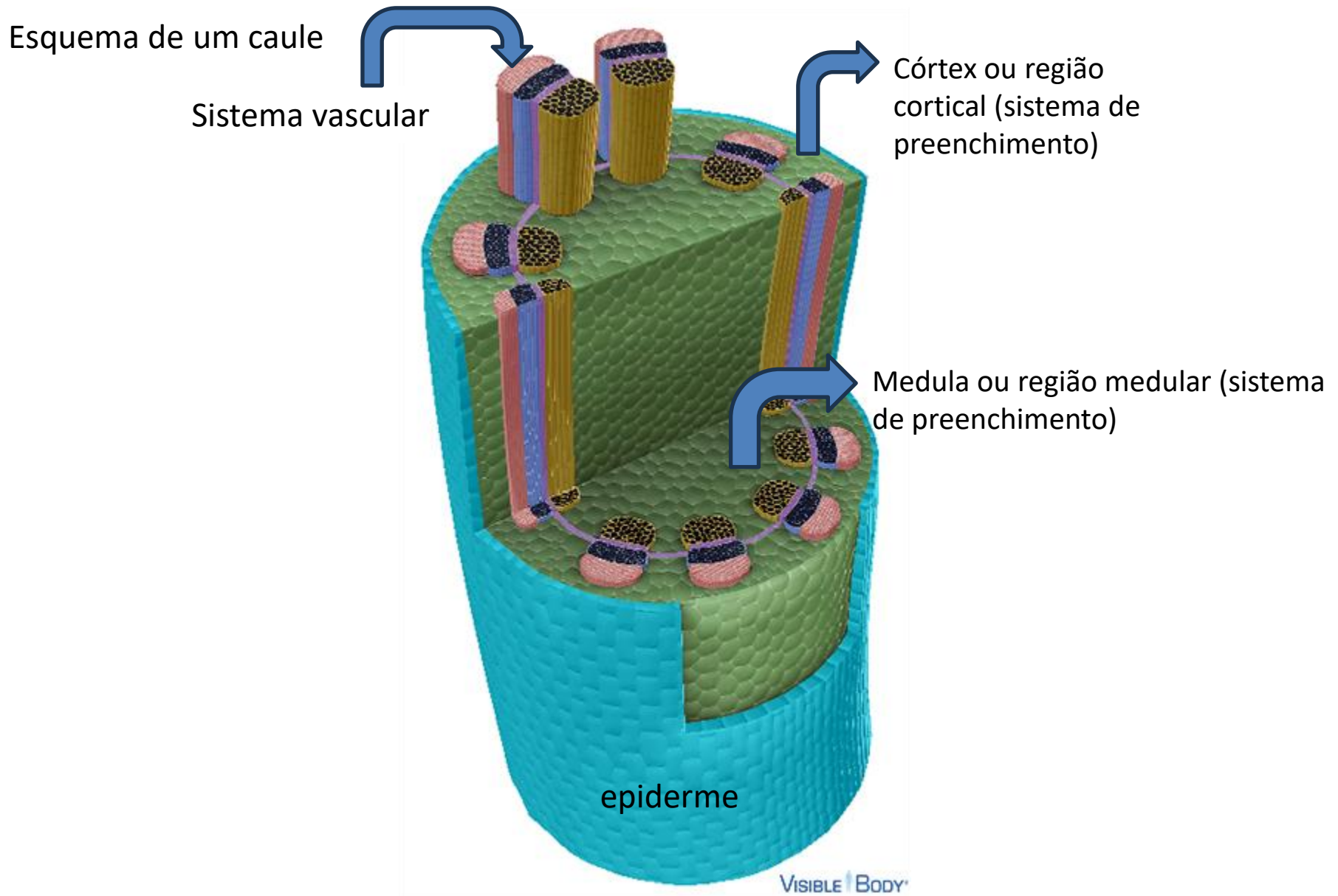


Raiz: sistema de preenchimento representado pela região cortical ou córtex

Região do sistema fundamental em uma raiz de espermatófitas: córtex

Sistema de revestimento

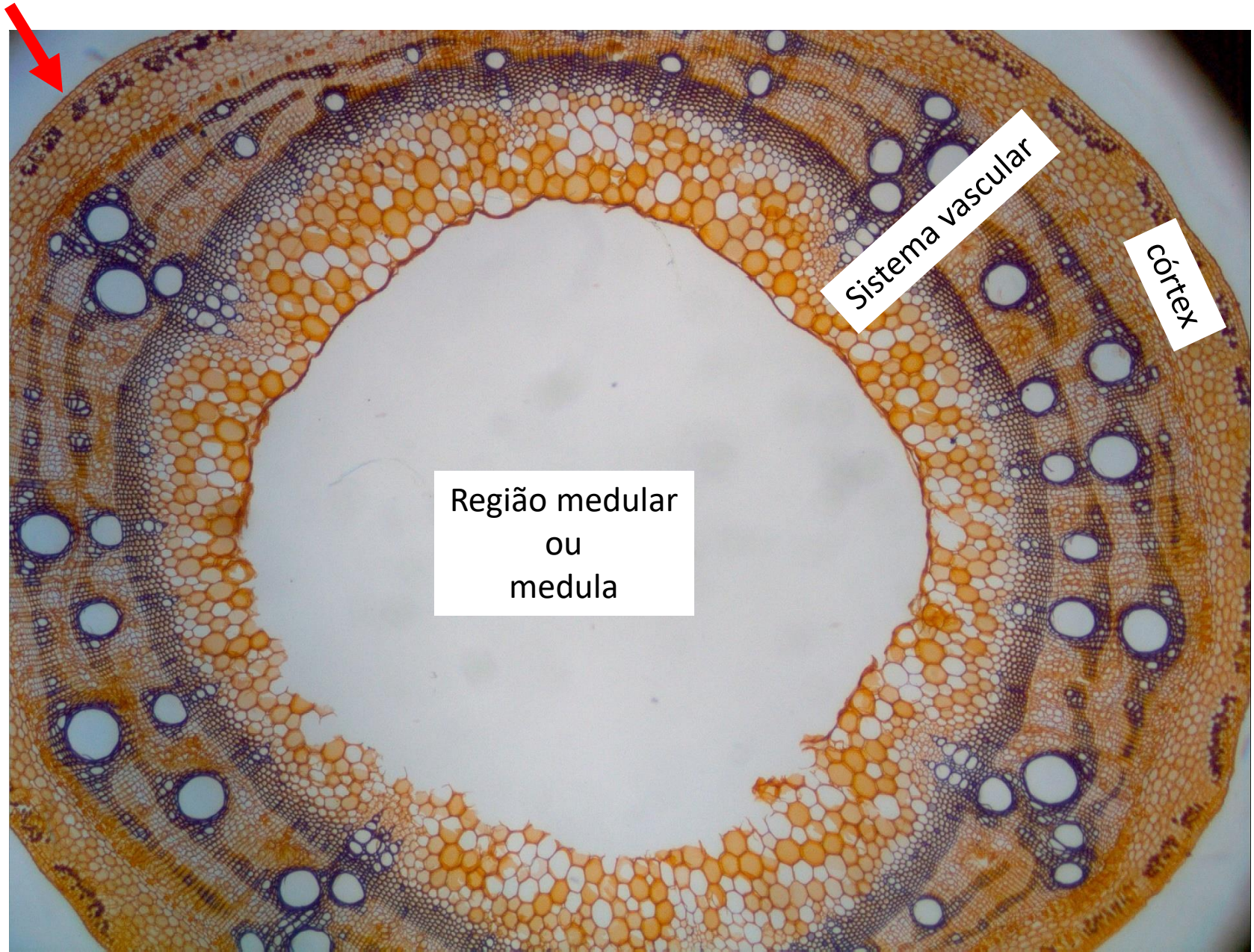




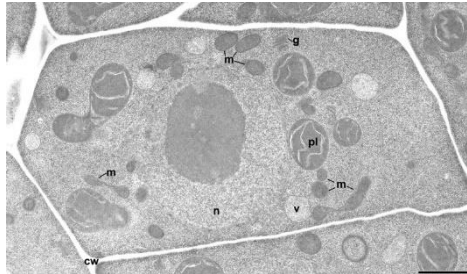
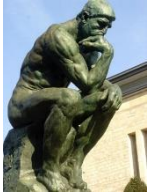
Caule em espermatófita: sistema de preenchimento representado por duas regiões: córtex e medula

Regiões do sistema fundamental em um caule de espermatófito: córtex e medula

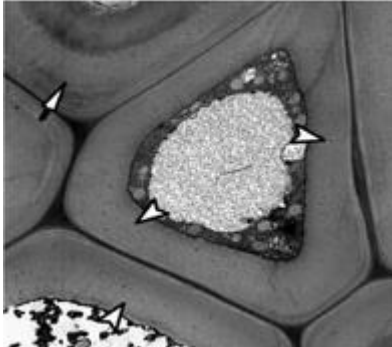
Sistema de revestimento



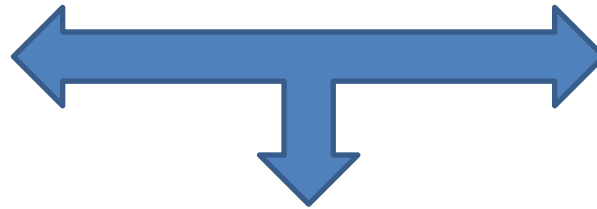
Quais tipos celulares podem ser observados nas regiões do córtex e da medula?



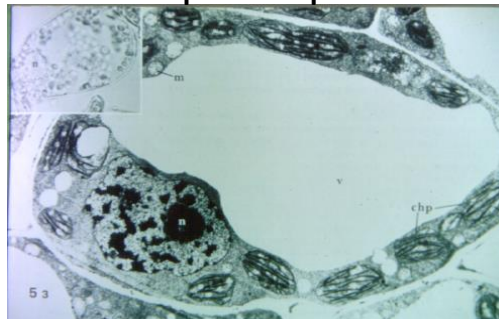
Célula esclerenquimática



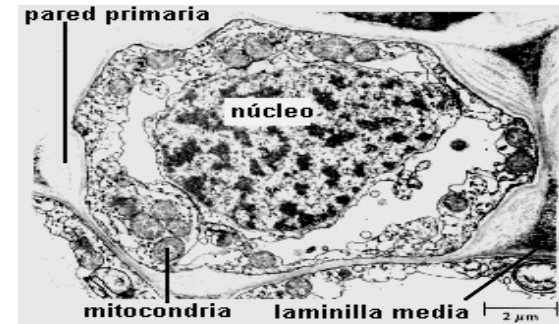
Célula do meristema fundamental (tecido meristemático)



Célula parenquimática

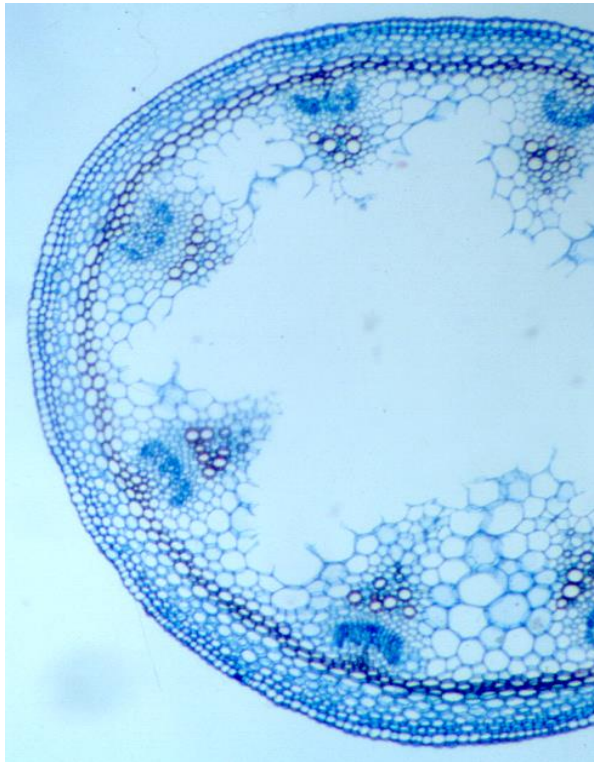
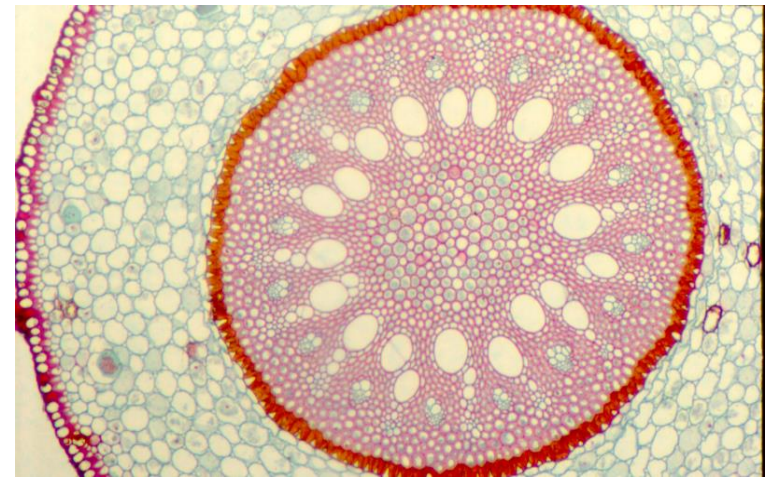


Célula colenquimática

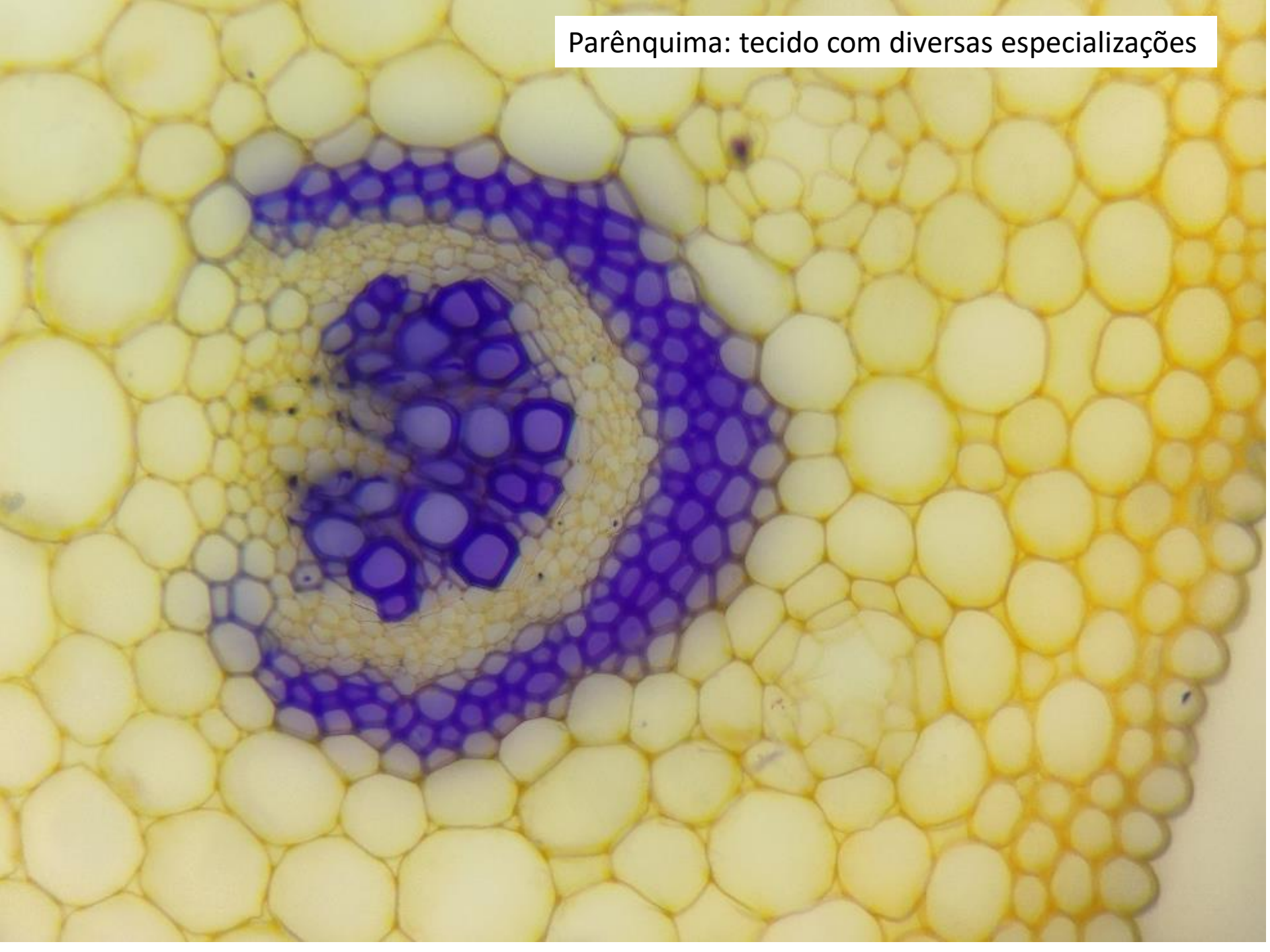




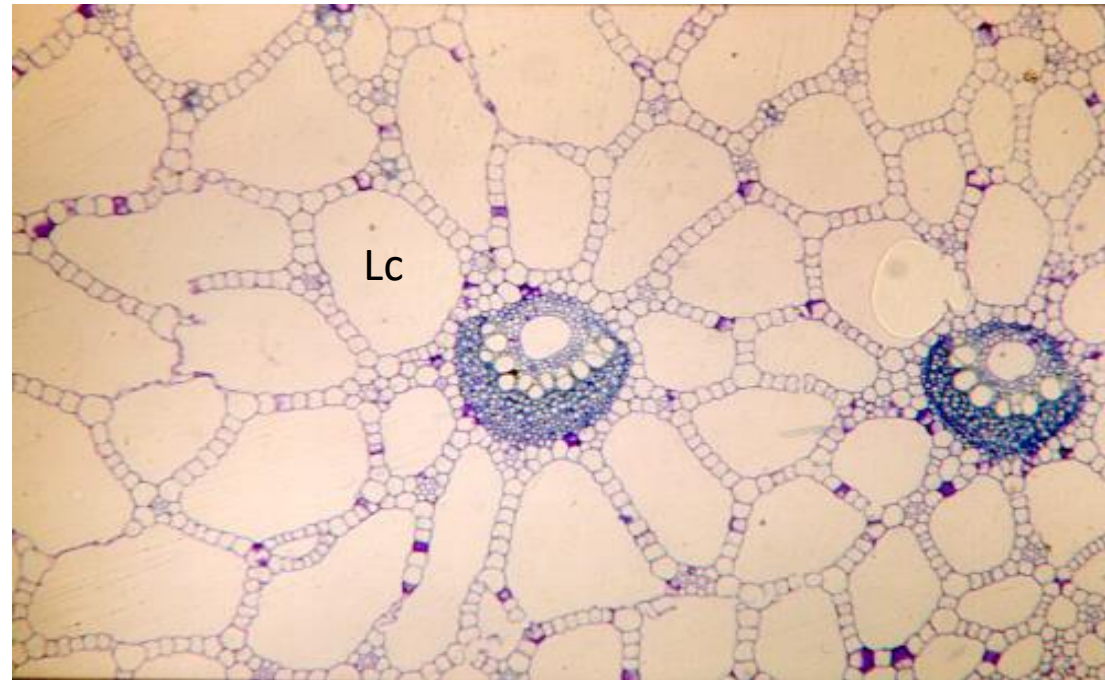
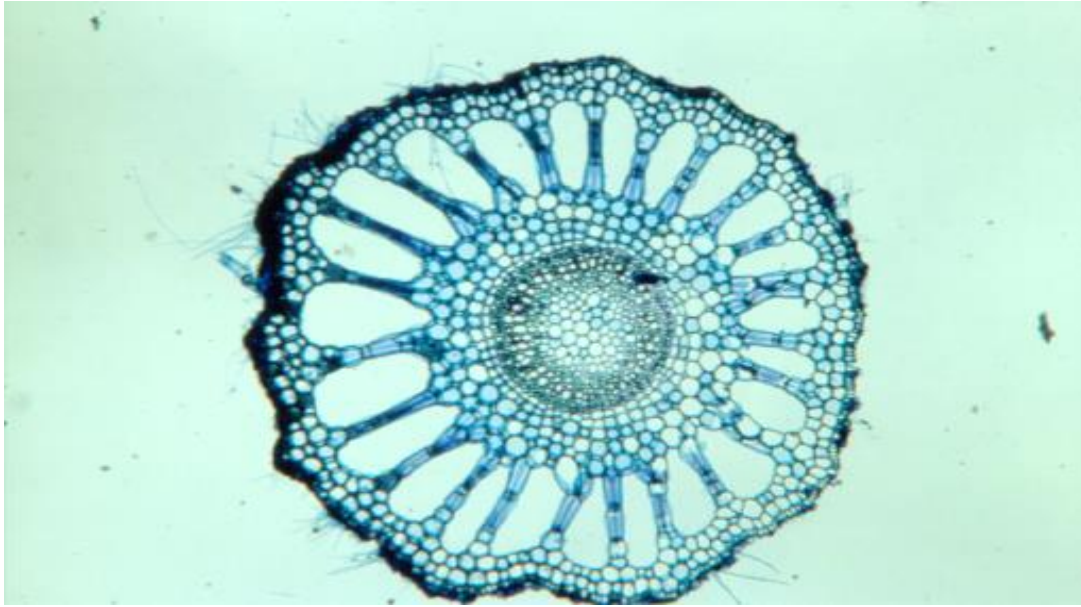
Tecidos fundamentais ou de preenchimento:  
parênquima, colênquima e esclerênquima



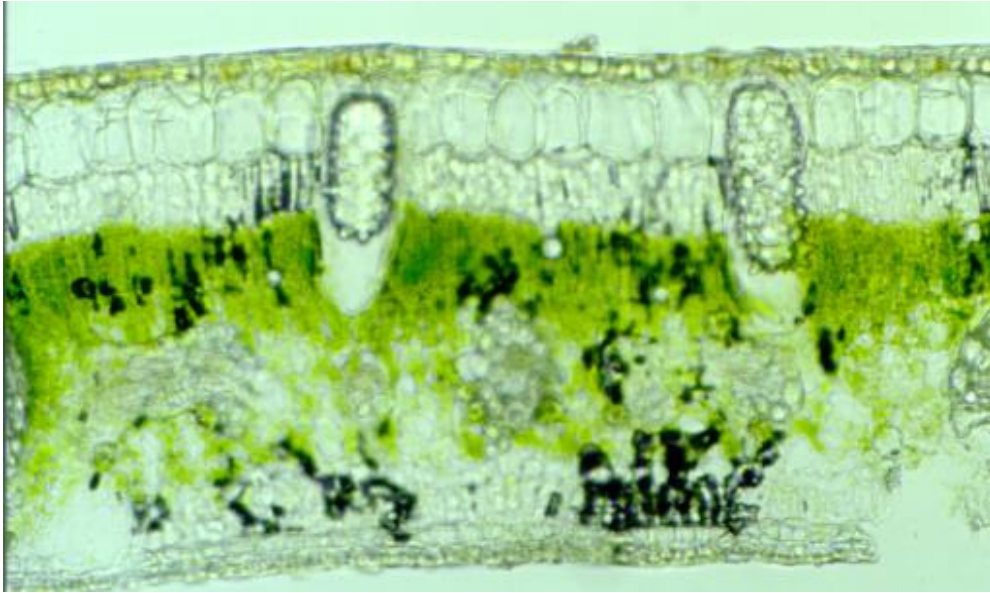
Parênquima: tecido com diversas especializações



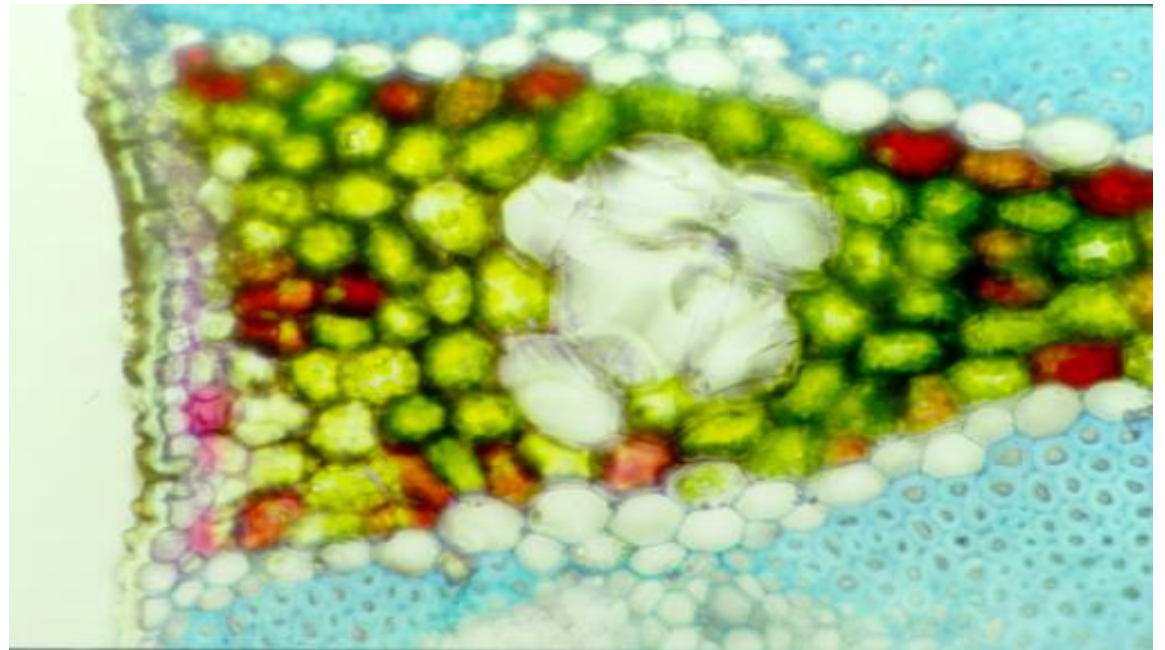
**AERÊNQUIMA: tipo de parênquima com grandes espaços intercelulares (lacunas)**



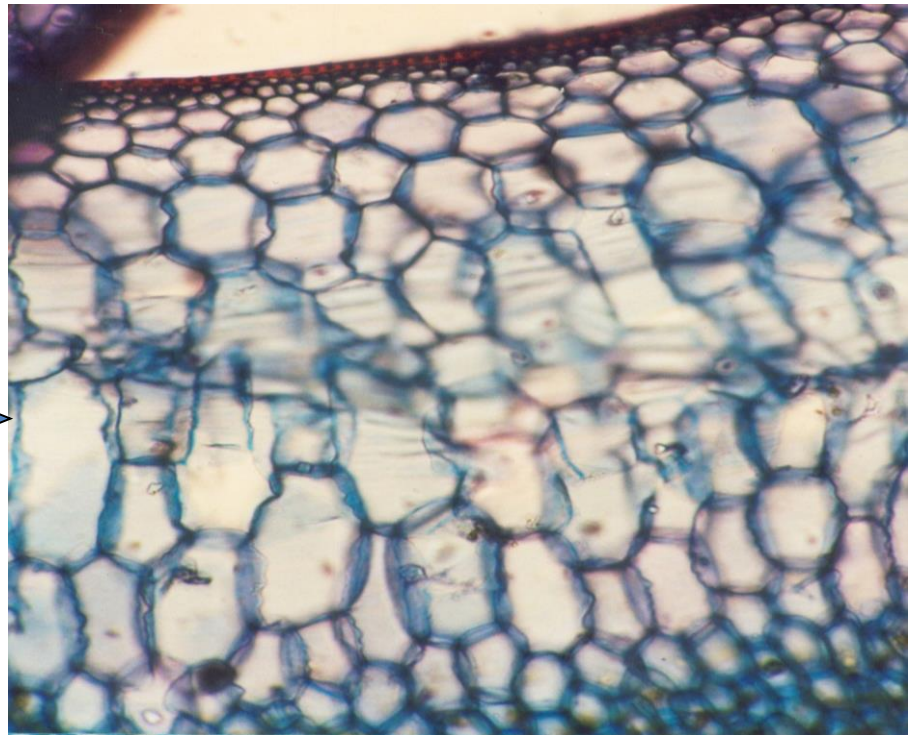
Lc = lacuna do aerênquima



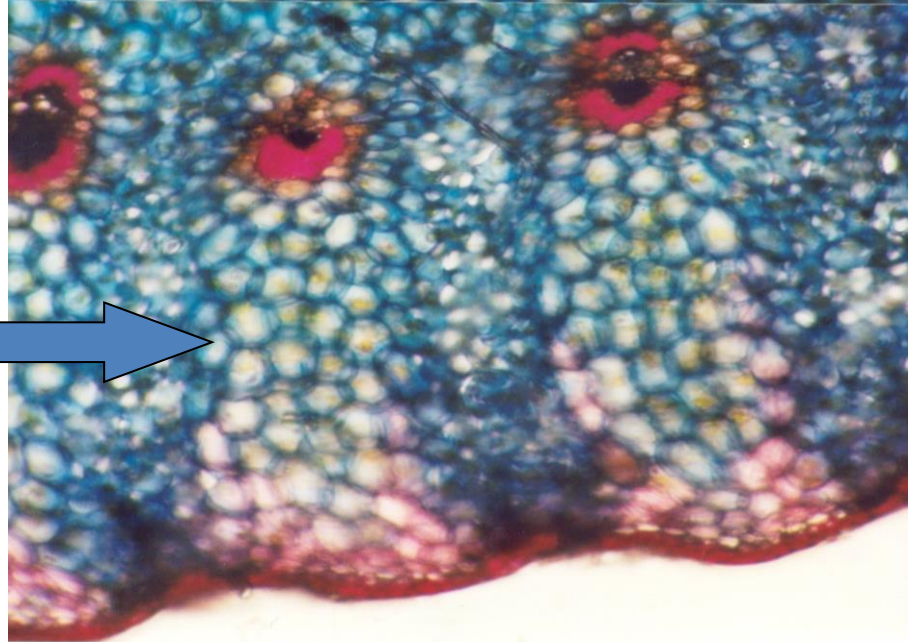
**CLORÊNQUIMA:** tipo de parênquima cujas células contêm clorofila



**Parênquima  
Aquífero  
(células que  
acumulam água)**

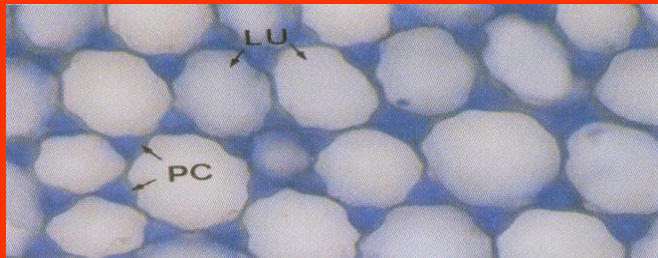
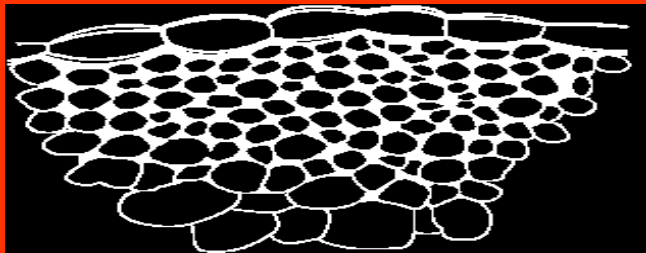


**Parênquima  
clorofiliano**

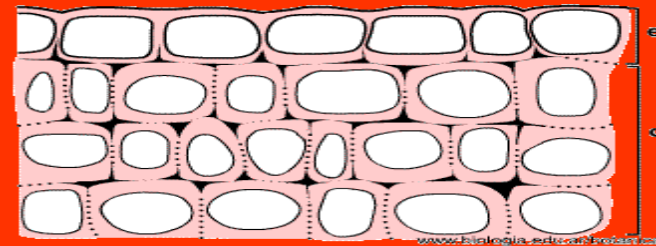


# Colênquima: tecido composto por células com espessamento de parede primária

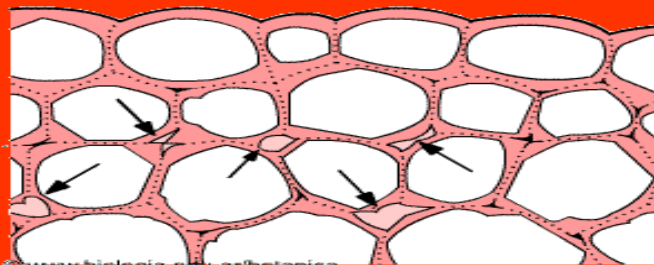
## ANGULAR



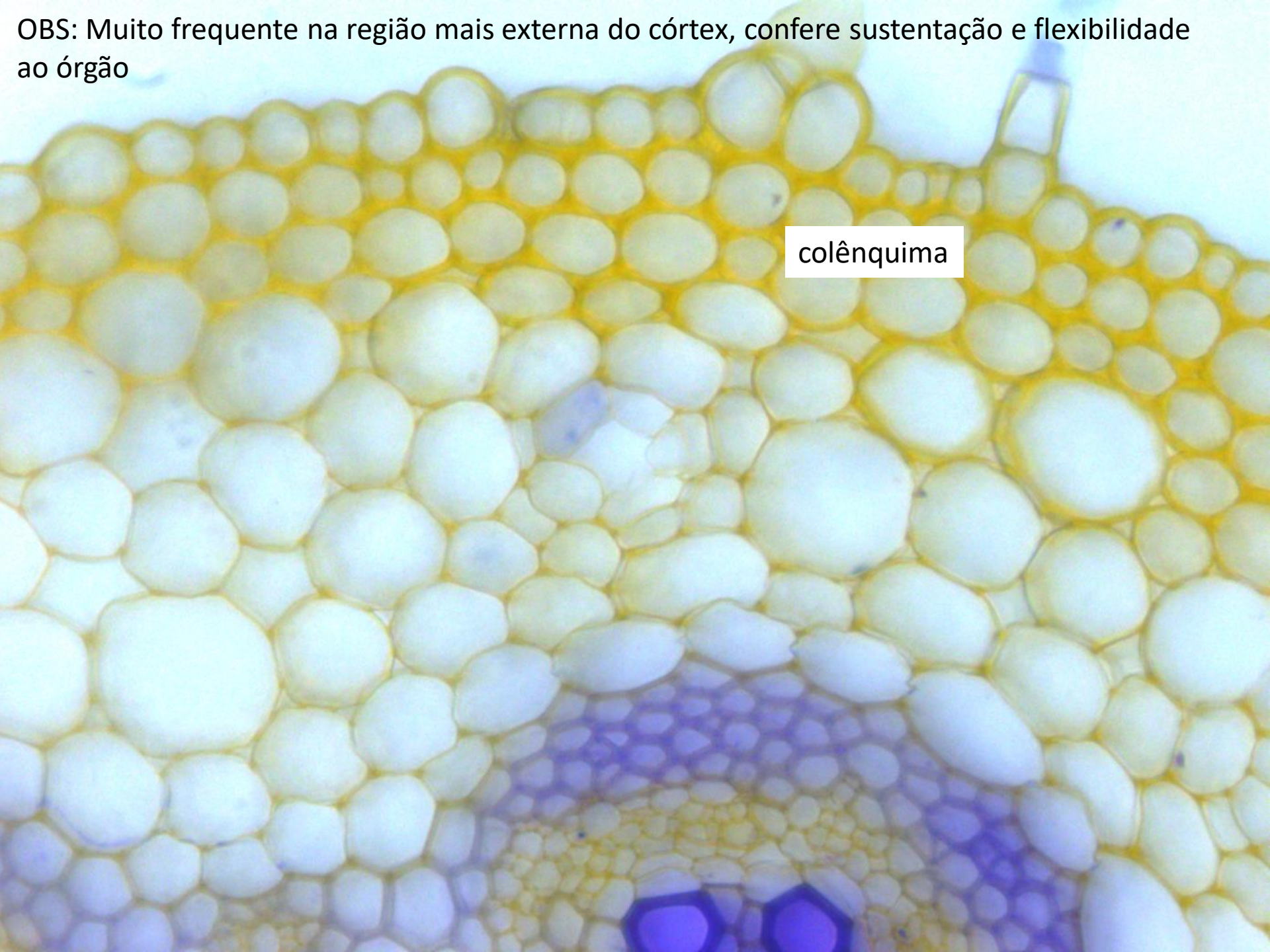
## LAMELAR



## LACUNAR



OBS: Muito frequente na região mais externa do córtex, confere sustentação e flexibilidade ao órgão



colênquima

# Esclerênquima: tecido composto por células com parede primária e parede secundária

Tipos celulares:

- Esclereídes: normalmente mais curtas. São diferenciadas a partir de uma célula parenquimática.
- Fibras: normalmente mais longas. São diferenciadas a partir de uma célula meristemática.

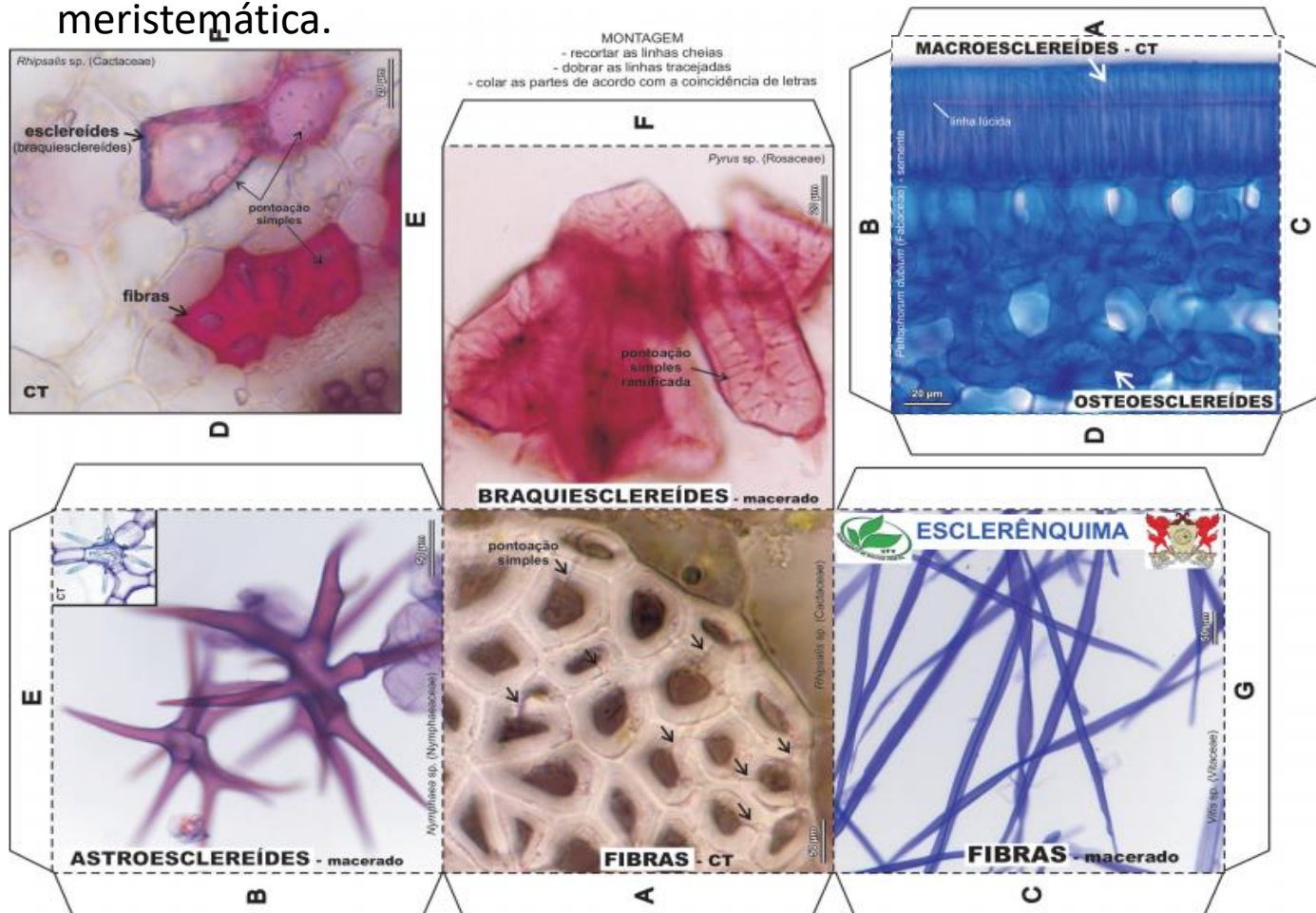
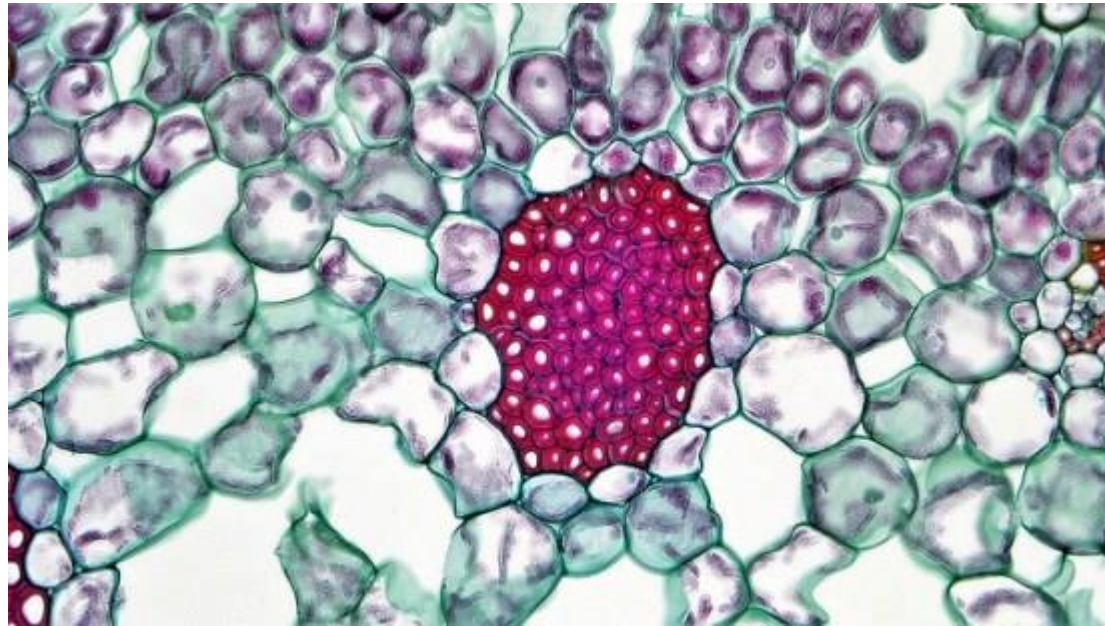
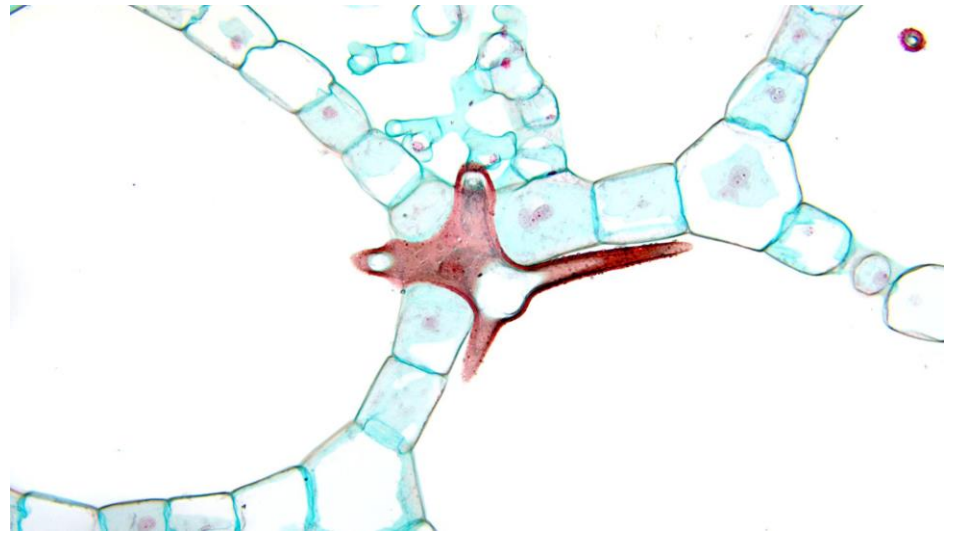
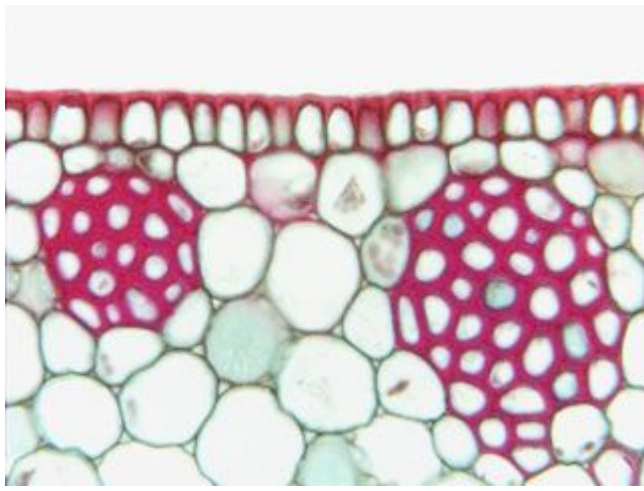


Figura 26. Anatobloco aberto para impressão e montagem. Esclerênquima





OBS: Confere sustentação e rigidez ao órgão

Em resumo.....

