



# Estabelecimento e organização dos meristemas apicais: caulinar e radicular

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(MORFOANATO)  
Instituto de Biociências – USP**



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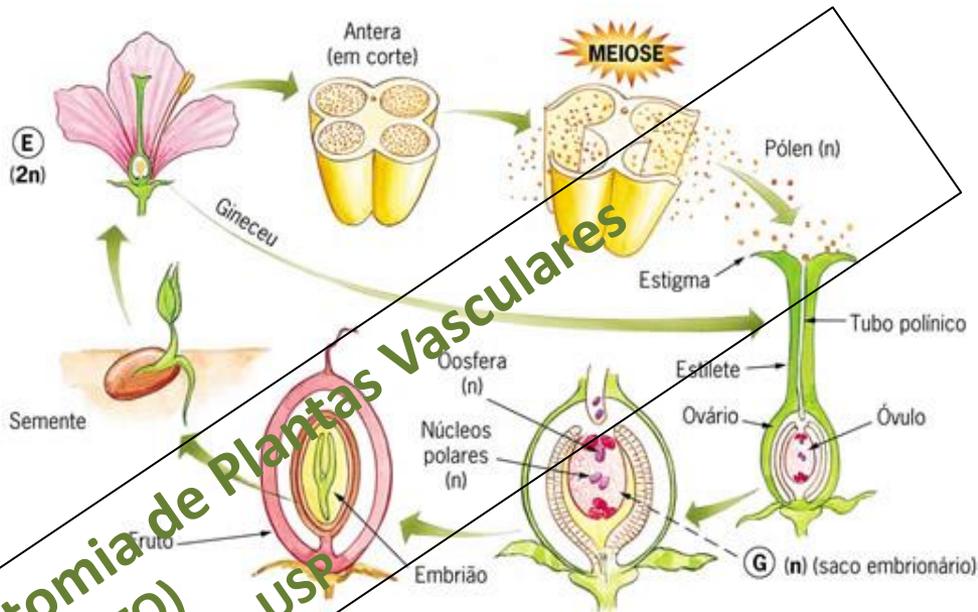


Vieira & Fonseca (2014)

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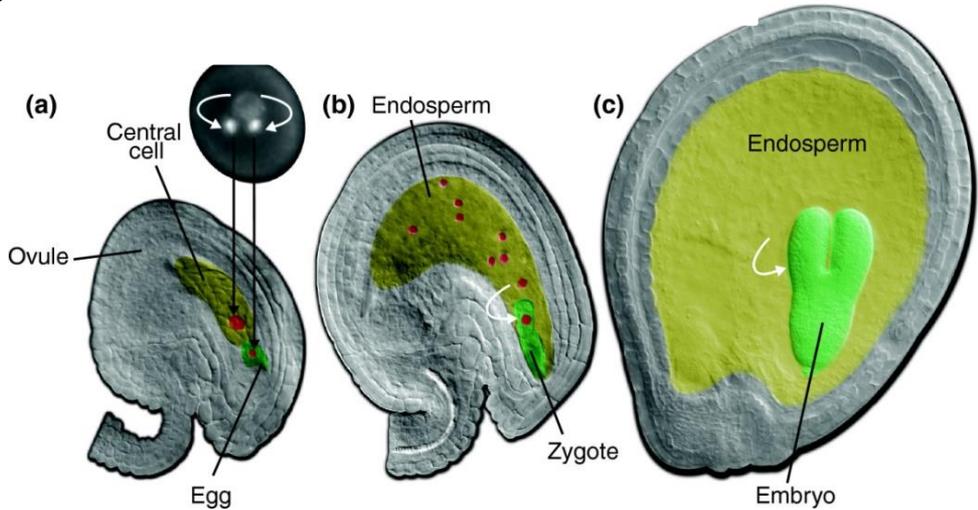


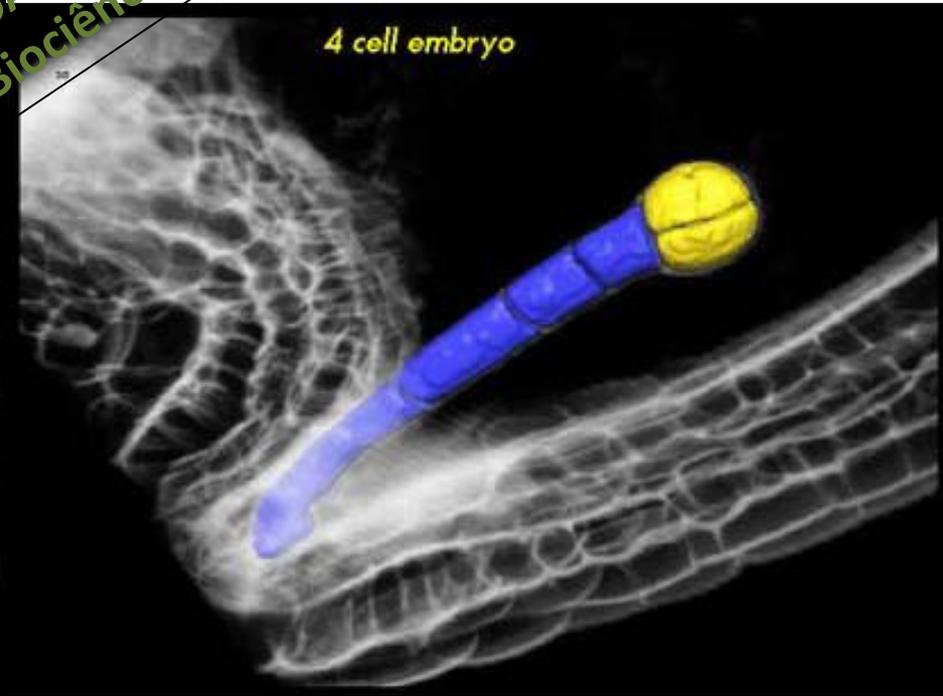
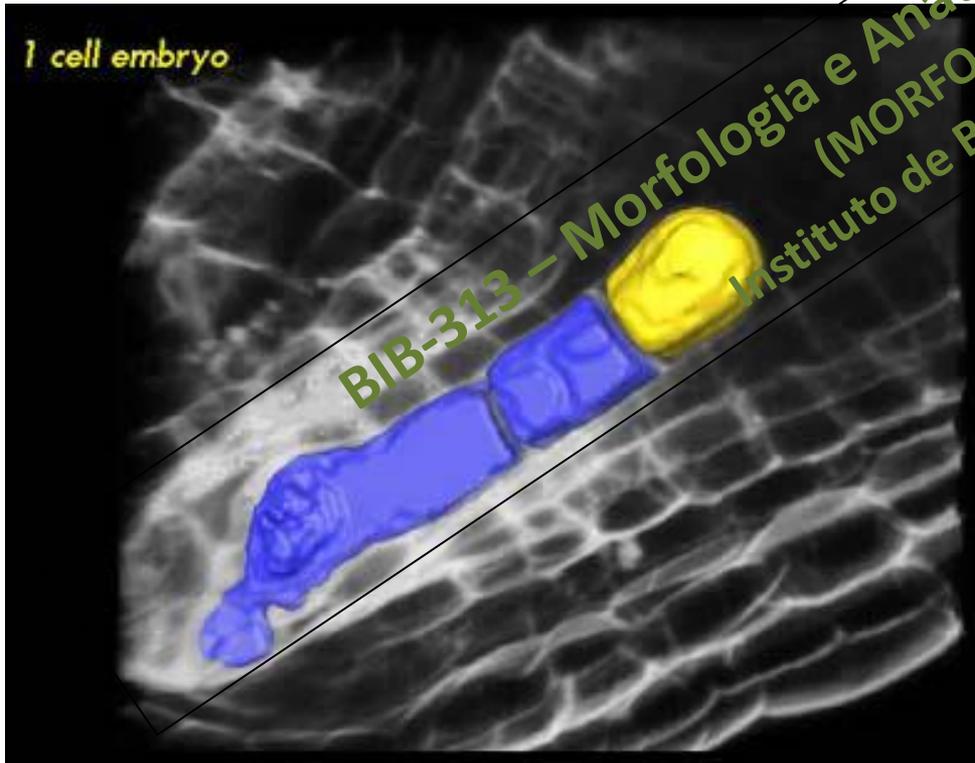
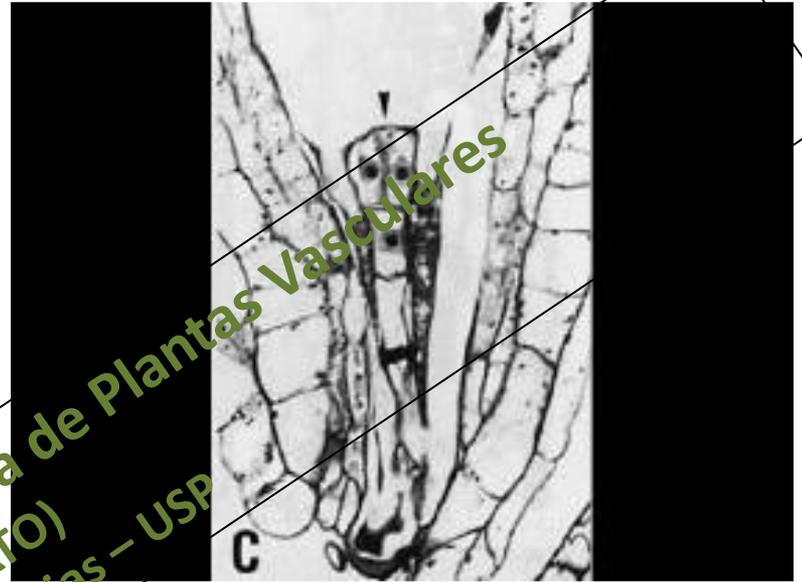
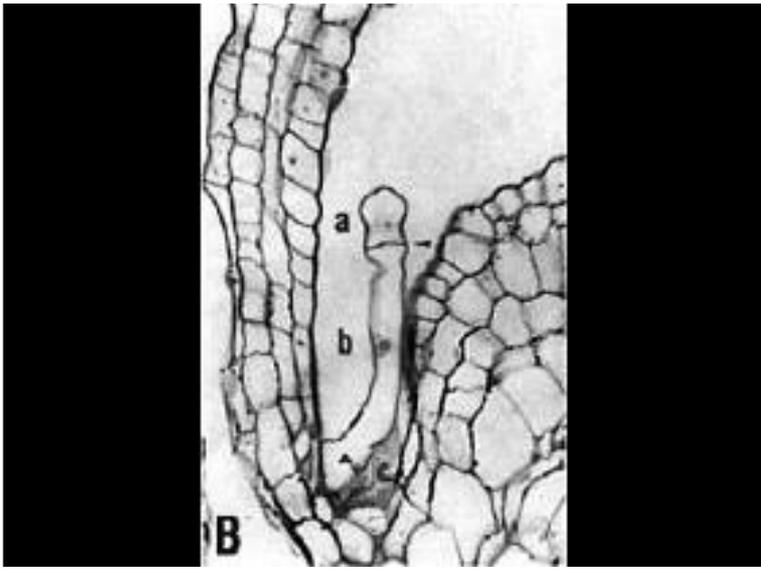
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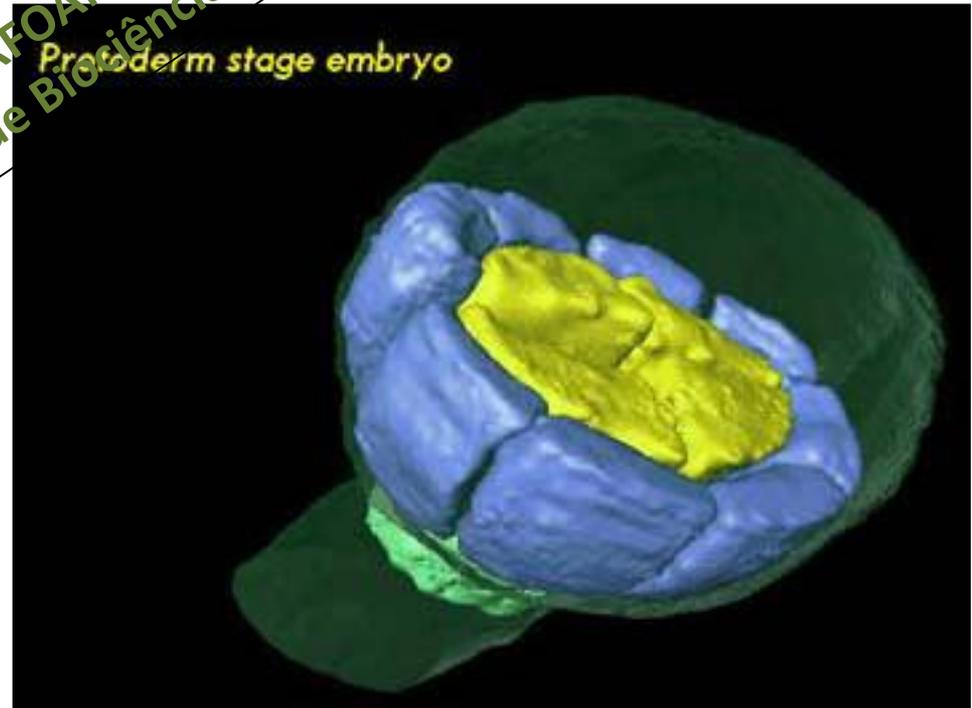
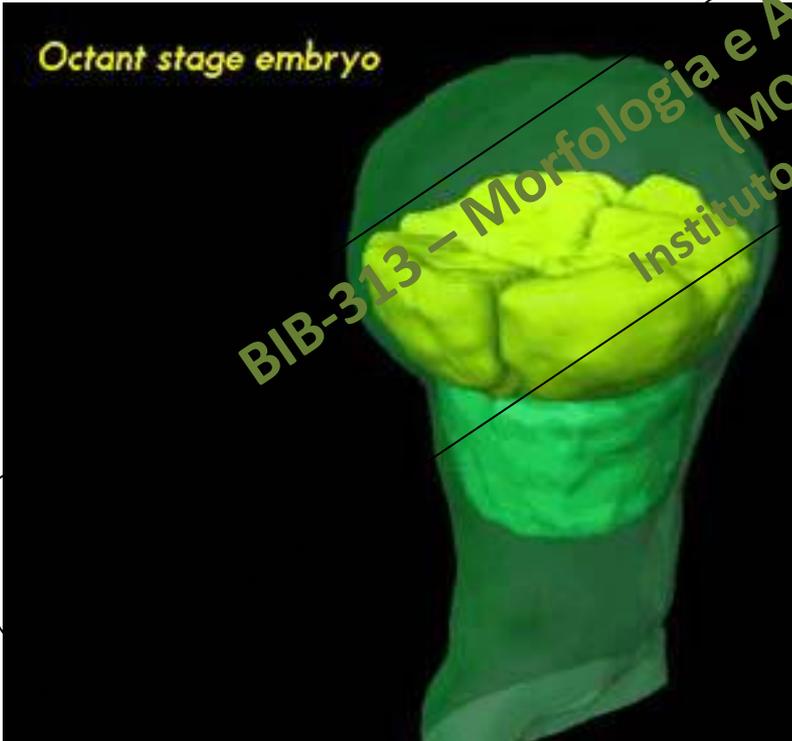
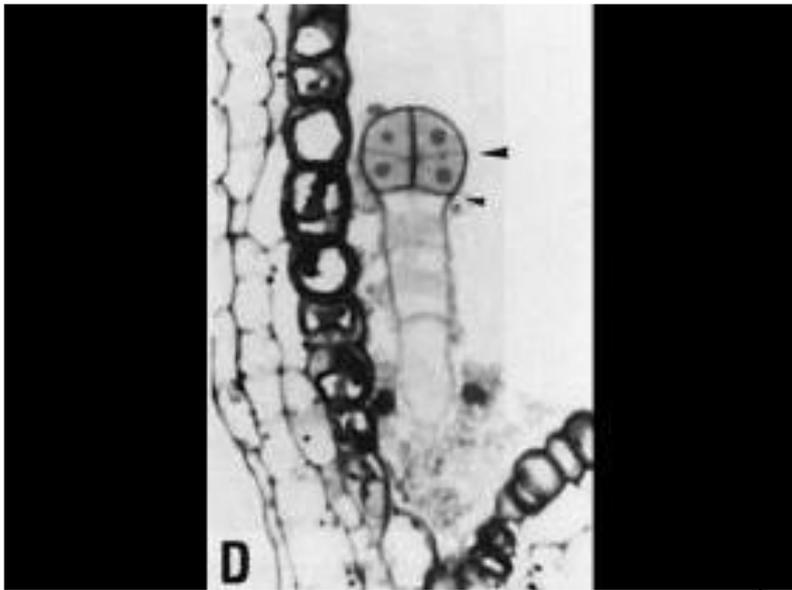


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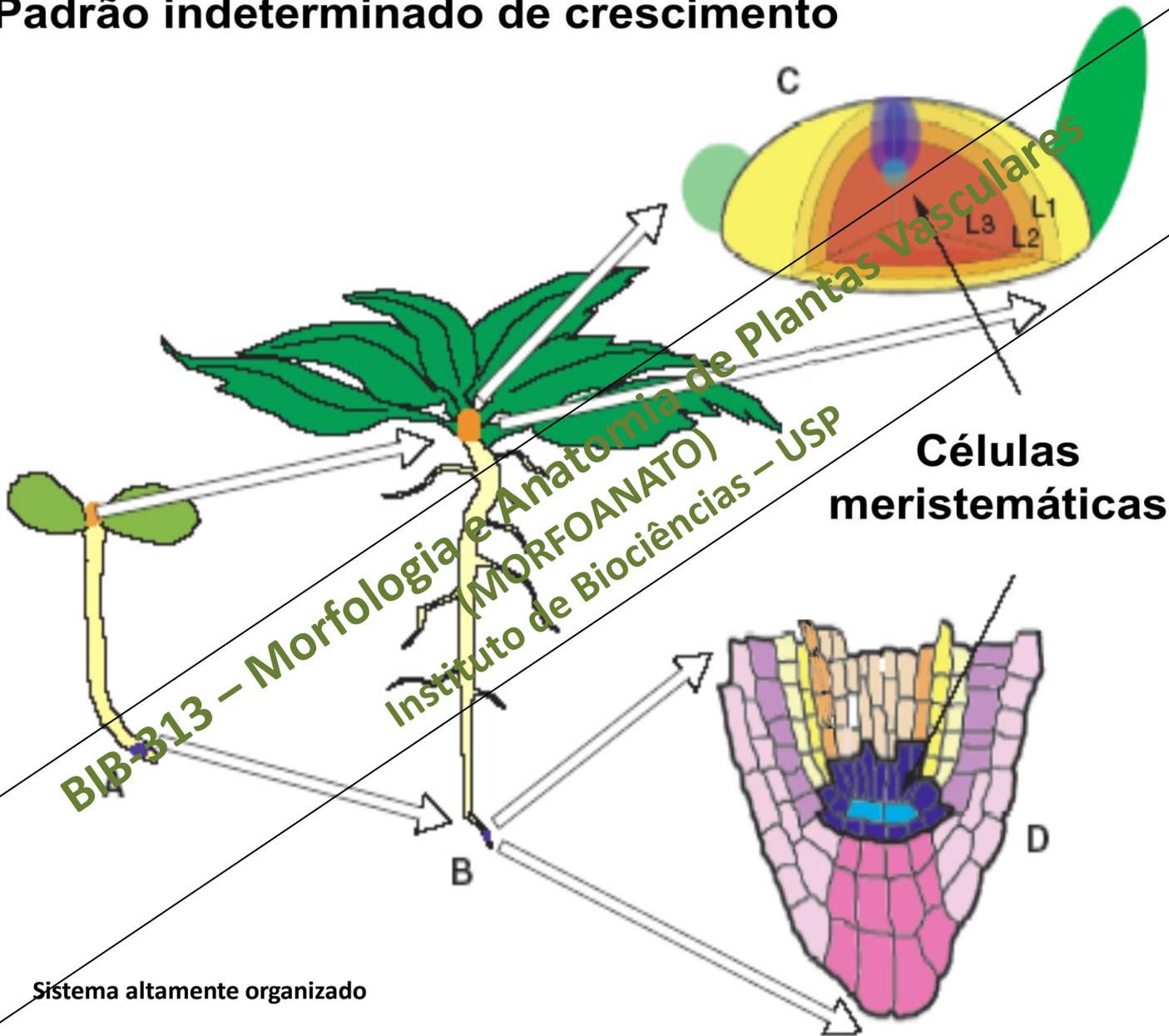






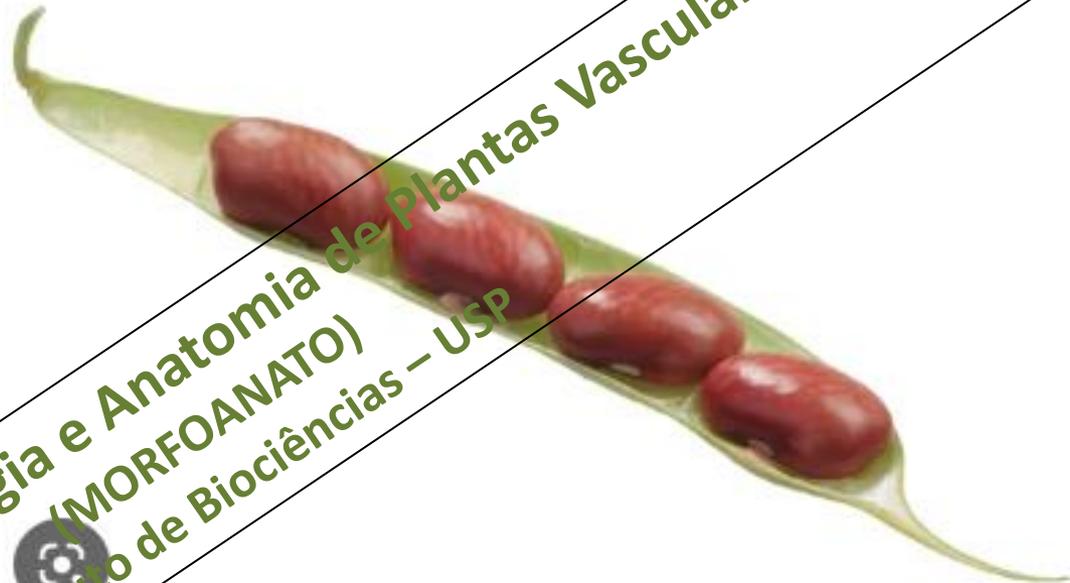
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# Padrão indeterminado de crescimento





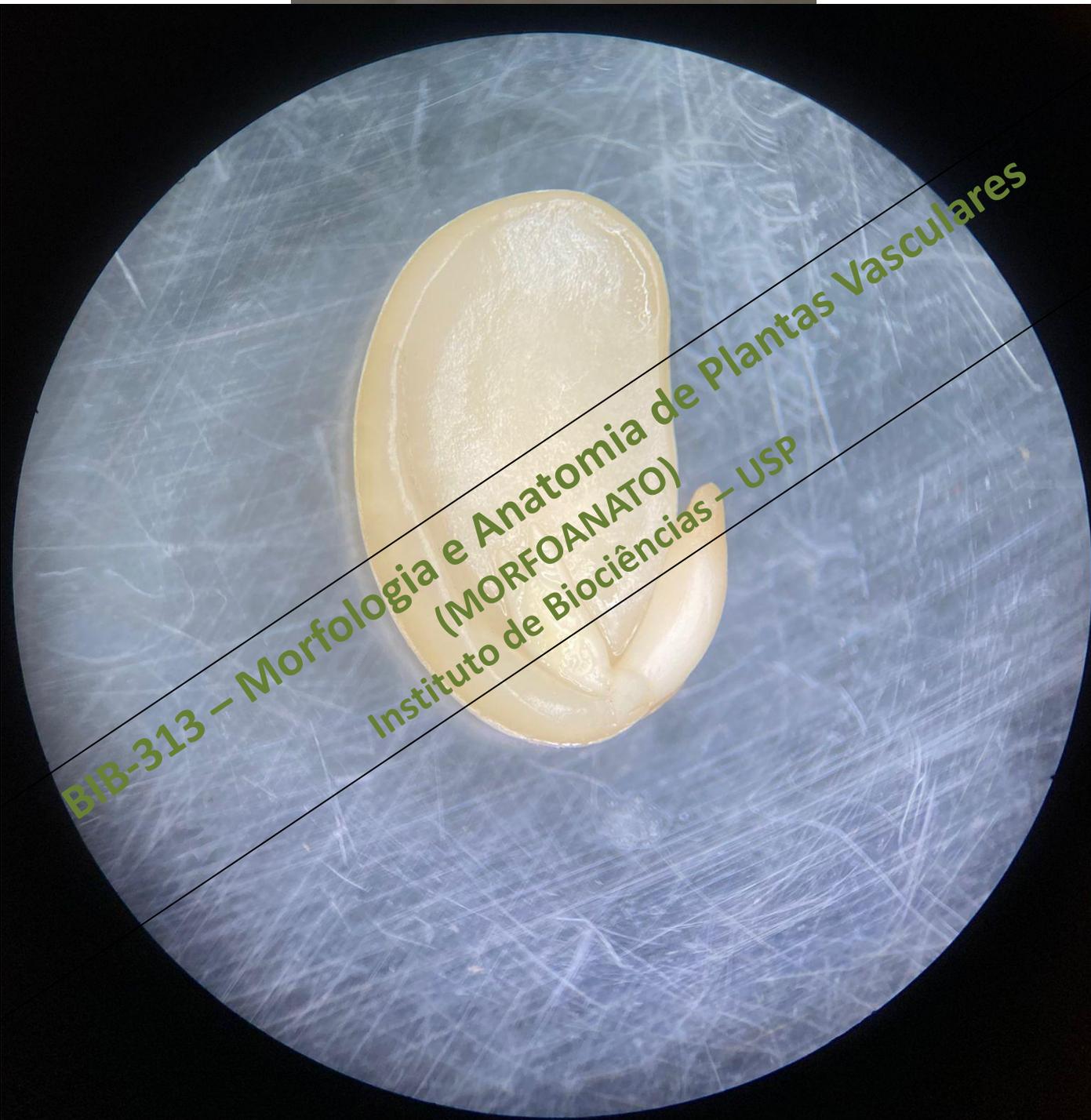
Semente do feijão (*Phaseolus vulgaris*, Fabaceae, Monocotiledônea)



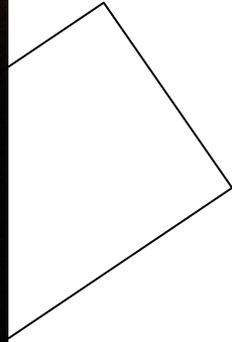
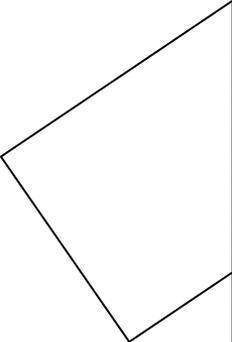
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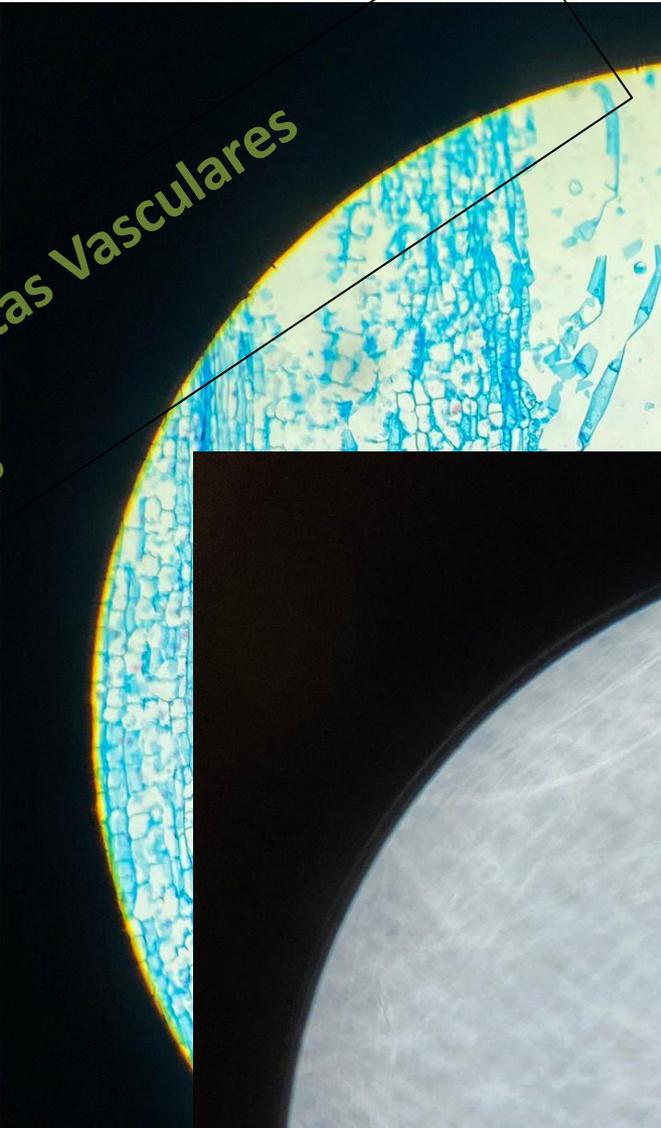
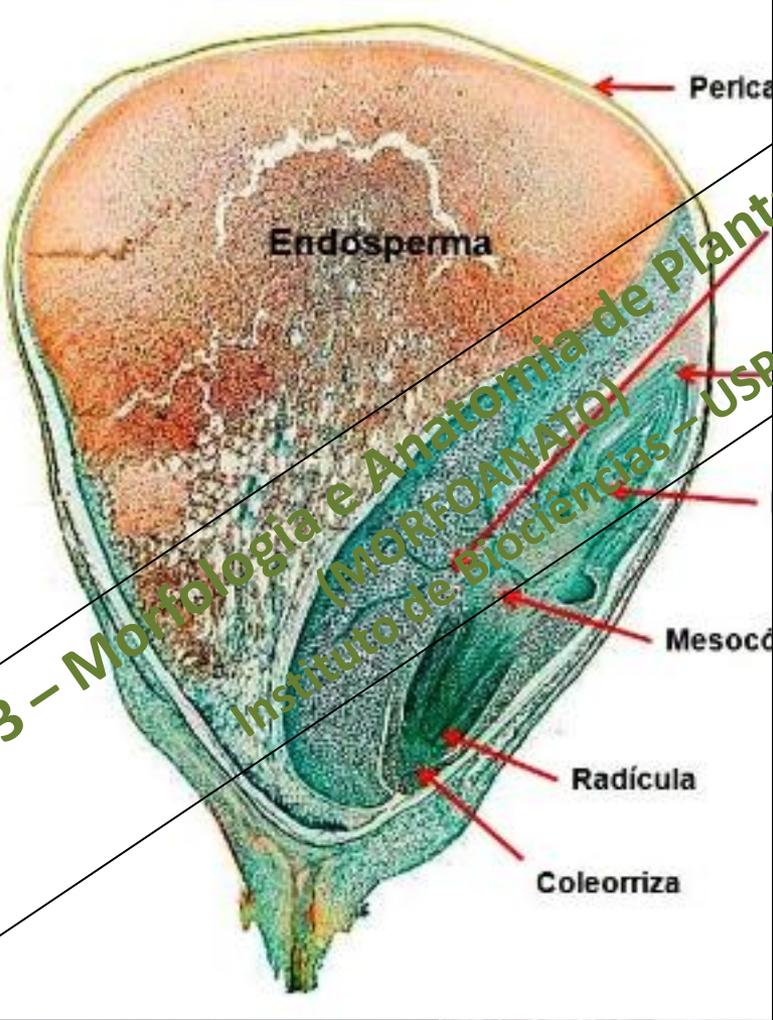


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Fruto do milho (*Zea mays*, Poaceae, Monocotiledônea)

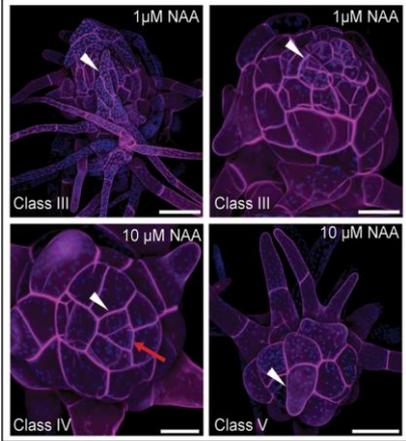


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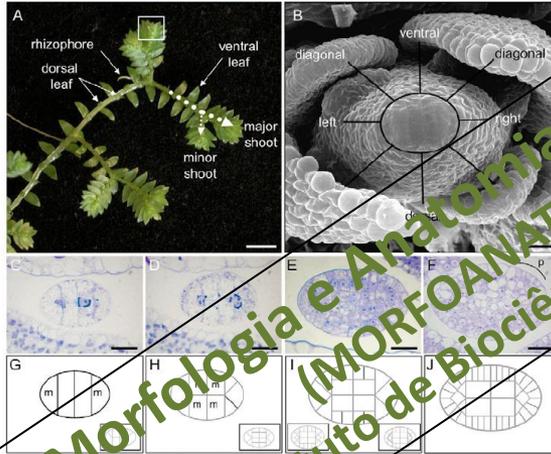
Fruto do milho = Cariopse

# Organização do Meristema apical caulinar

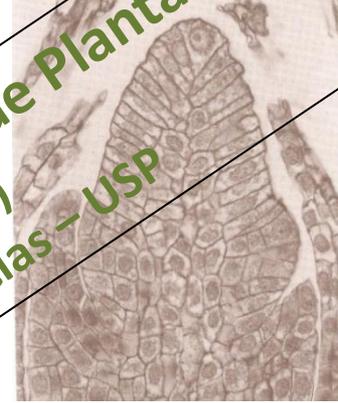
Gametófito de um musgo



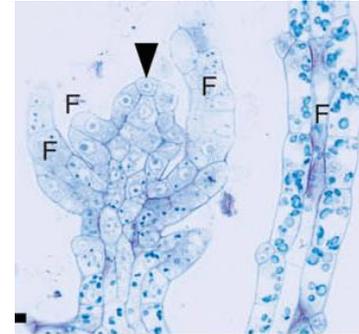
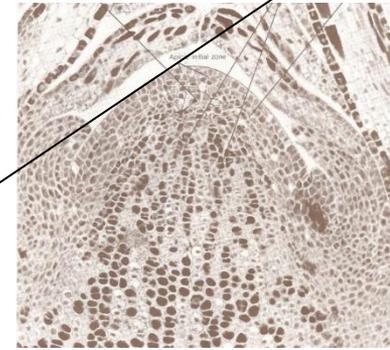
Esporófito de uma licófitas



Esporófito de uma monilófitas



Esporófito de espermatófitas



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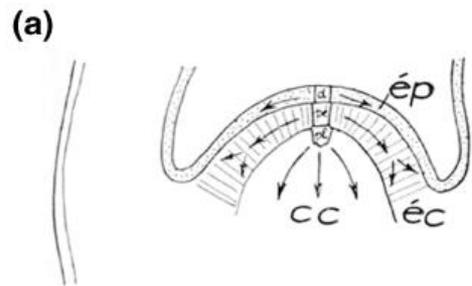
Terminologias adotadas em espermatófitas

ep: epiderme  
ec: subepiderme  
cc: centro

cmc: célula-mãe central  
mc: meristema central  
zp: zona periférica  
zia: zona apical inicial

t: túnica  
c: corpo

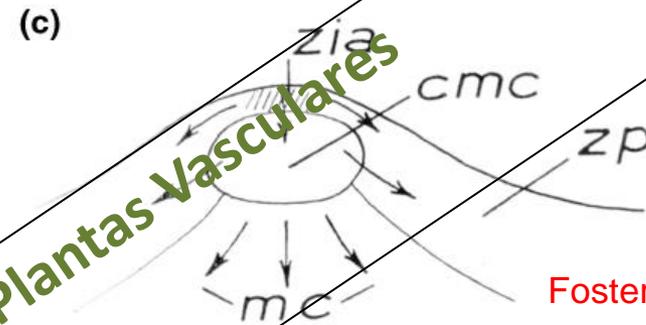
ma: meristema de "espera" (*attente*)  
pmsp: promeristema esporogênico  
pmr: promeristema receptacular  
mm: meristema medular



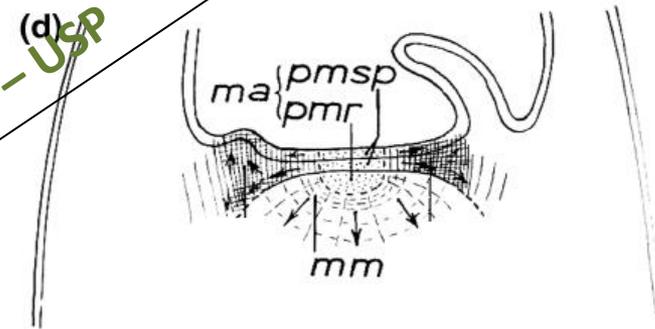
Hanstein



Schmidt



Foster



Buvat

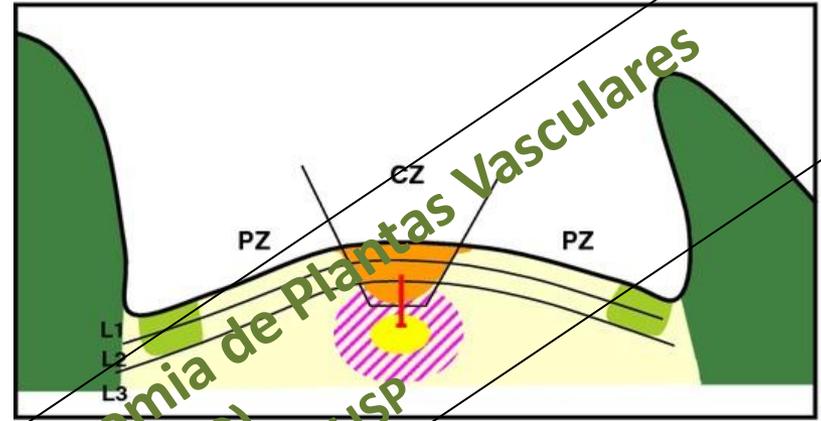
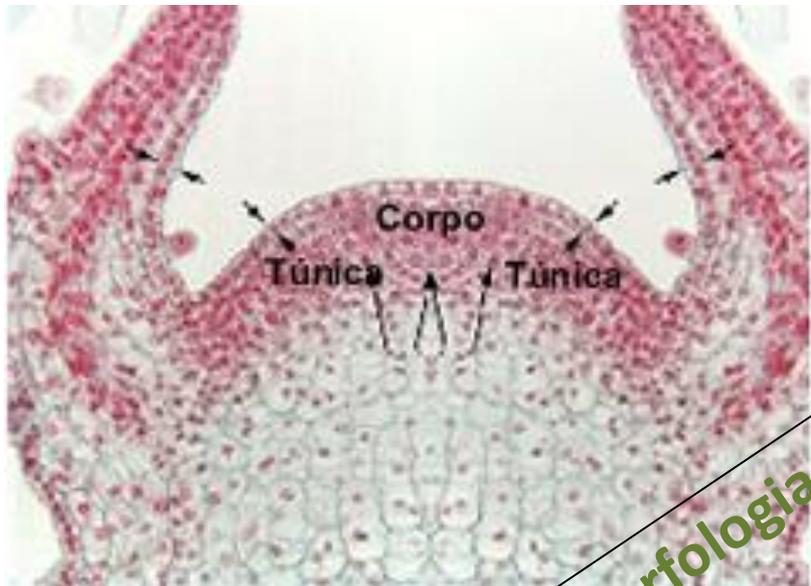
(e)

Hanstein 1868	Schmidt 1924	Buvat 1952	
Dermatogen	Tunica	Anneau initial	} <b>Méristème d'attente</b>
Periblem		Proméristème sporogène	
Plerome	Corpus	Proméristème réceptaculaire	
		Meristème médullaire	

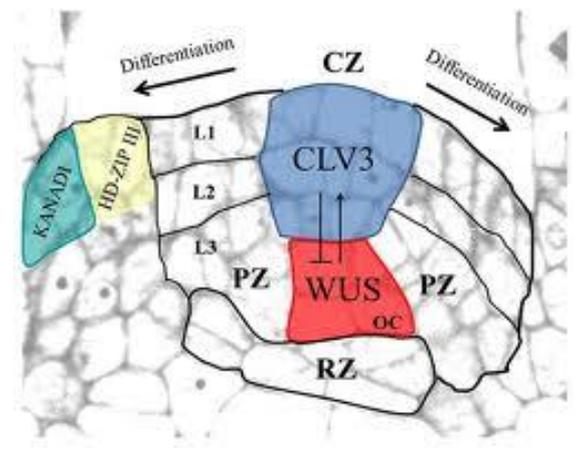
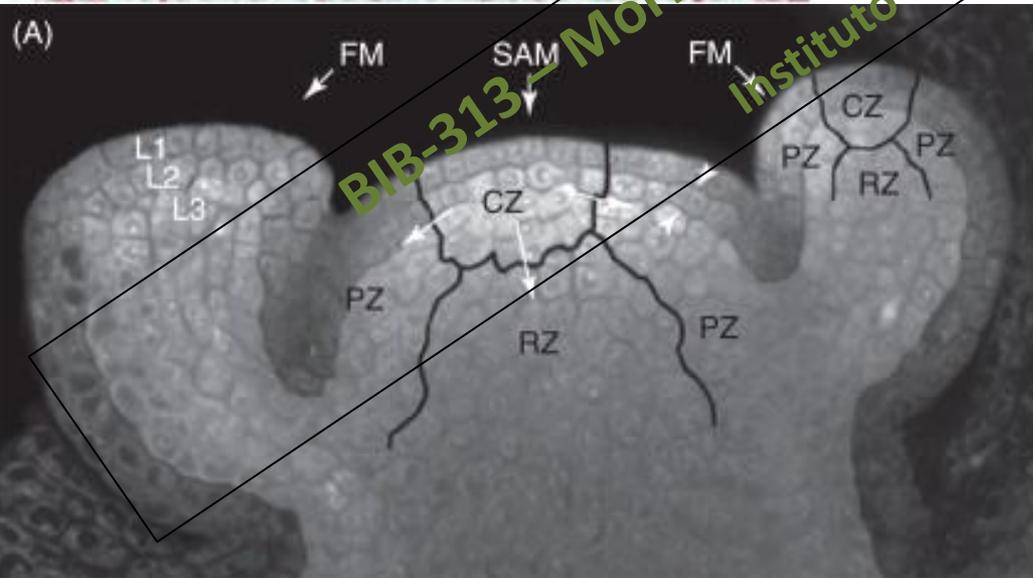
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Atualmente, as terminologias adotadas:

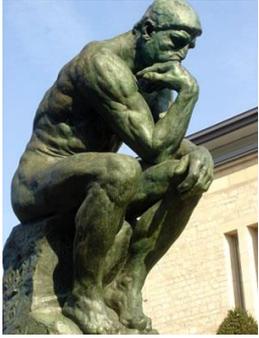
1. Teoria da Túnica-corpo
2. Teoria da Zonação



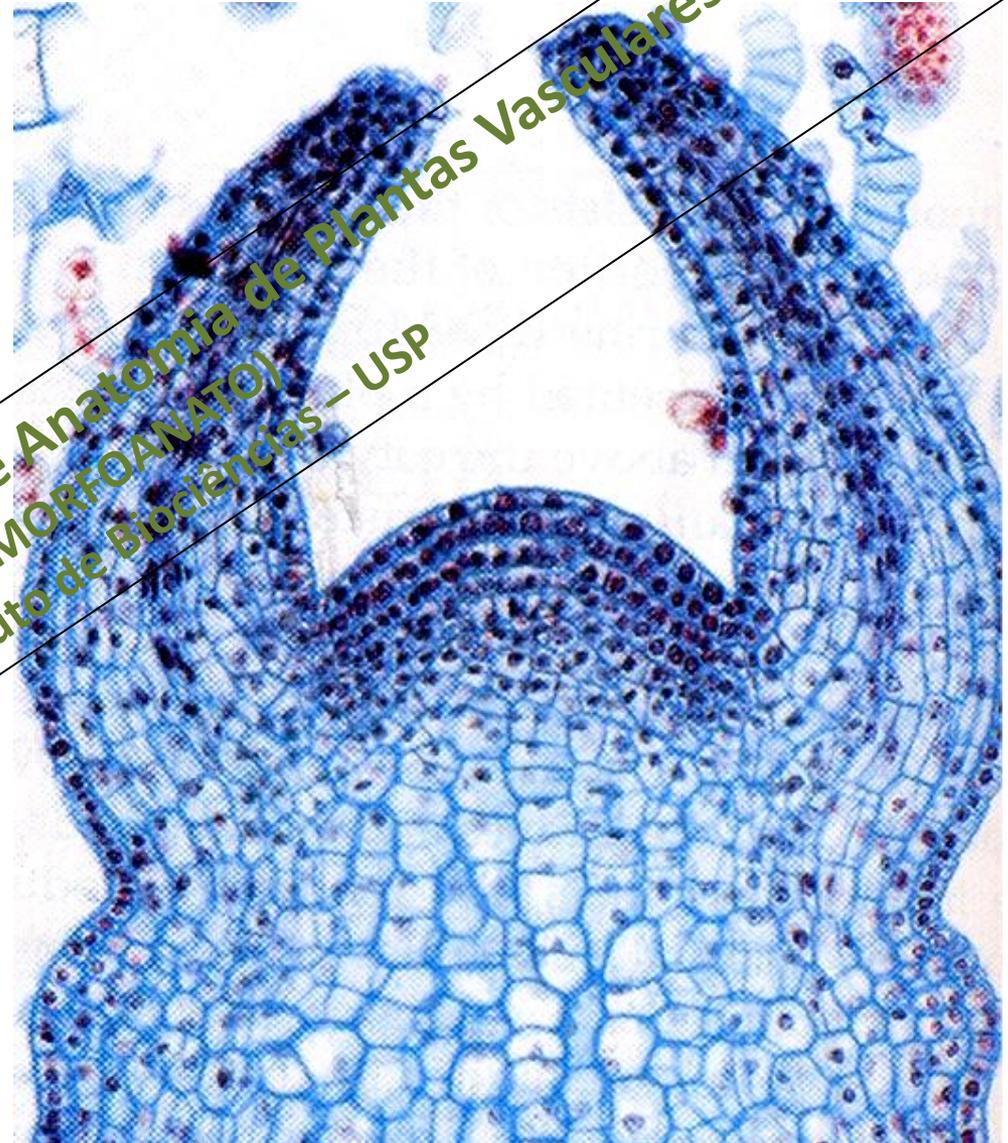
- CLE27
- CLE41 (not in CZ)
- WUS
- CLV
- CLV2/CRN2/CLE40/BAM1-2-3
- CLE19



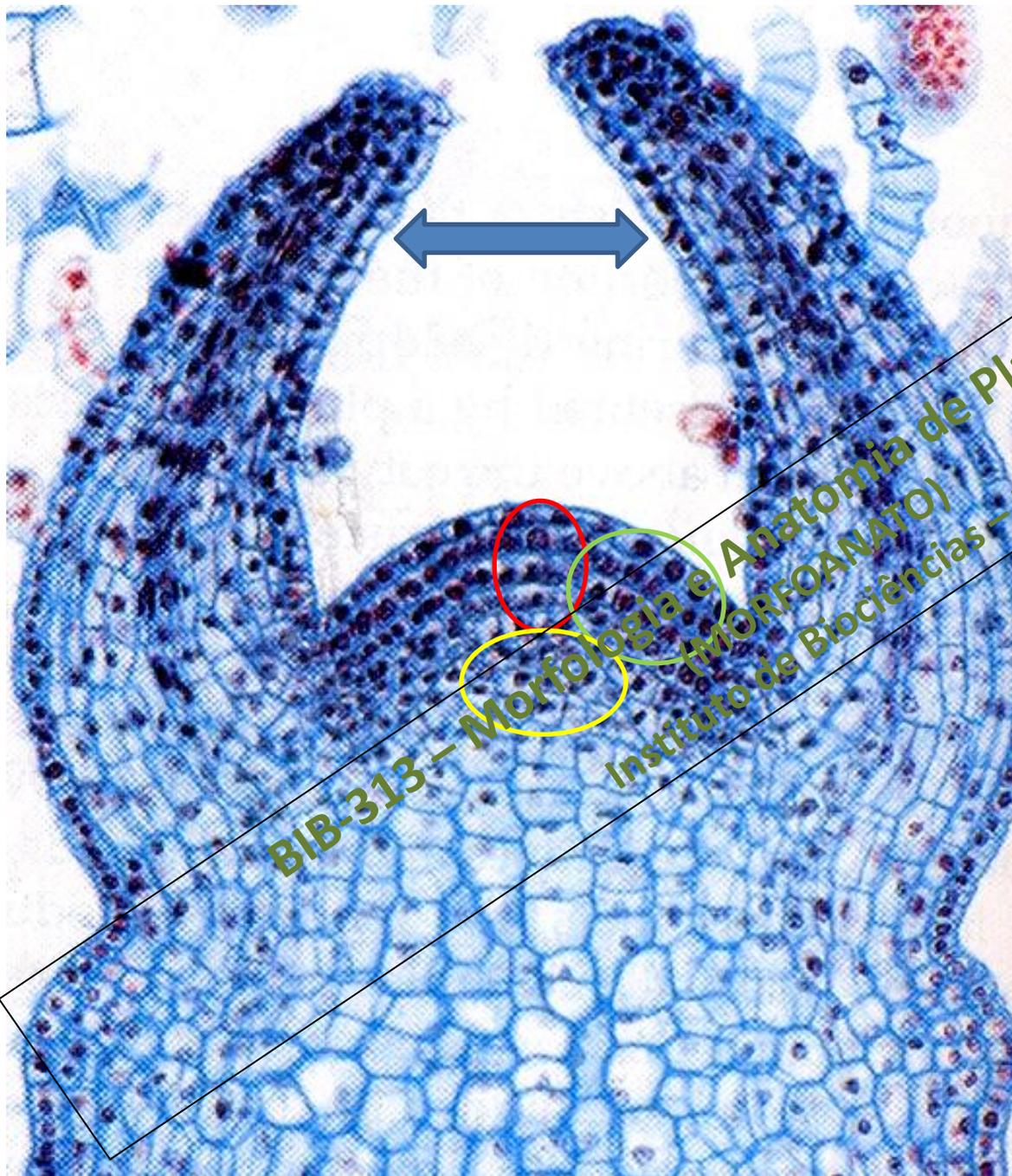
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Observe a secção longitudinal do ápice caulinar de *Plectranthus* sp.



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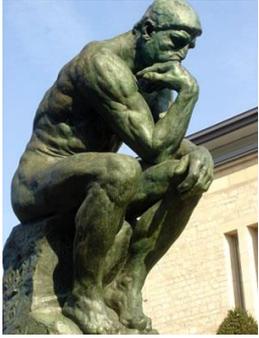
zona central (vermelho)

zona periférica (verde)

zona medular (amarelo)

primórdios foliares (seta)

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Ramo de *Murraya paniculata* (Rutaceae) e *Plectranthus* sp. (Lamiaceae)

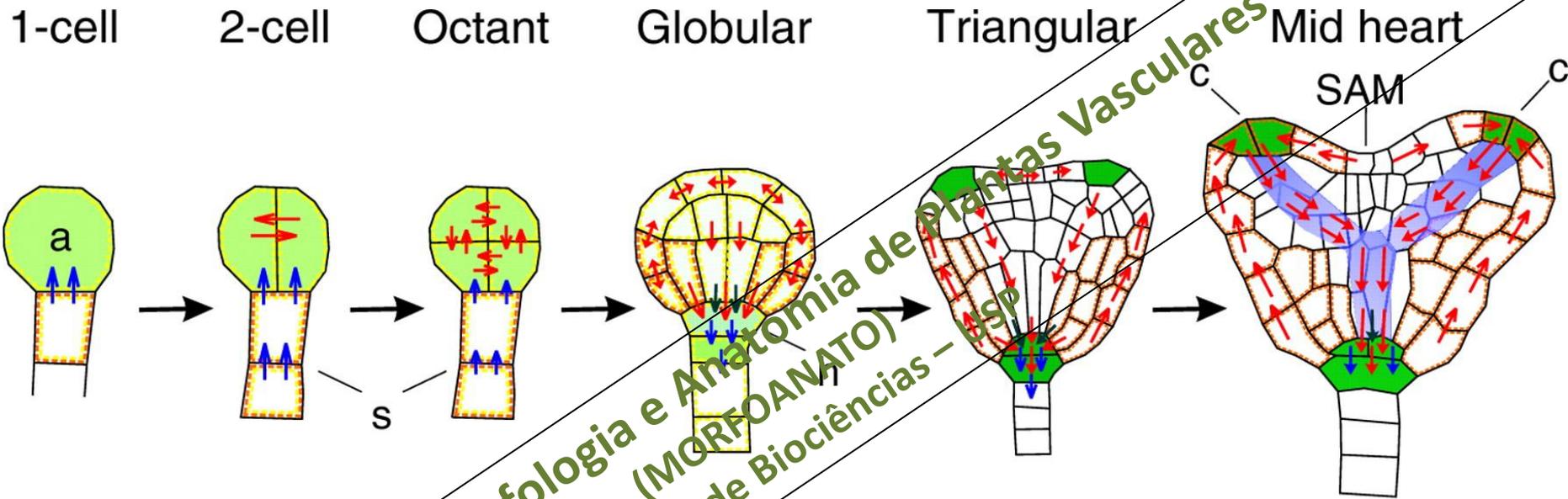


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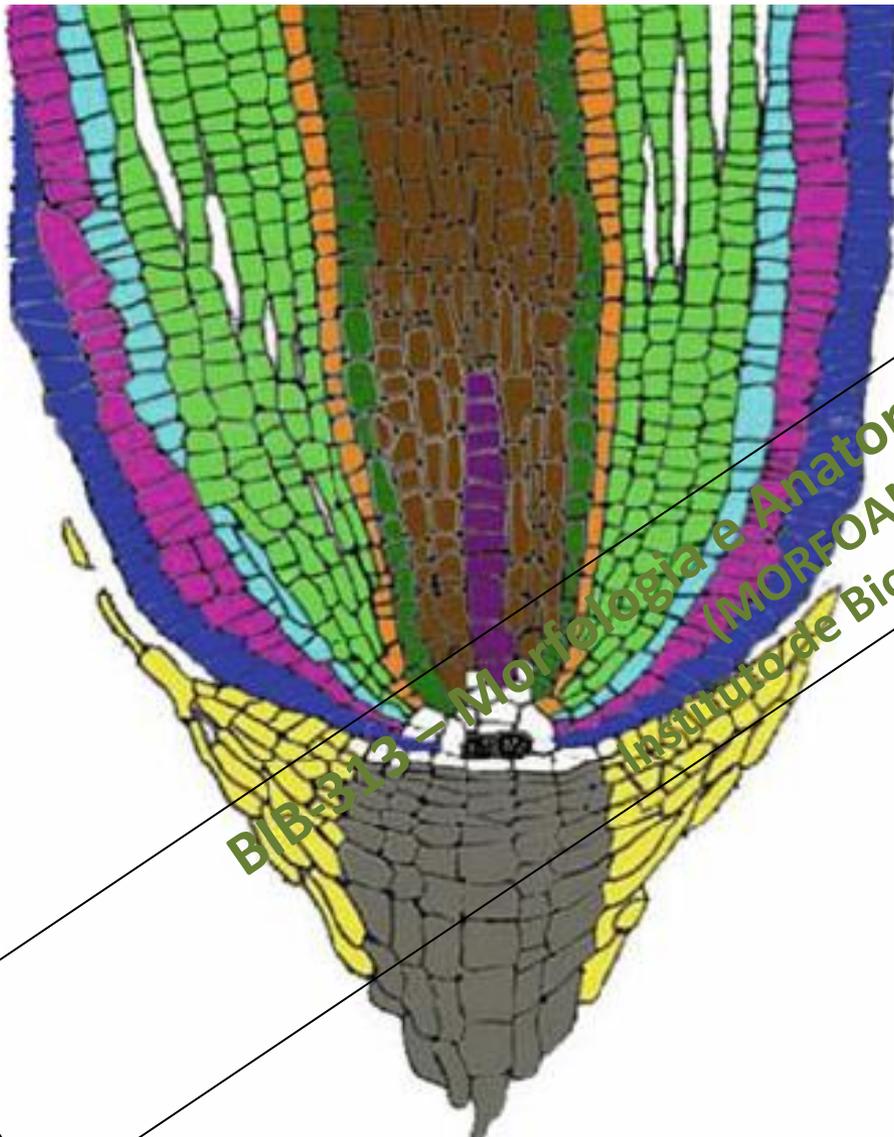


# Diferenciação dos meristemas durante a embriogênese



Key		PIN1		Auxin concentration gradient (low-high)	a	Apical cell
		PIN4			c	Cotyledon
		PIN7		Future vasculature	h	Hypophysis
		ABCB1			s	Suspensor cells
		ABCB19		Future shoot apical meristem		

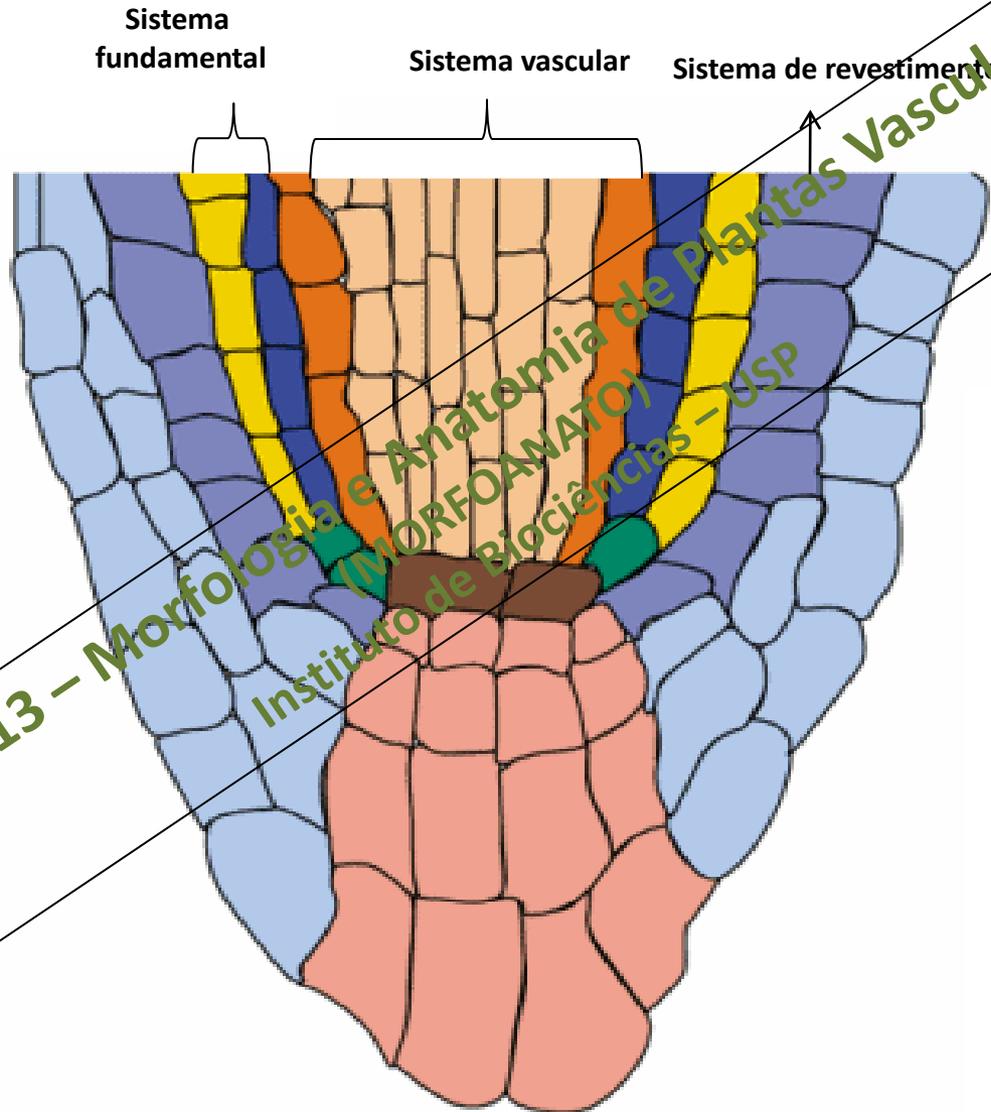
# MAR: Meristema Apical Radicular



- Epidermis
  - Exodermis
  - Sclerenchyma
  - Cortex
  - Endodermis
  - Pericycle
  - Stele
  - Xylem
  - Columella
  - Lateral root cap
  - Initials and derivatives
  - Quiescent Center (QC)
- Outer cell layer
- Ground tissues
- Stele

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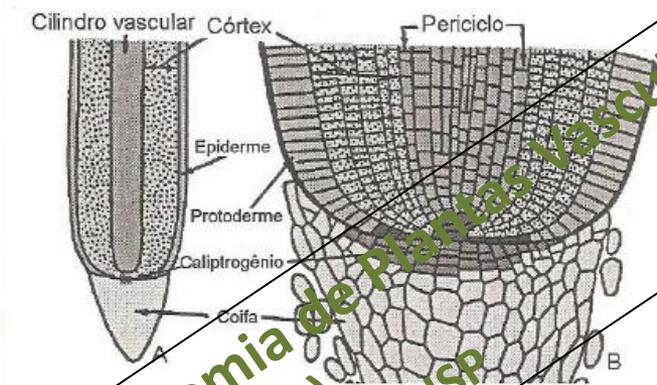
Epiderme e coifa originadas a partir da mesma inicial



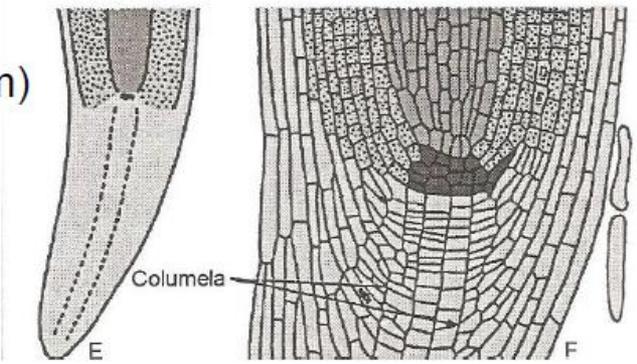
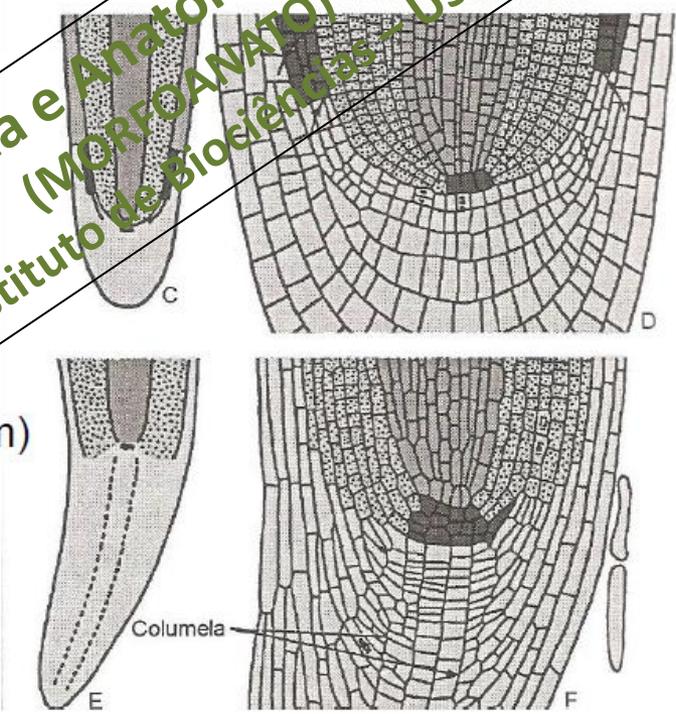
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# Padrões gerais de organização do MAR em espermatófitas

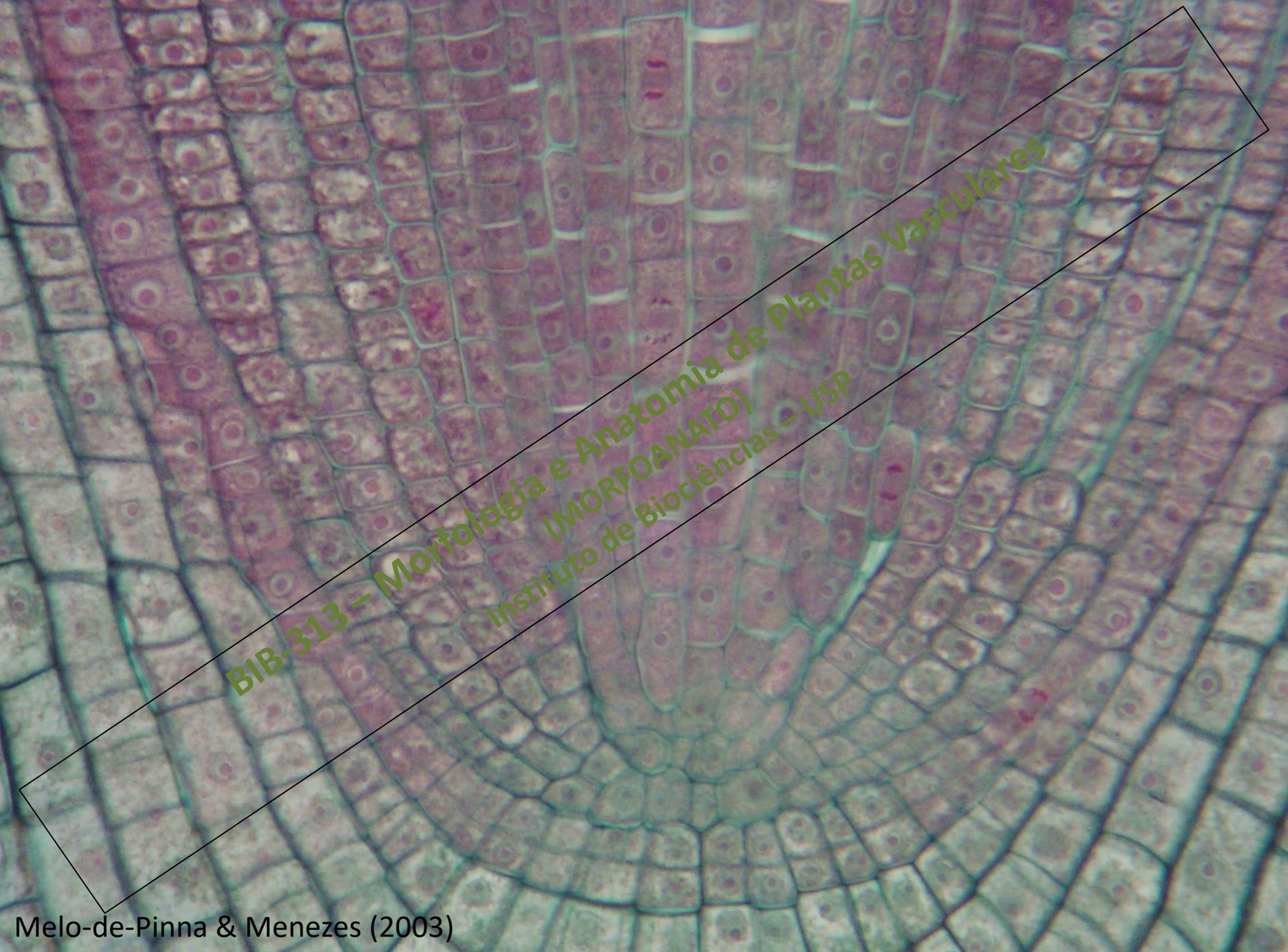
Fechado  
(Diferentes iniciais)



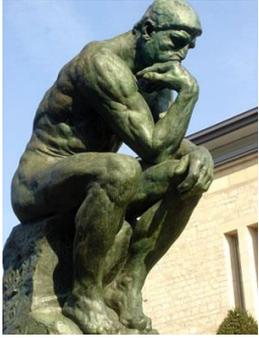
Aberto  
(Iniciais em comum)



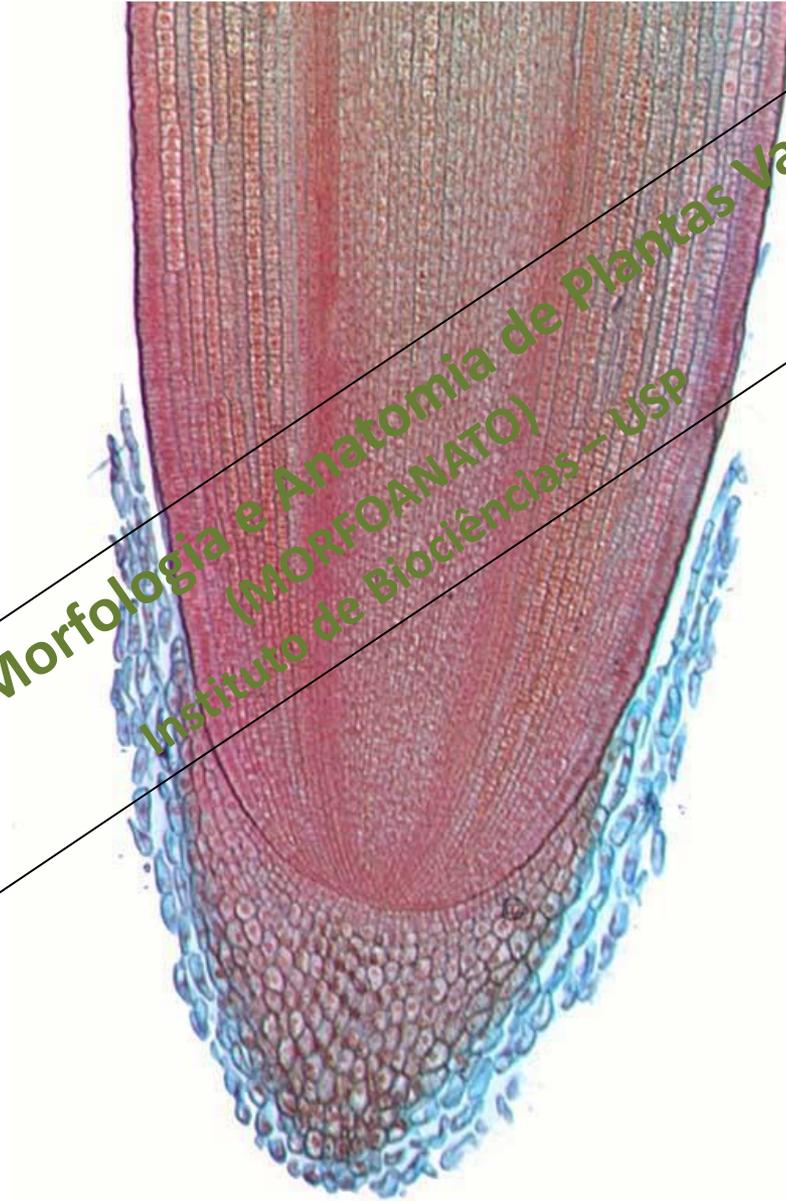
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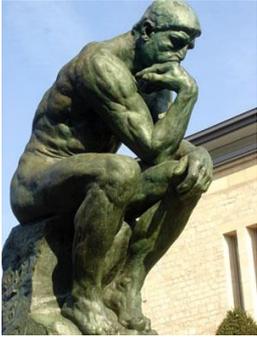


Observe a secção longitudinal do ápice radicular de *Allium cepa*.



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# Onde encontramos MAR no sistema radicular?

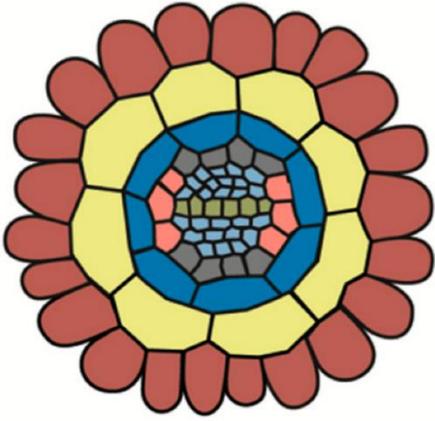


Secção longitudinal da raiz de *Eichornia crassipes* (Pontederiaceae).

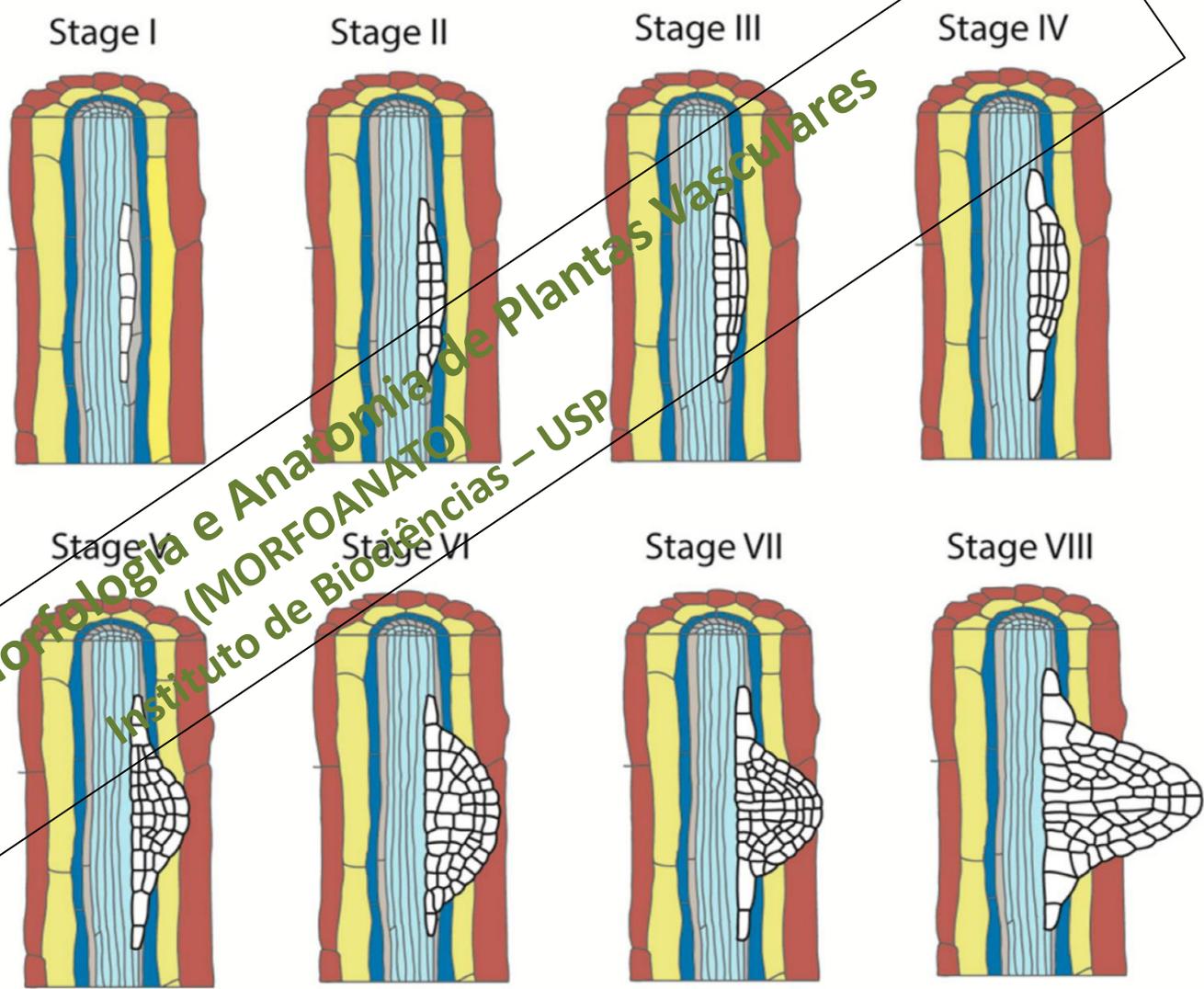


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**a**

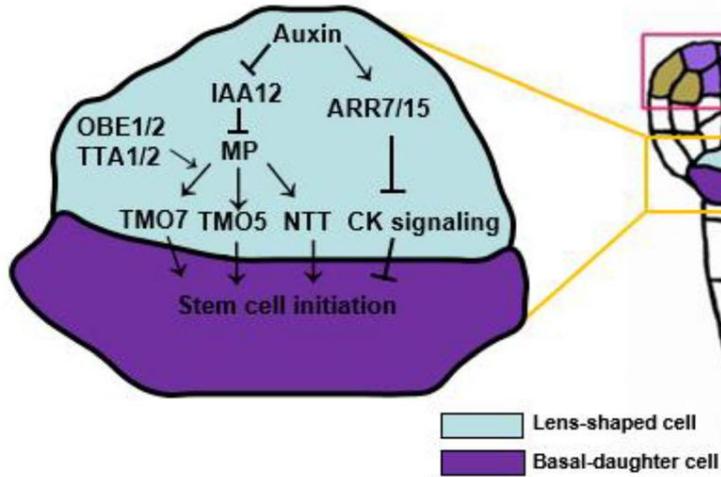
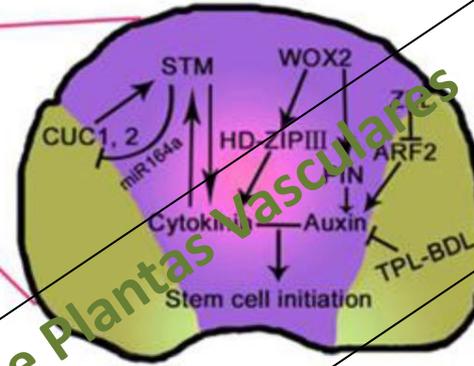
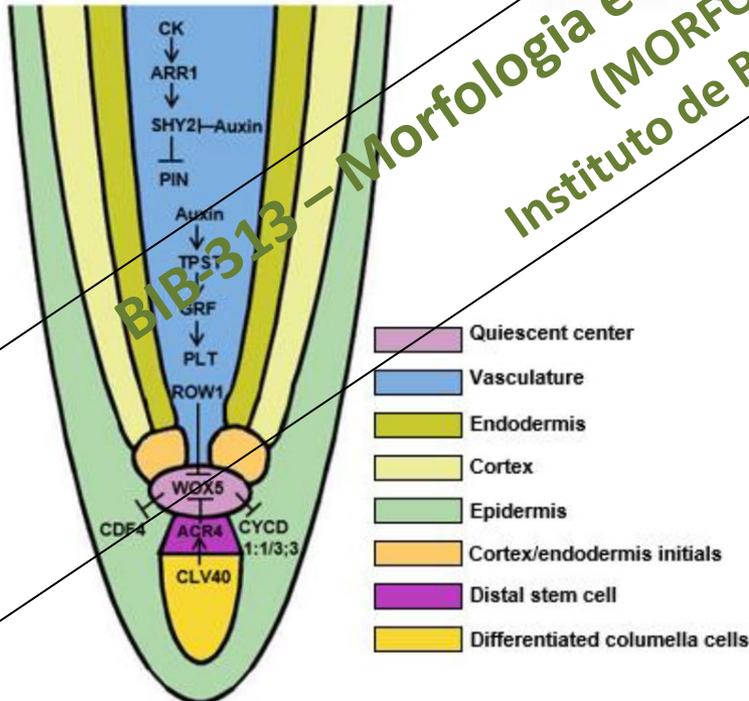
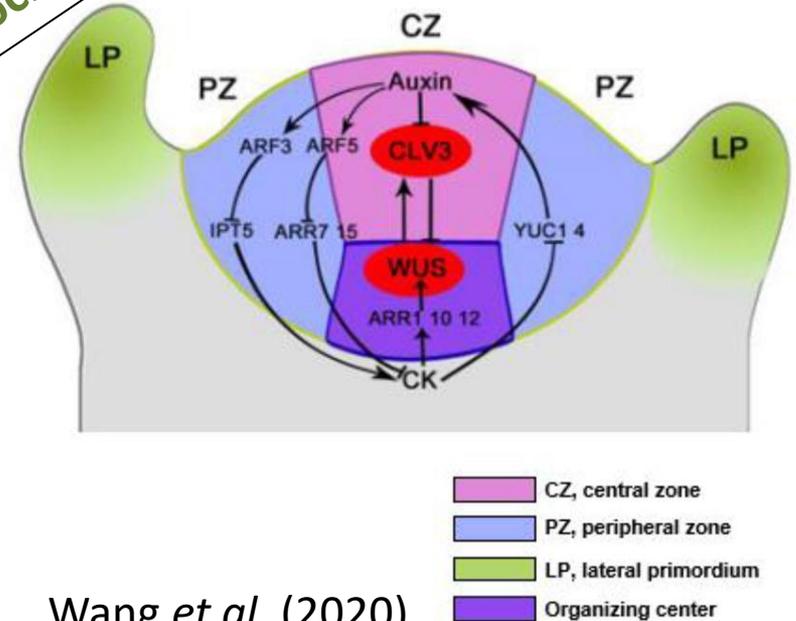


**b**



- Epidermis
- Cortex
- Endodermis
- Phloem pole pericycle
- Xylem pole pericycle
- Pericycle
- Phloem
- Xylem
- ] Stele
- Lateral root primordia

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**A****B****C****D**Wang *et al.* (2020)

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