



---

Pourquoi la frisée n'est pas de la laitue....

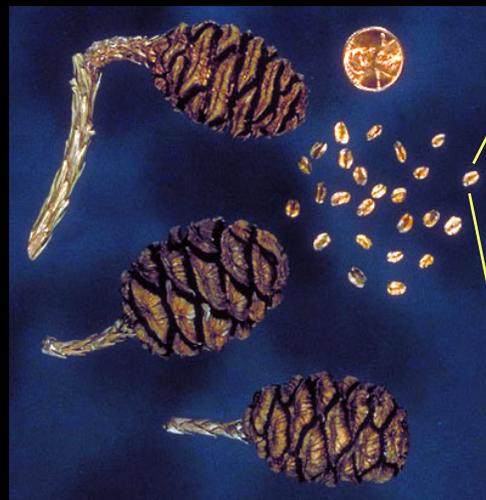
Comment se développent les feuilles ?



Henri Rousseau, Le rêve

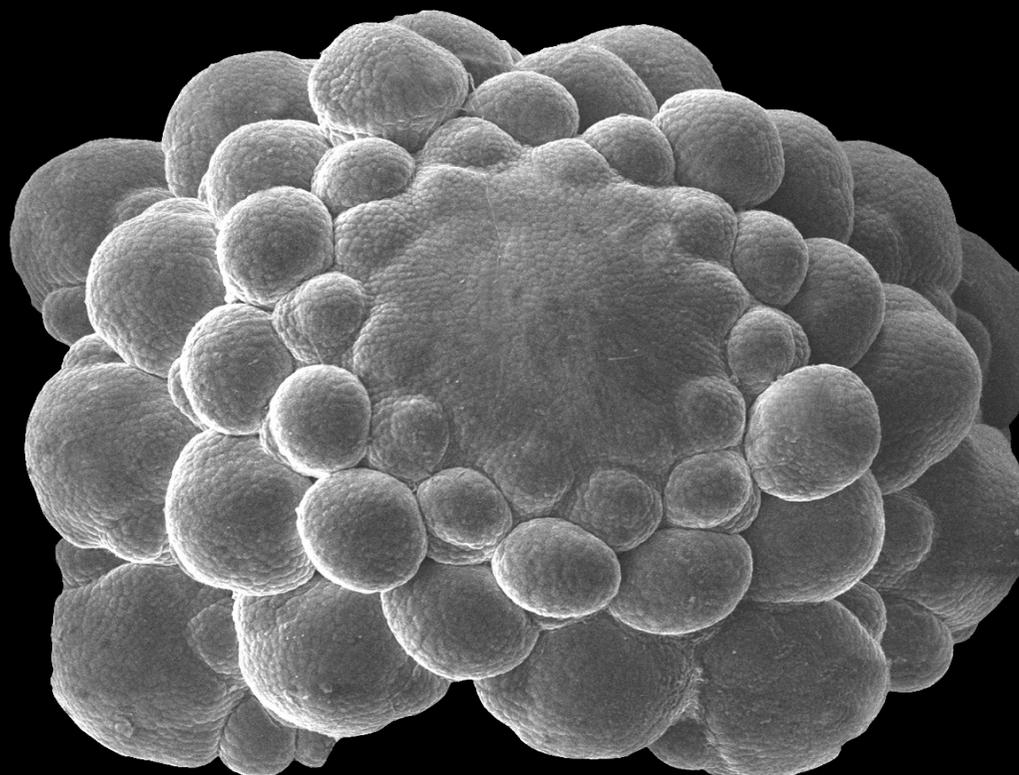
- Où naissent les feuilles ?
- Comment se forment-elles ?
- Comment acquièrent-elles différentes formes ?

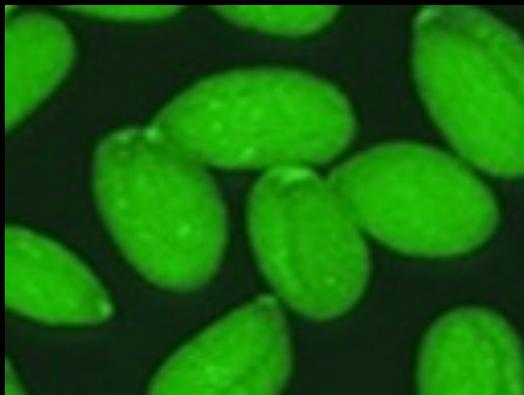
Le développement des plantes  
se fait de façon **continue**  
tout au long de leur vie...







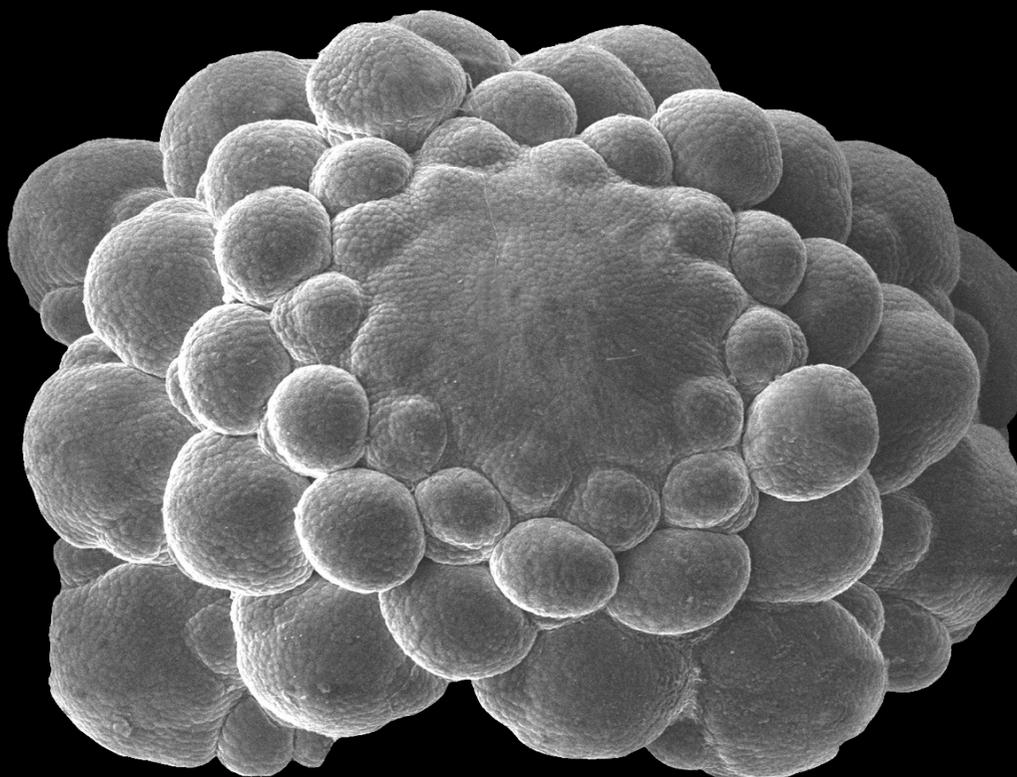


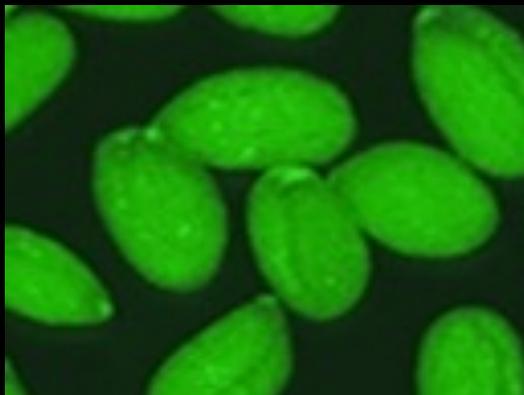


Graines

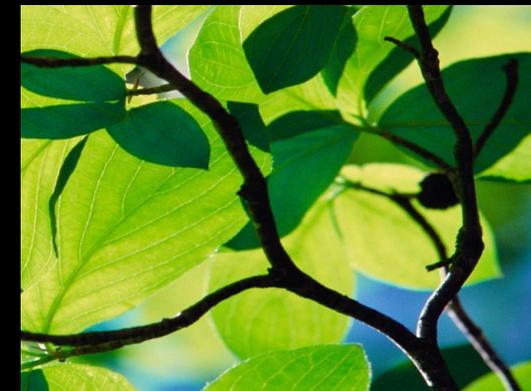
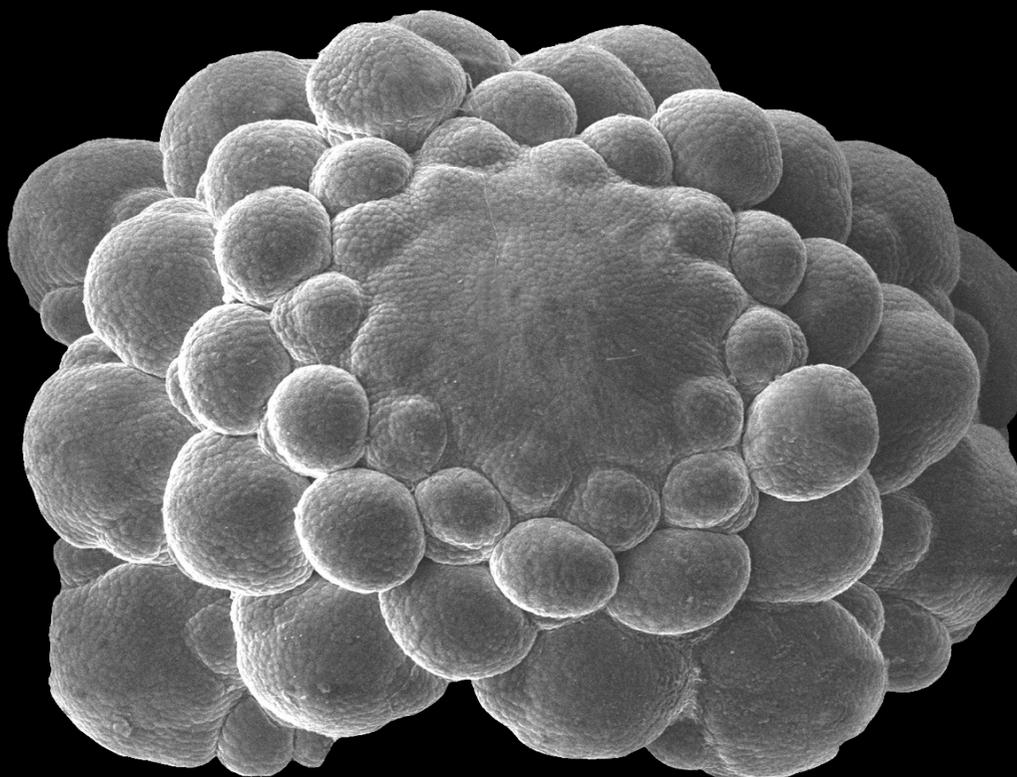


Bourgeons





Graines



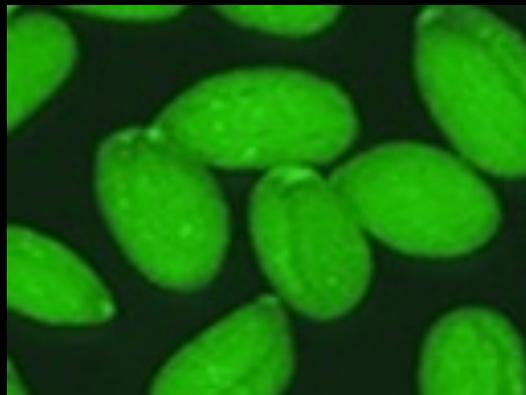
Tiges et Feuilles



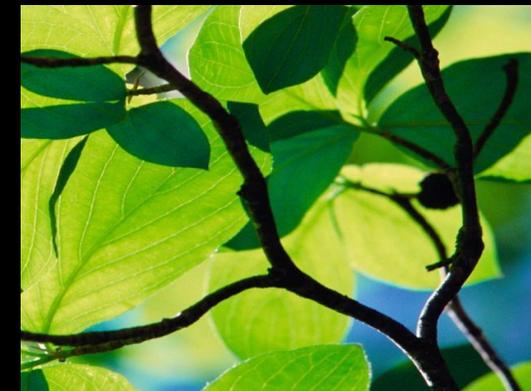
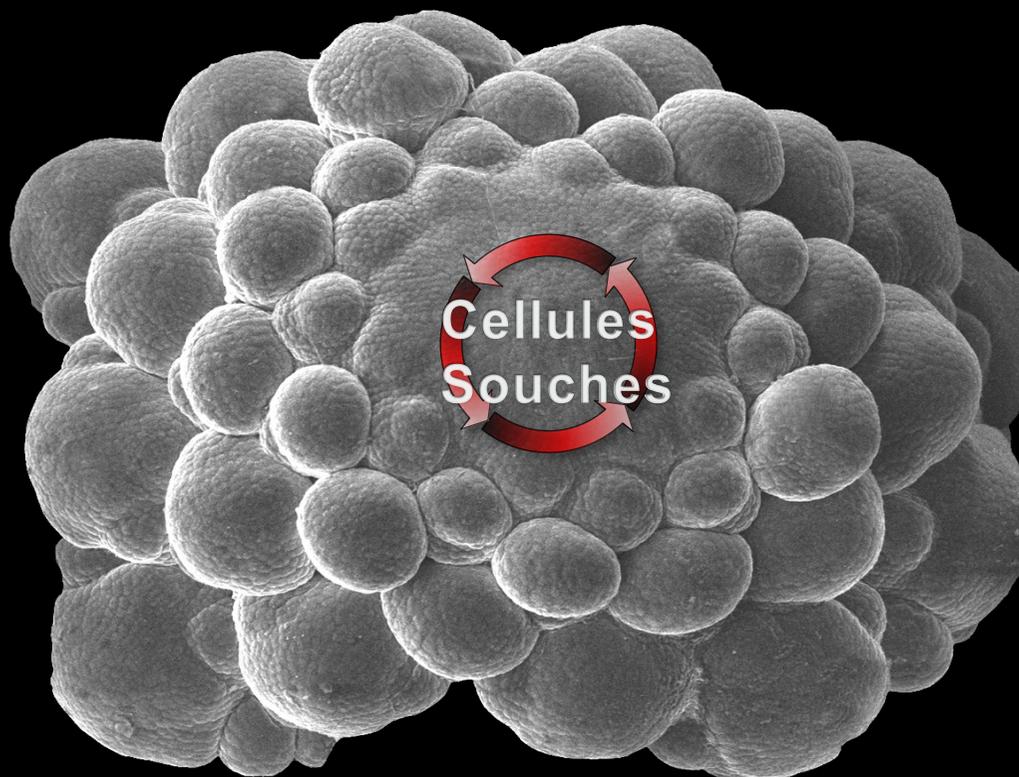
Bourgeons



Fleurs



Graines



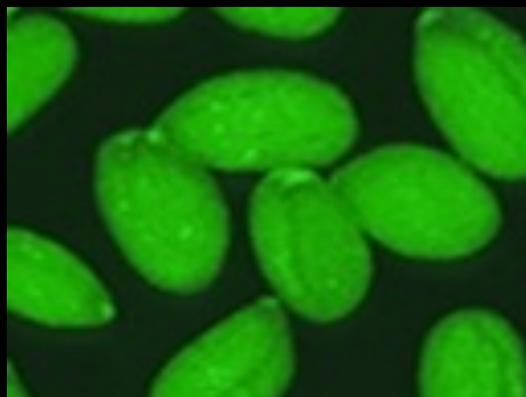
Tiges et Feuilles



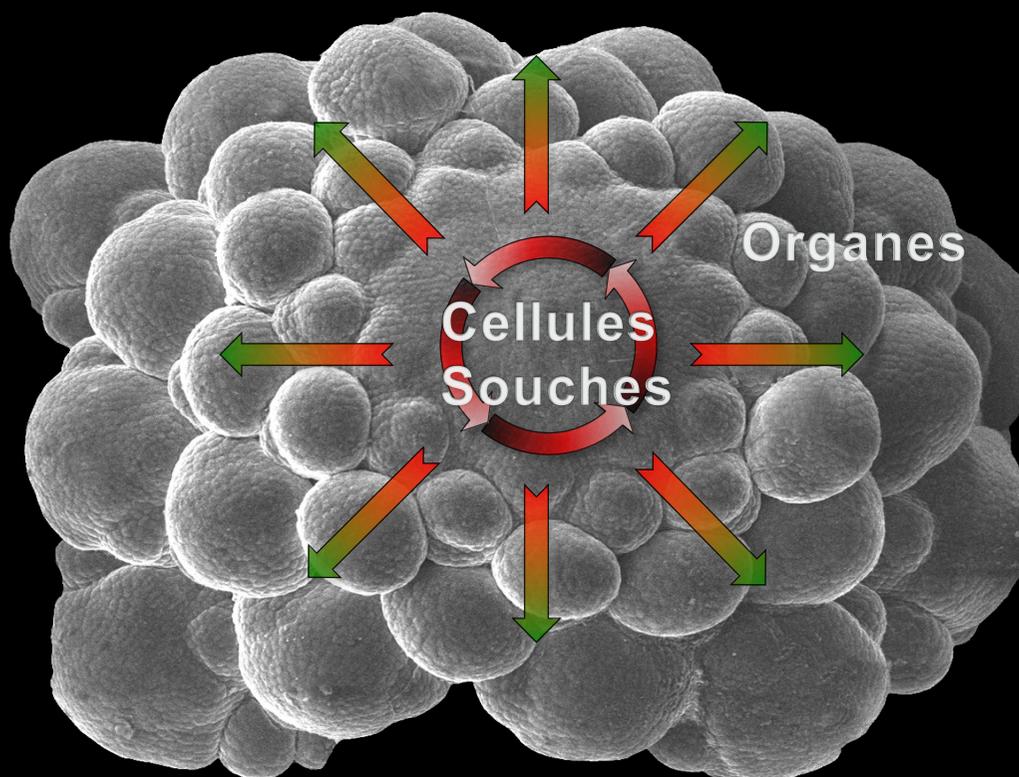
Bourgeons



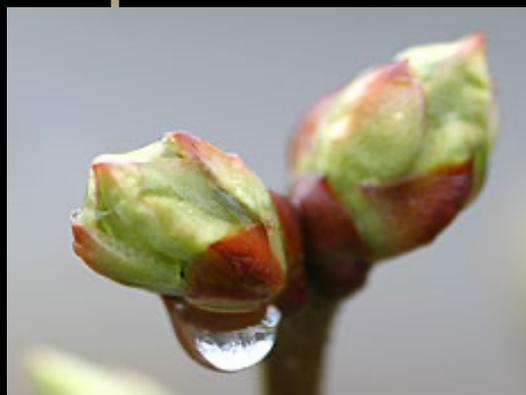
Fleurs



Graines



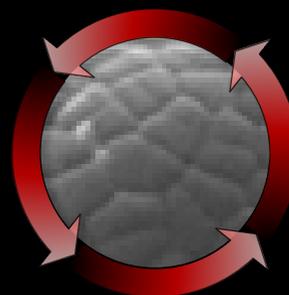
Tiges et Feuilles



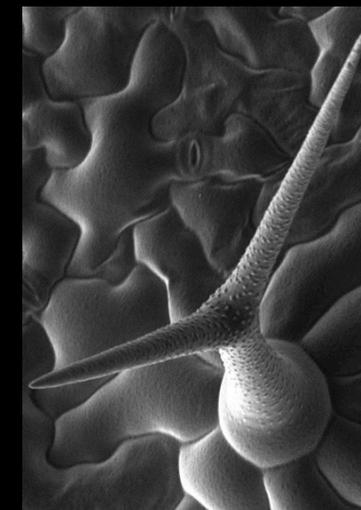
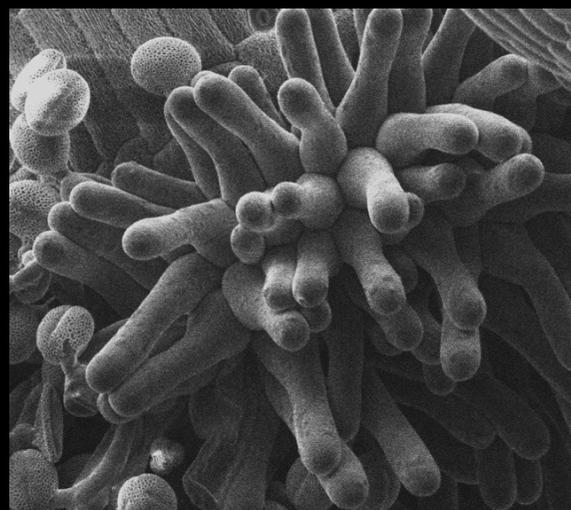
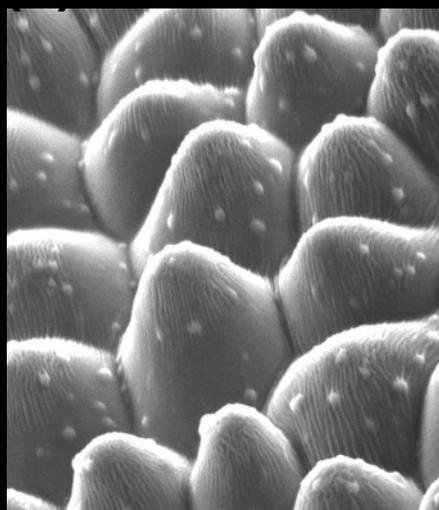
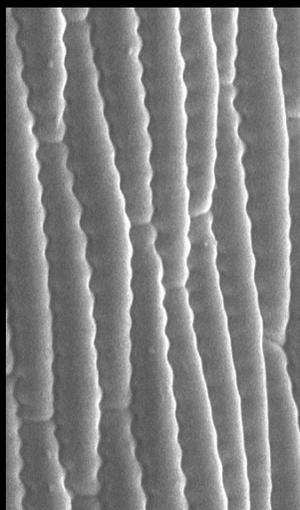
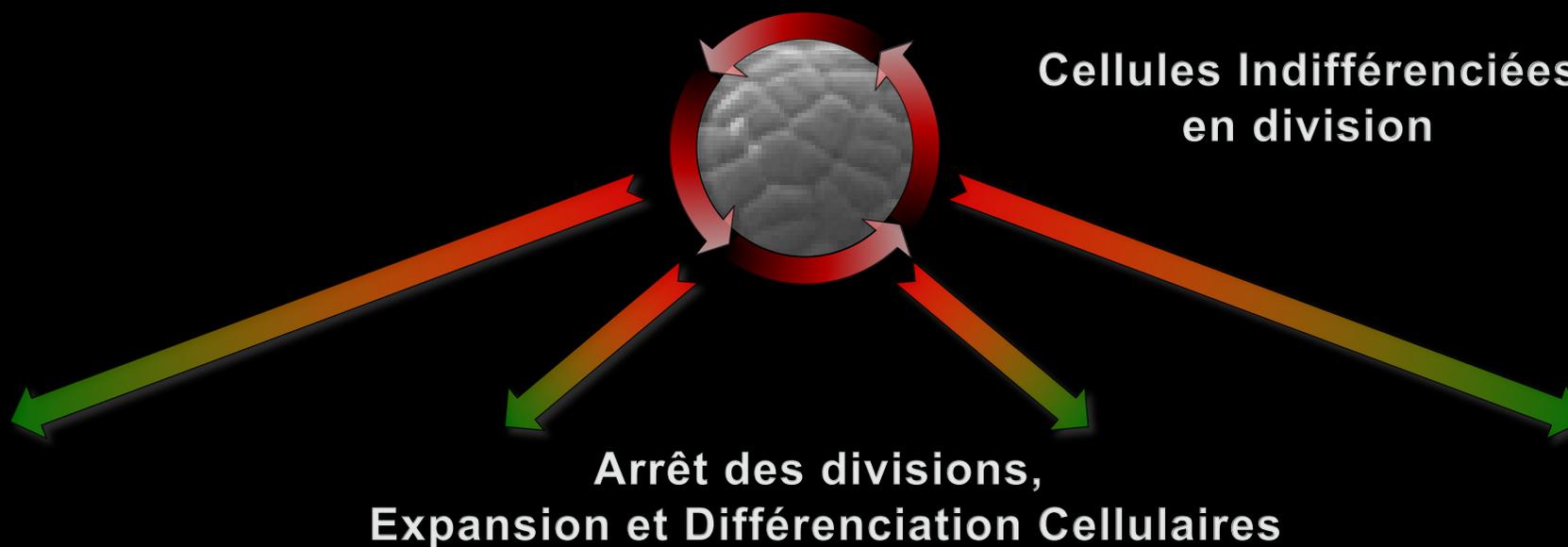
Bourgeons

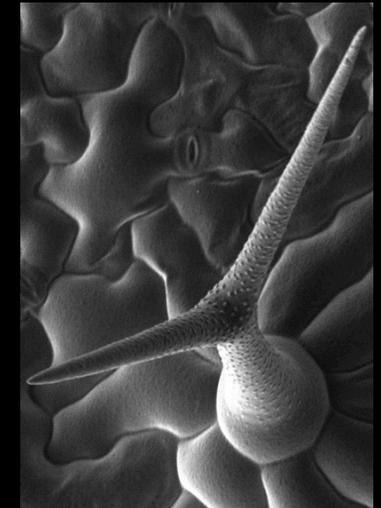
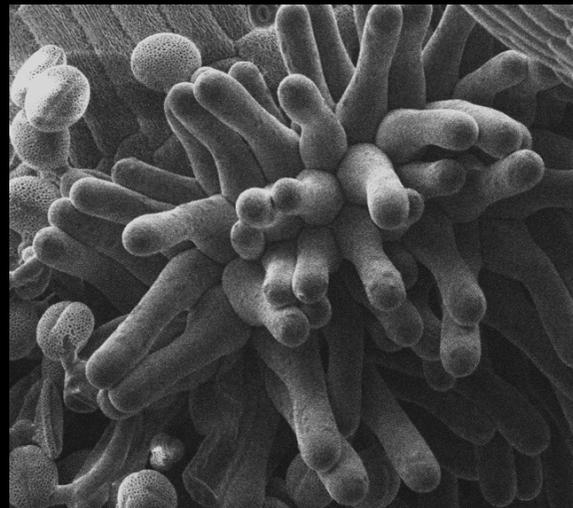
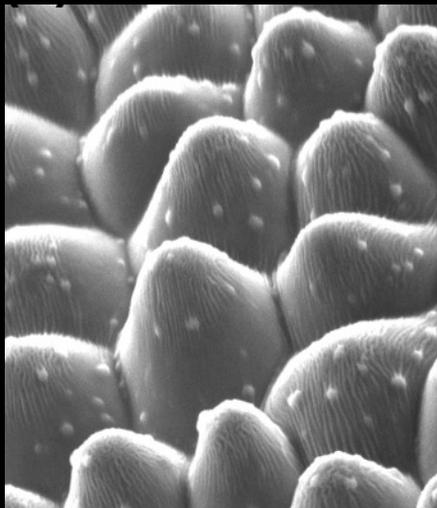
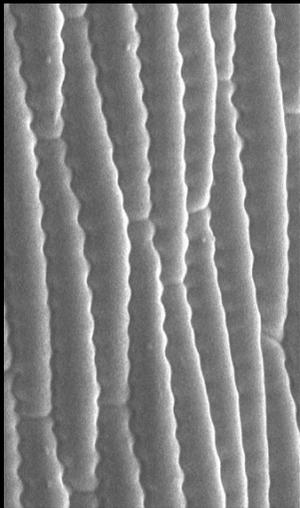
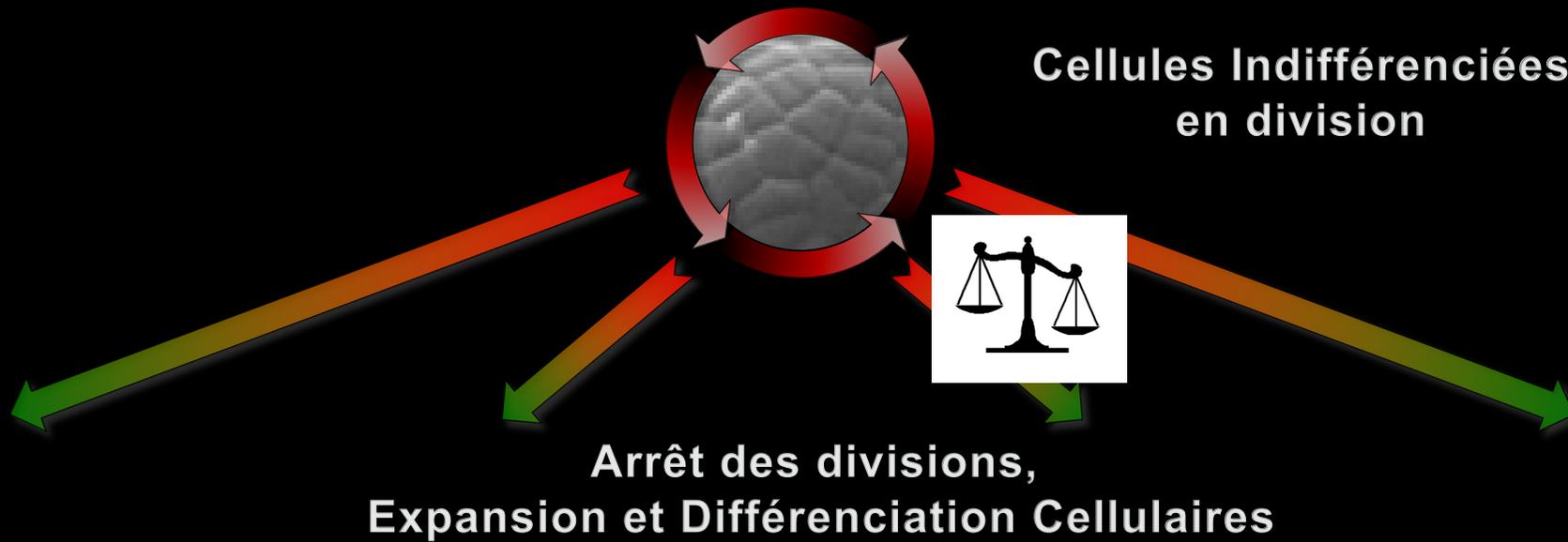


Fleurs

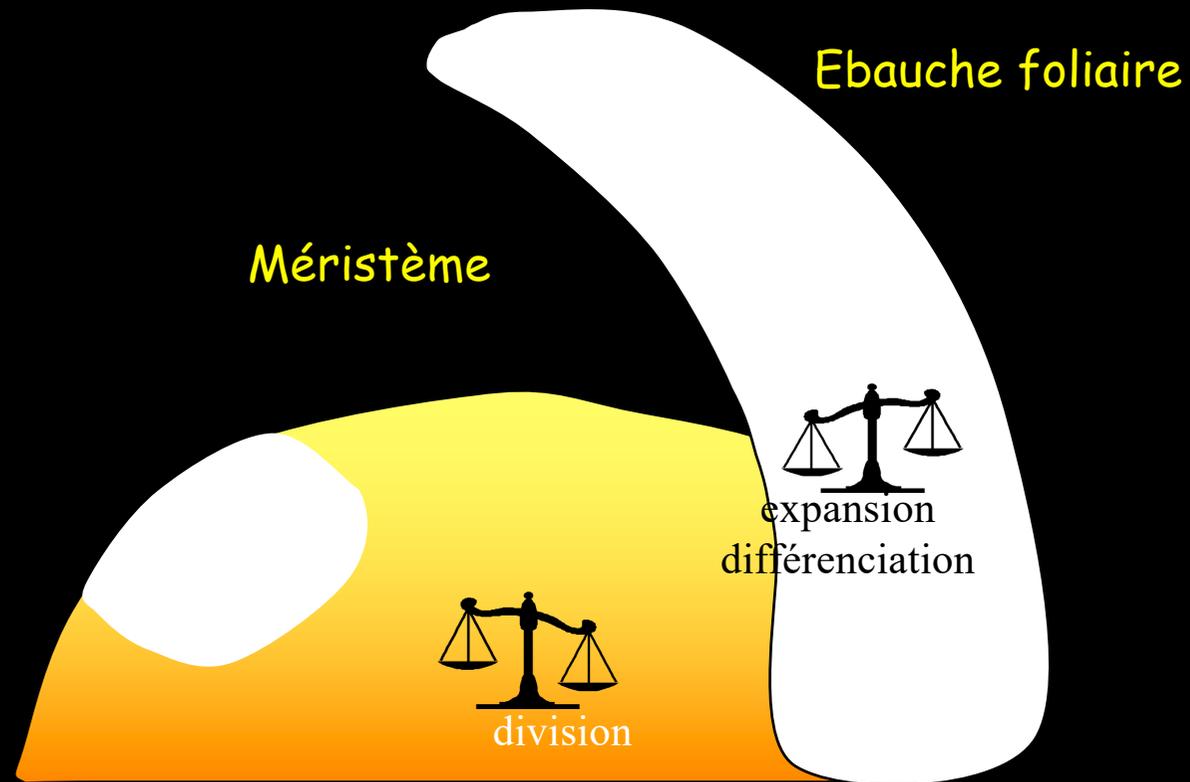


**Cellules Indifférenciées  
en division**

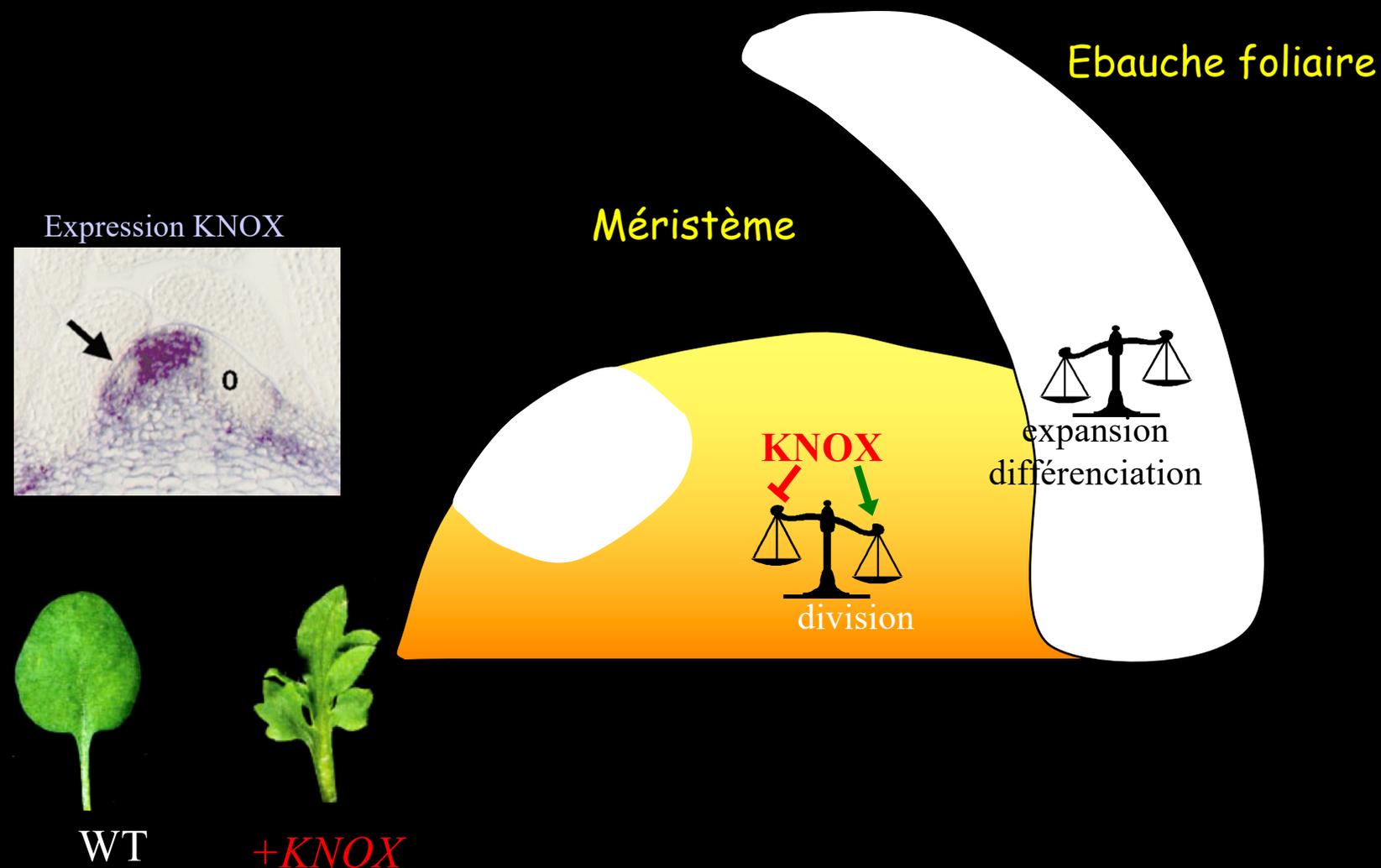




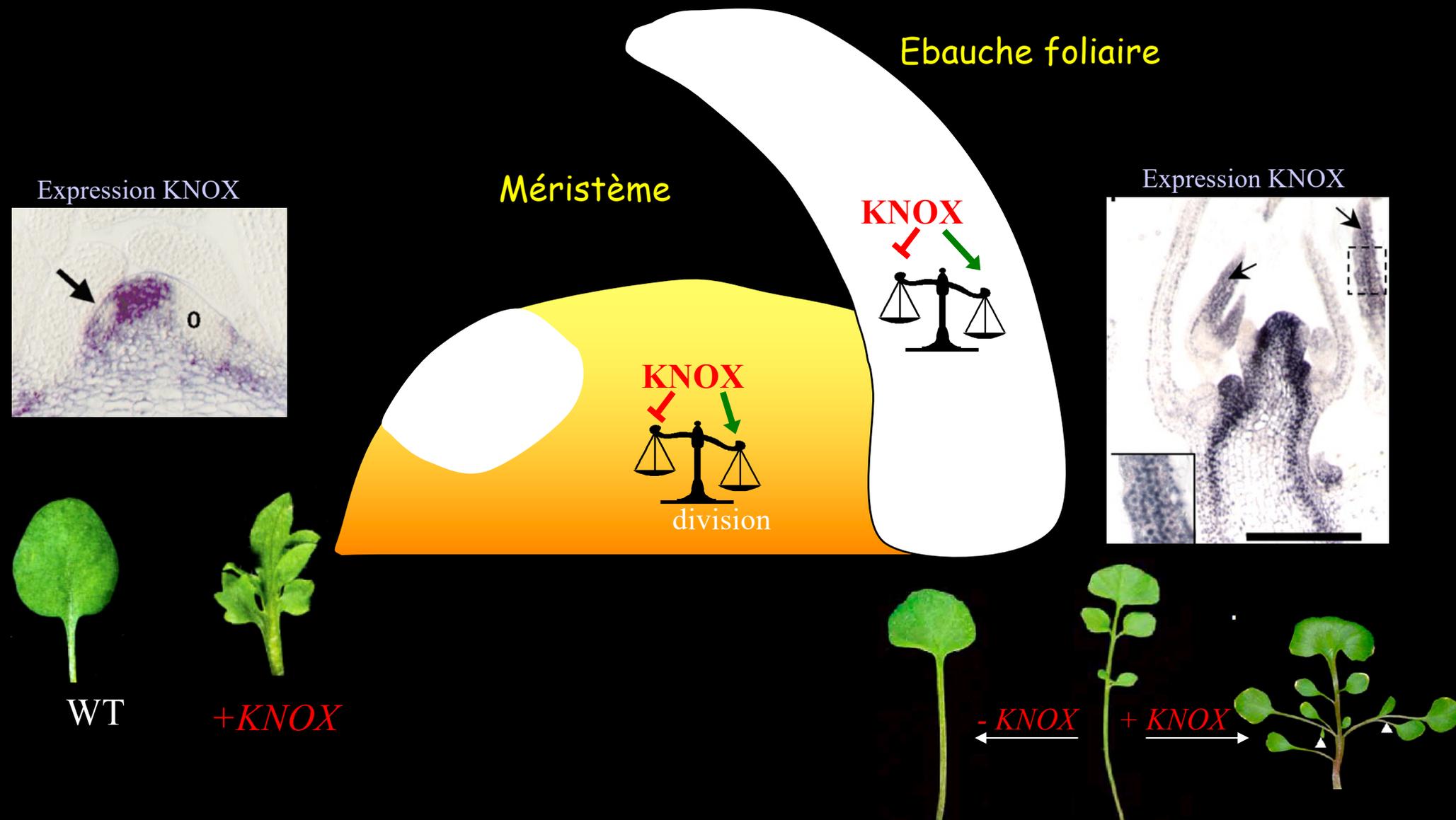
# Une étape clé de la formation des feuilles : La transition division/différenciation



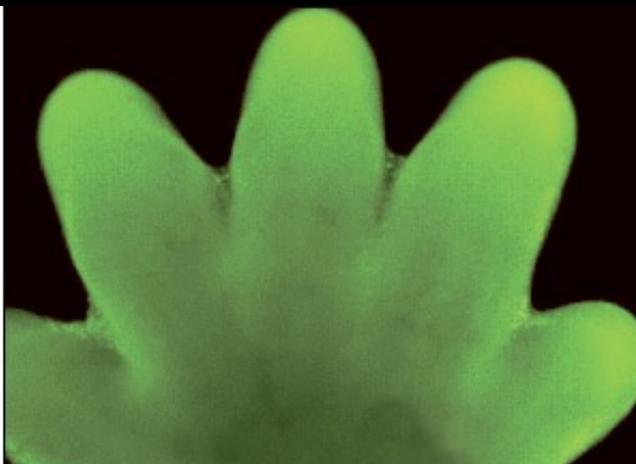
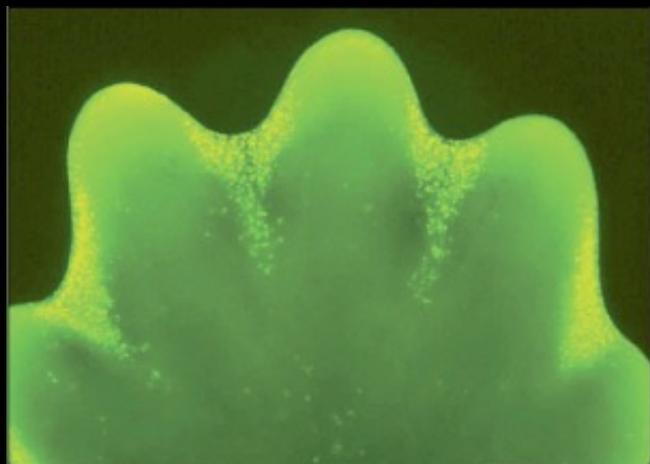
# Les gènes **KNOX** jouent un rôle central dans la transition division/différenciation



# Les gènes **KNOX** jouent un rôle central dans la transition division/différenciation



## - Mort cellulaire programmée



## - Mort cellulaire programmée

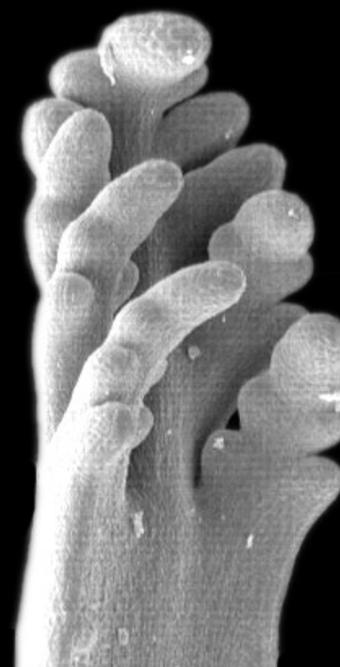
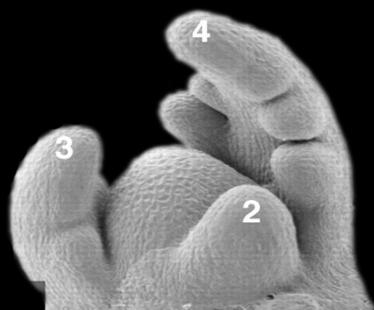


*Monstera deliciosa*



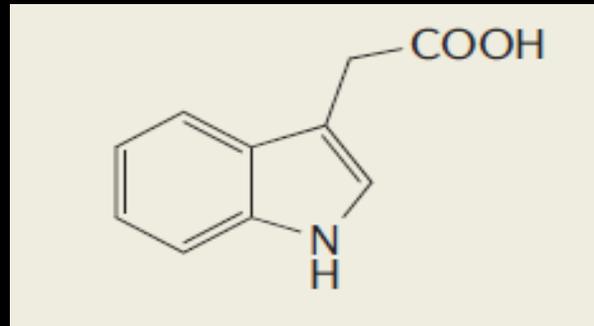
*Aponogeton  
madagascariensis*

- Mort cellulaire programmée
- Croissance différentielle



*Eschscholzia californica*

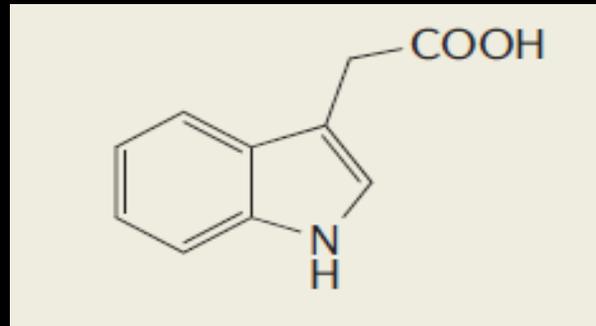
L'accumulation locale d'**auxine** :  
permet de  
**diriger la croissance**



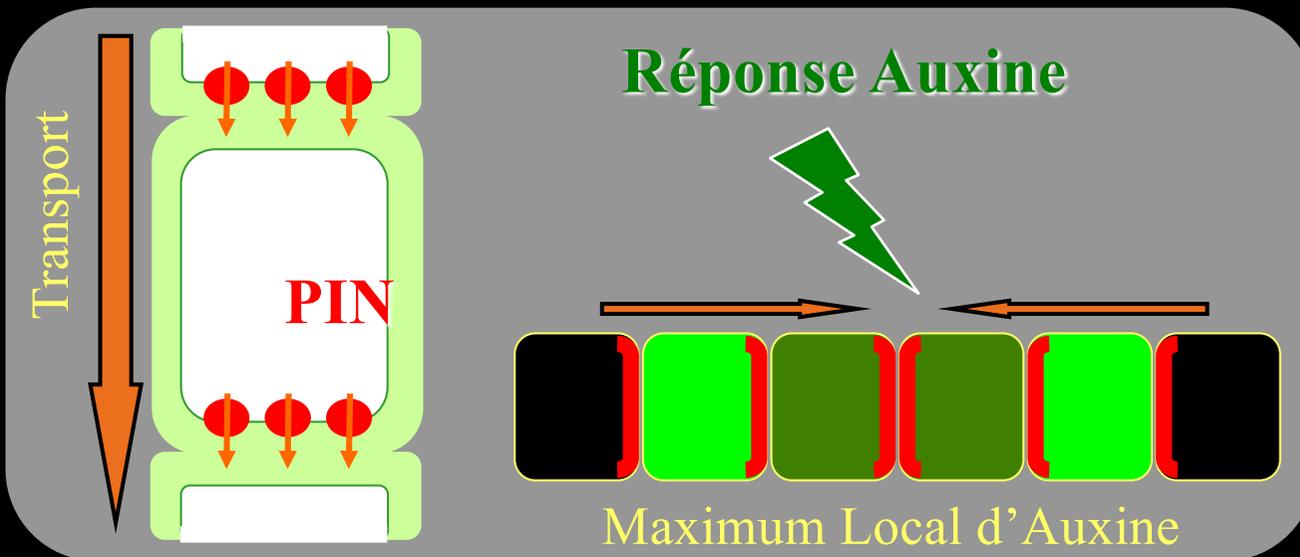
Auxine

IAA : Acide Indole-3-acétique

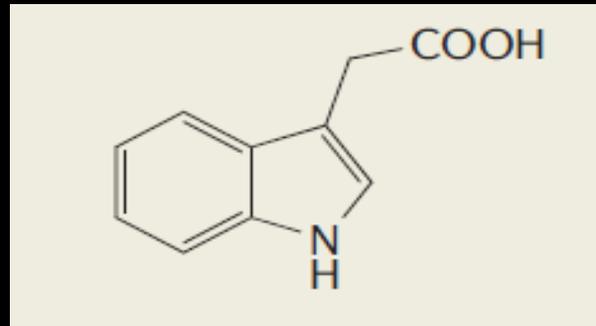
# L'accumulation locale d'auxine : permet de diriger la croissance



Auxine  
IAA : Acide Indole-3-acétique

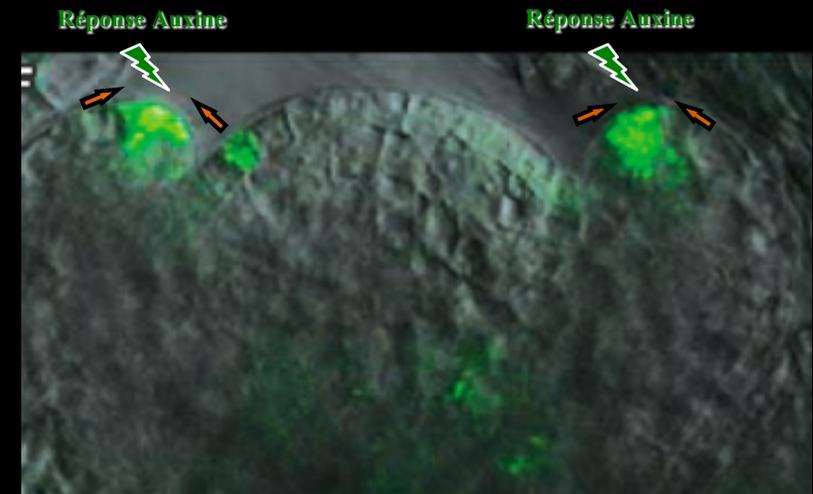
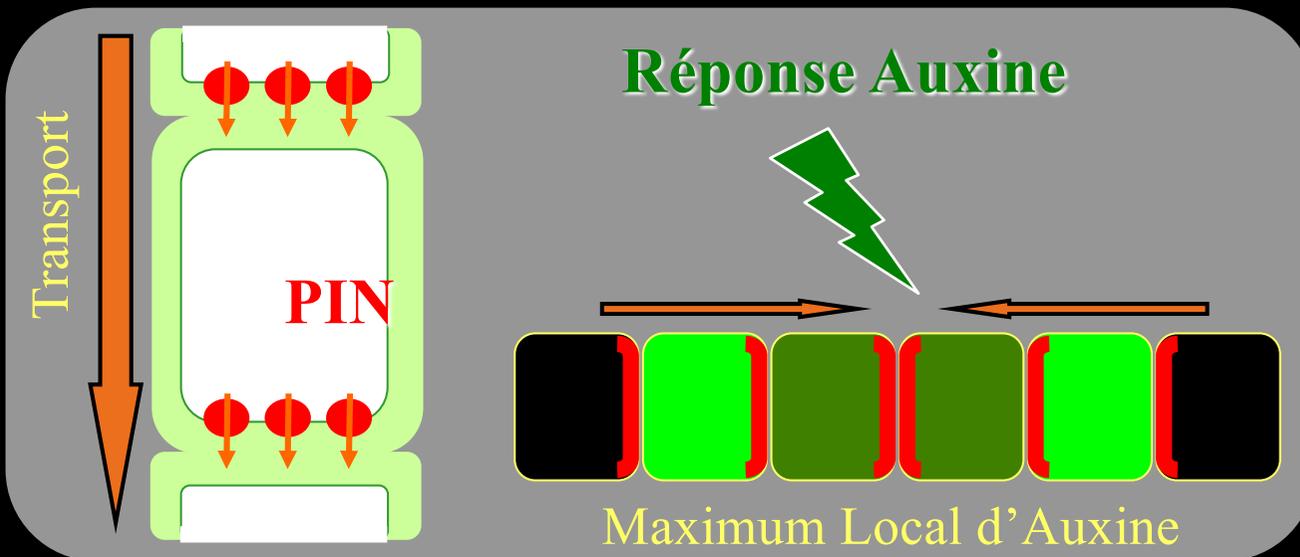


# L'accumulation locale d'auxine : permet de diriger la croissance

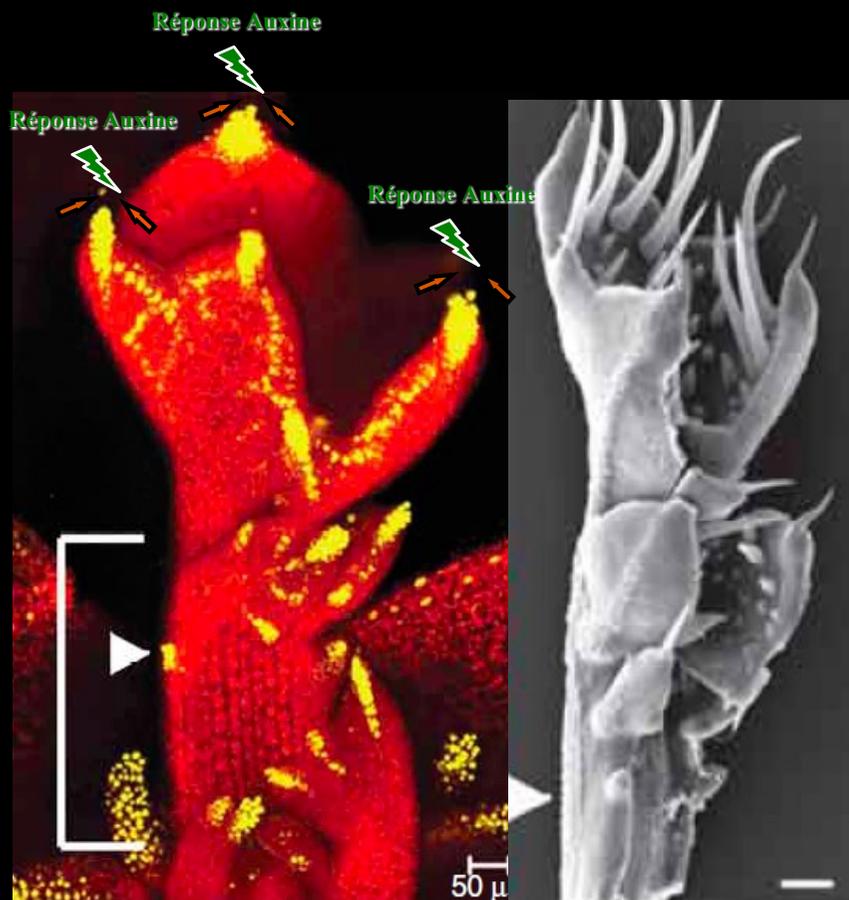


Auxine

IAA : Acide Indole-3-acétique

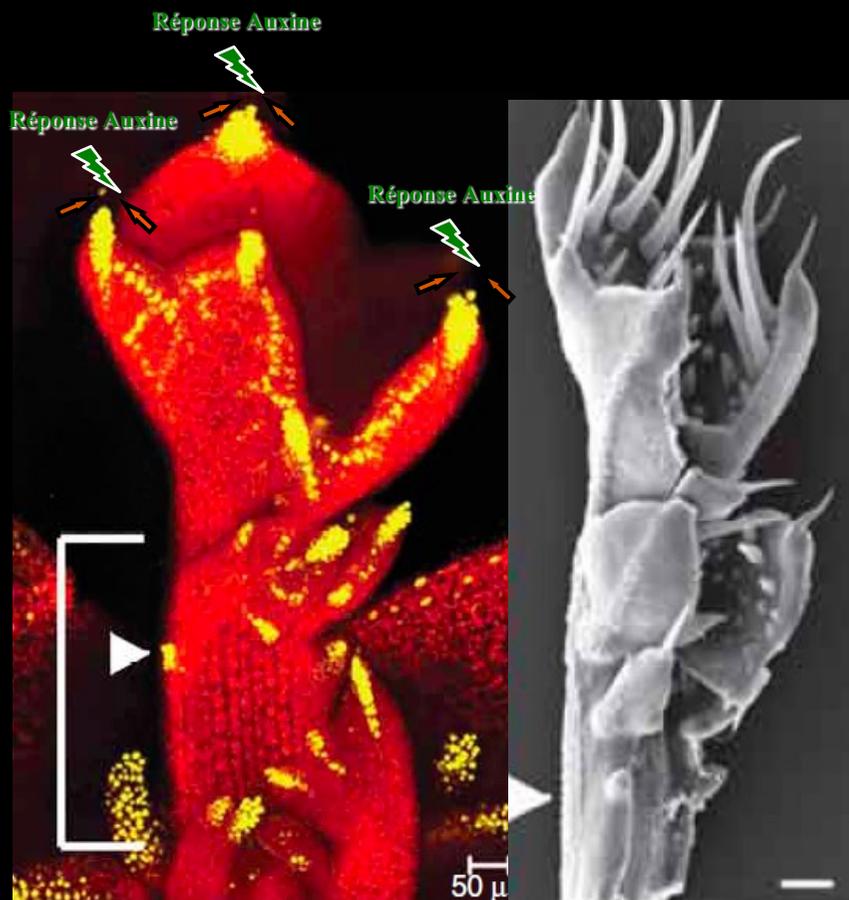


# La réponse à l'auxine est nécessaire à tous les types de découpes foliaires

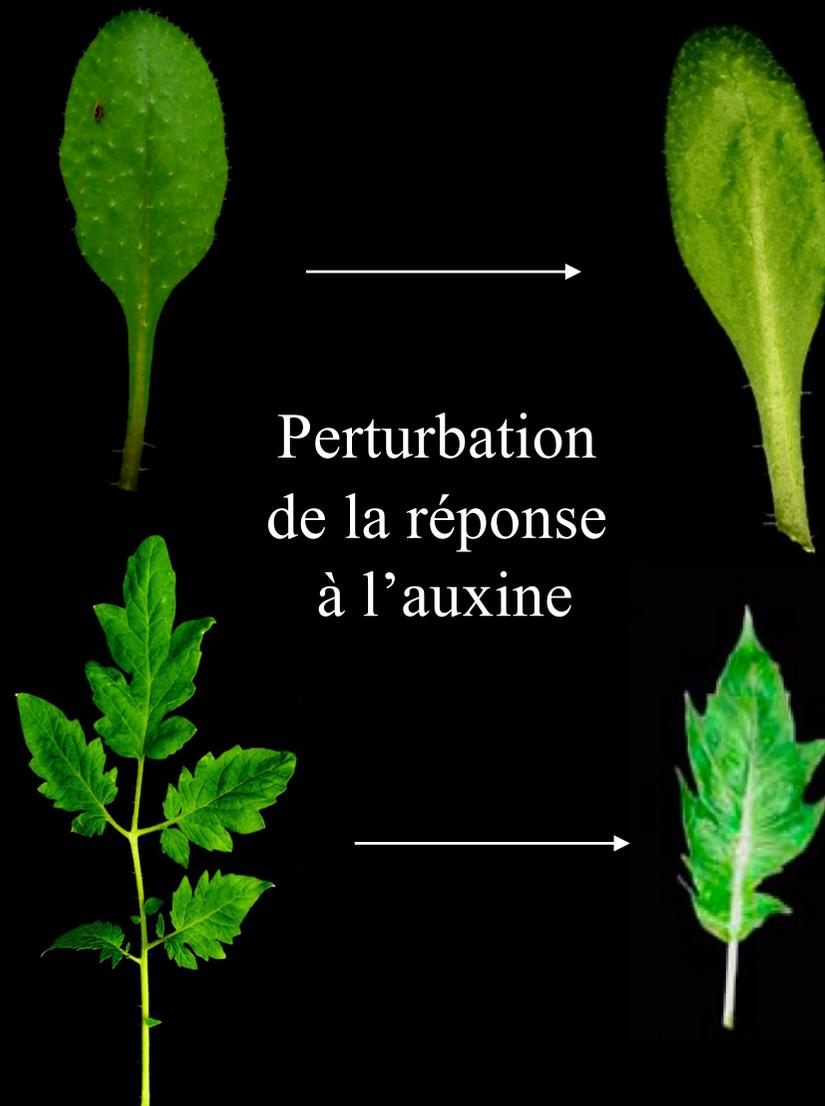


Réponse à l'auxine

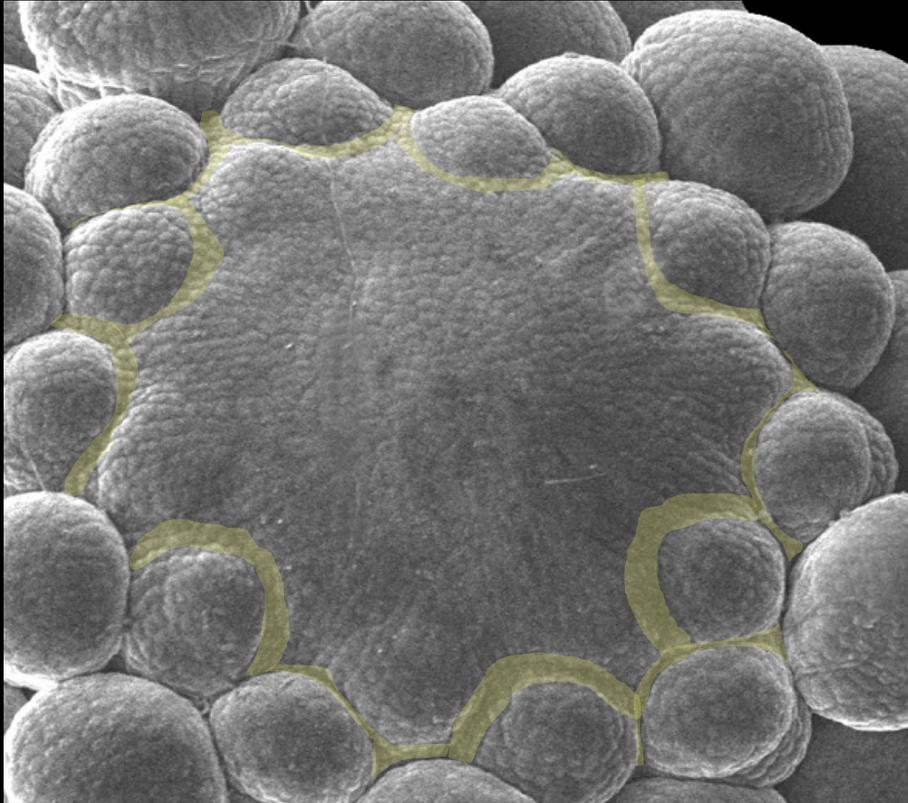
# La réponse à l'auxine est nécessaire à tous les types de découpes foliaires



Réponse à l'auxine

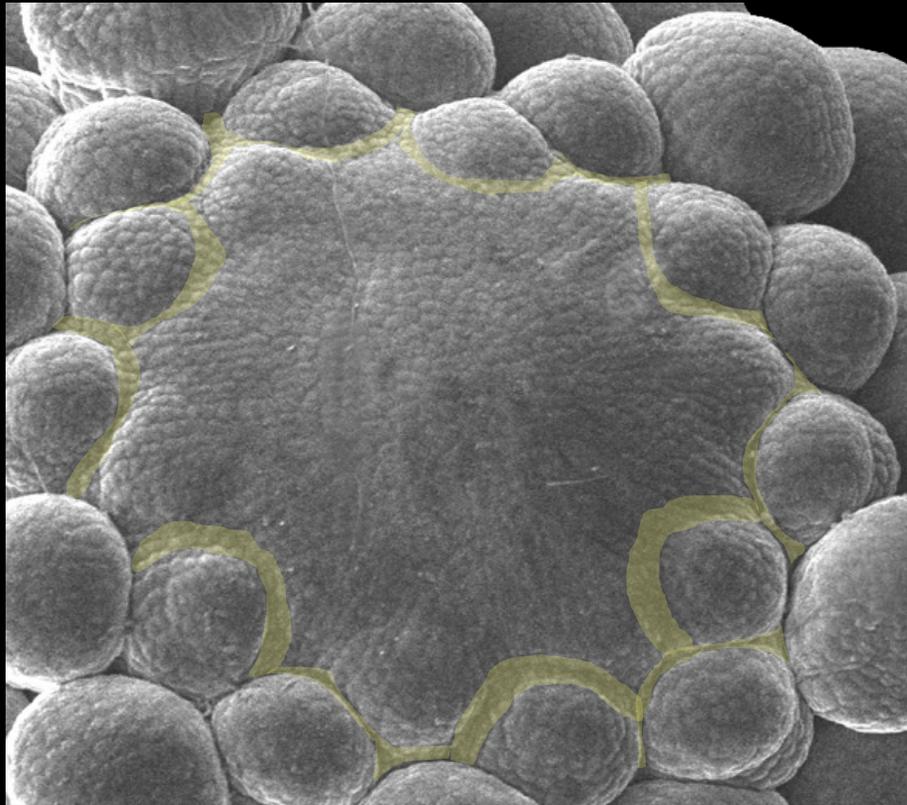


Les gènes *CUC* (*CUP-SHAPED COTYLEDON*)  
définissent les **domaines frontières**  
et permettent de séparer les organes



Domaine d'expression des gènes *CUC*

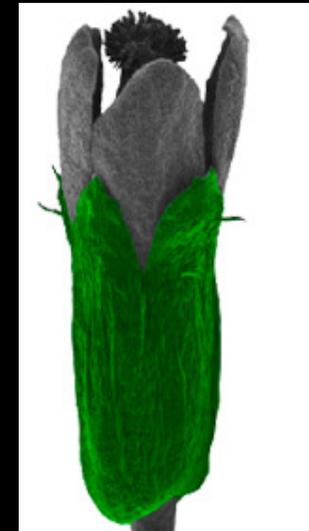
Les gènes *CUC* (*CUP-SHAPED COTYLEDON*)  
définissent les **domaines frontières**  
et permettent de séparer les organes



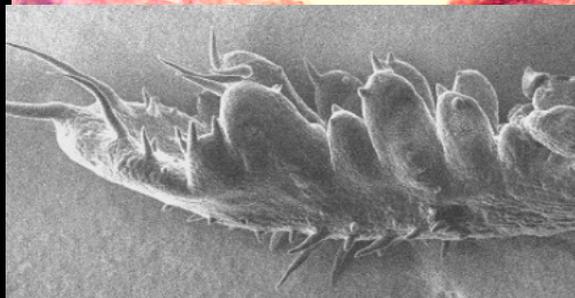
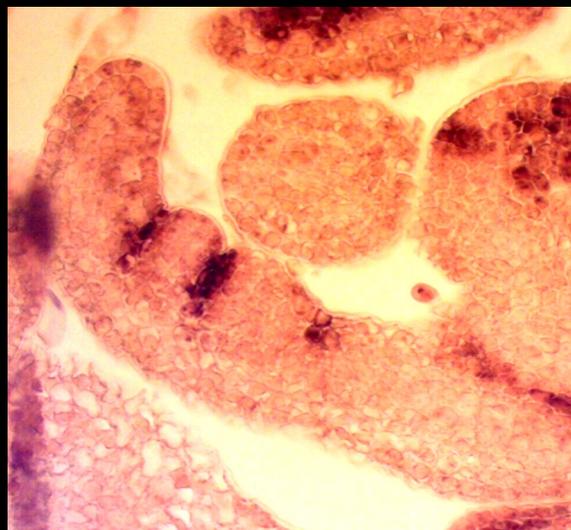
Domaine d'expression des gènes *CUC*

*CUC*

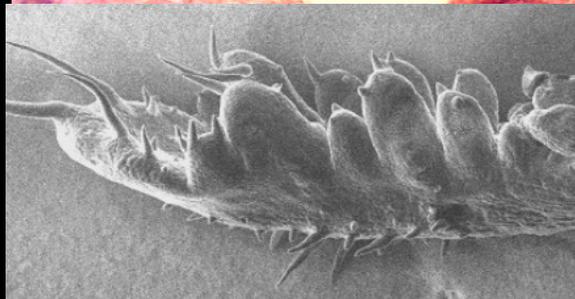
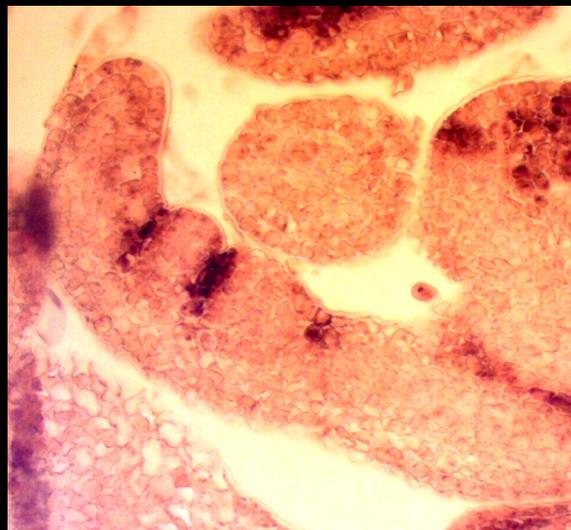
~~*CUC*~~



# Les gènes *CUC* permettent la **dissection** des feuilles



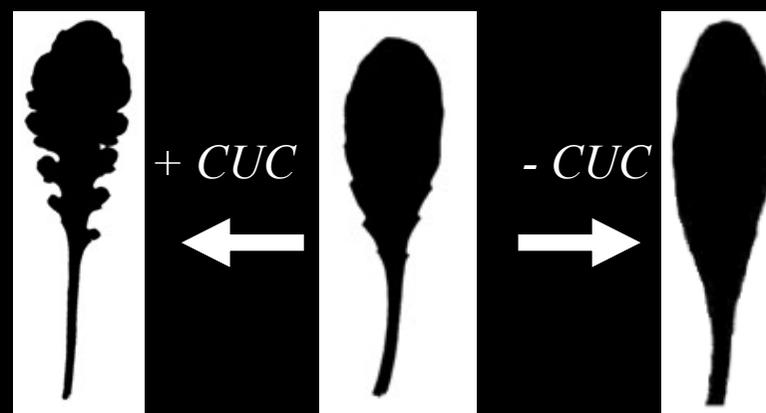
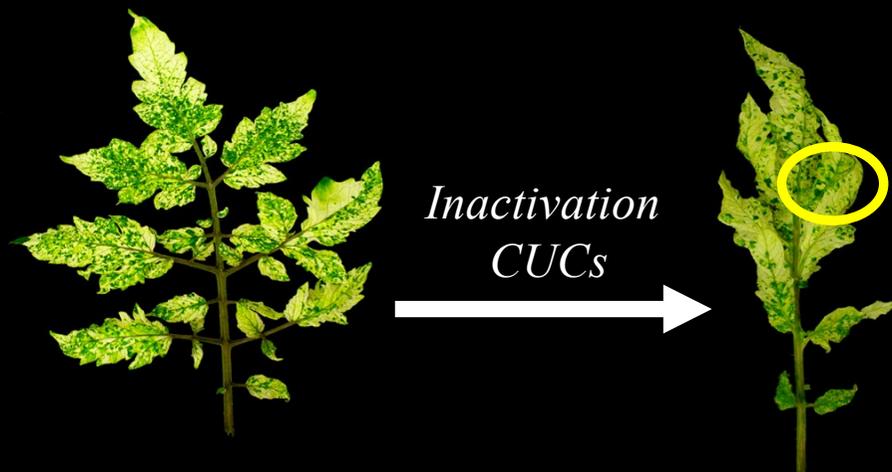
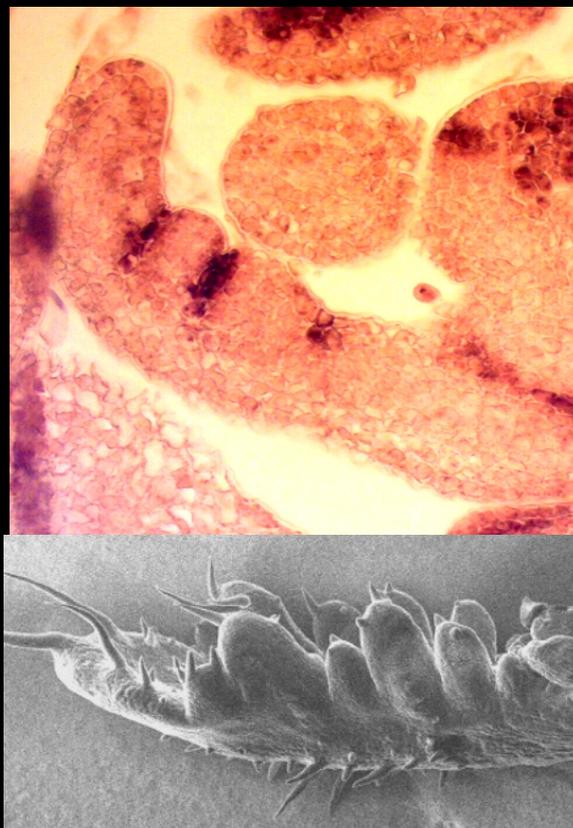
# Les gènes *CUC* permettent la **dissection** des feuilles

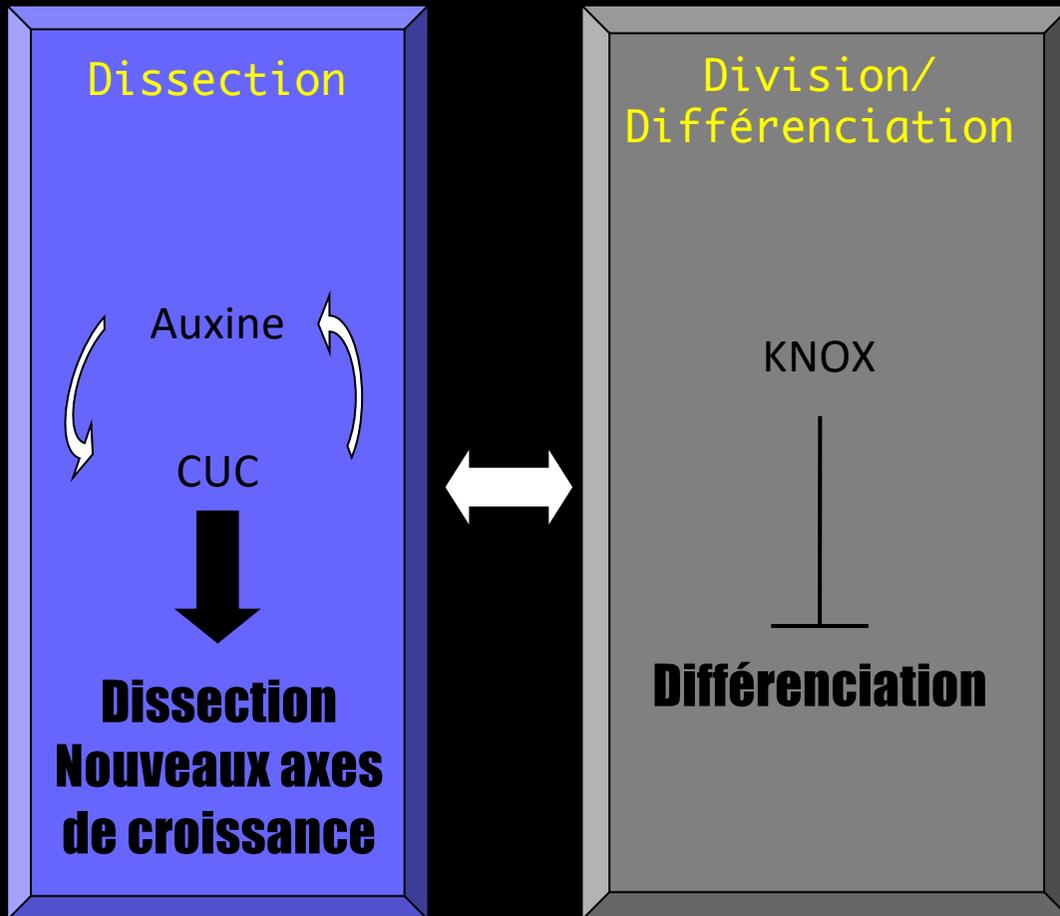


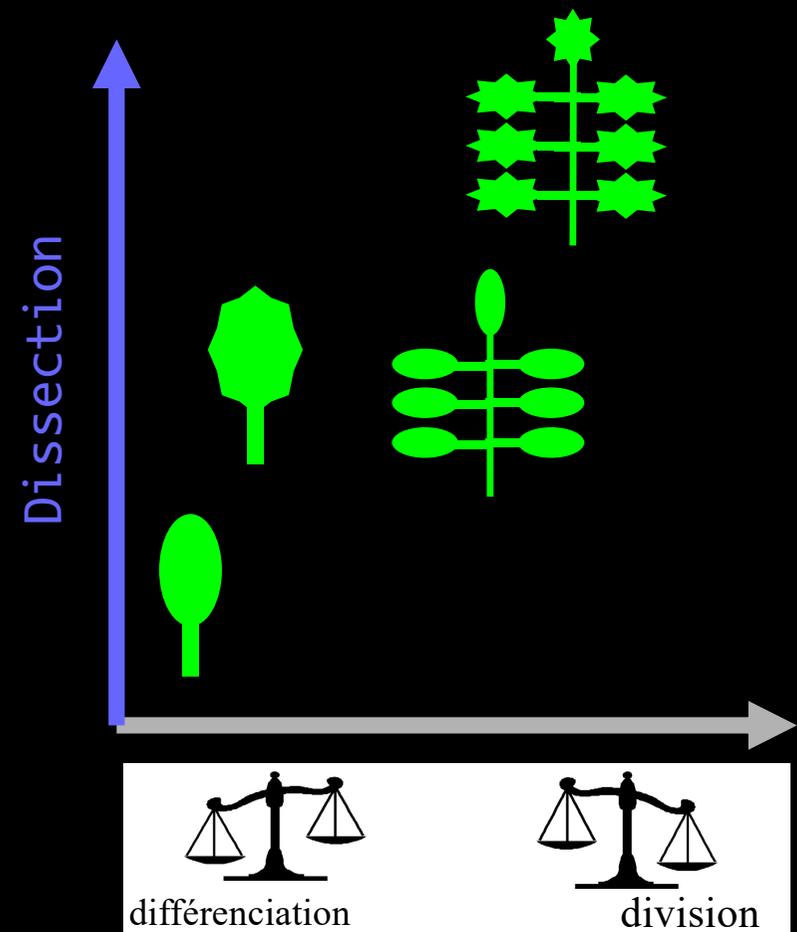
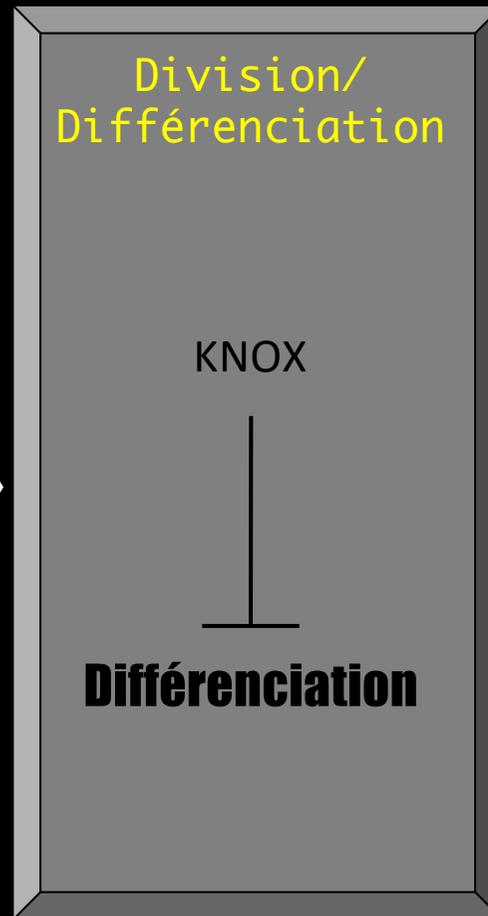
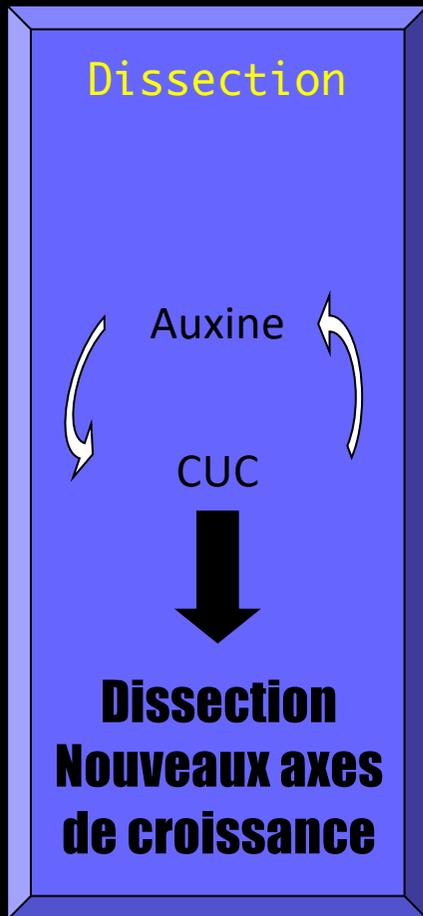
*Inactivation  
CUCs*



# Les gènes *CUC* permettent la **dissection** des feuilles







Réalisé sans trucage !

- Avec levure  
(avec **KNOX**)



- Sans levure  
(sans **KNOX**)



# Le développement des feuilles, c'est du gâteau !

Pas de mort cellulaire programmée

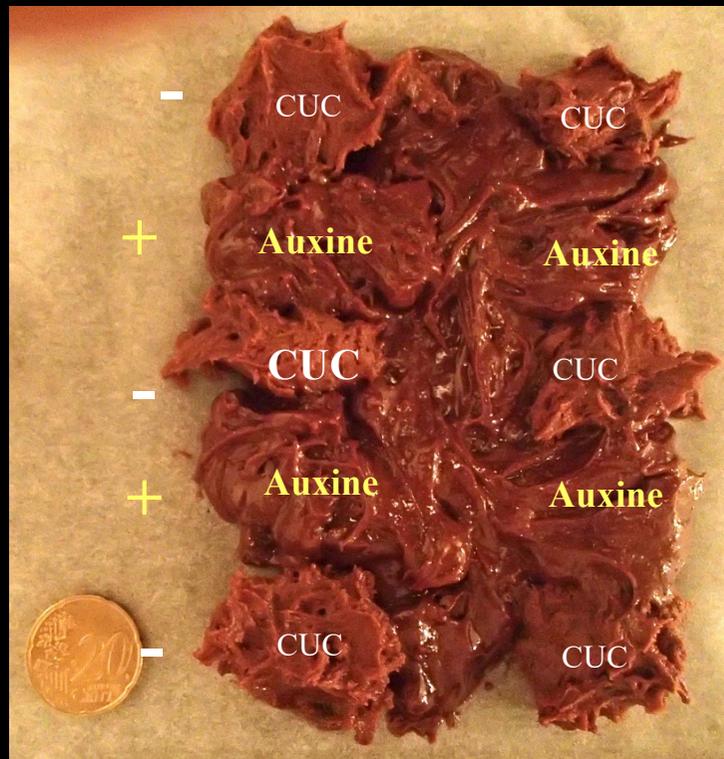


# Le développement des feuilles, c'est du gâteau !

Pas de mort cellulaire programmée

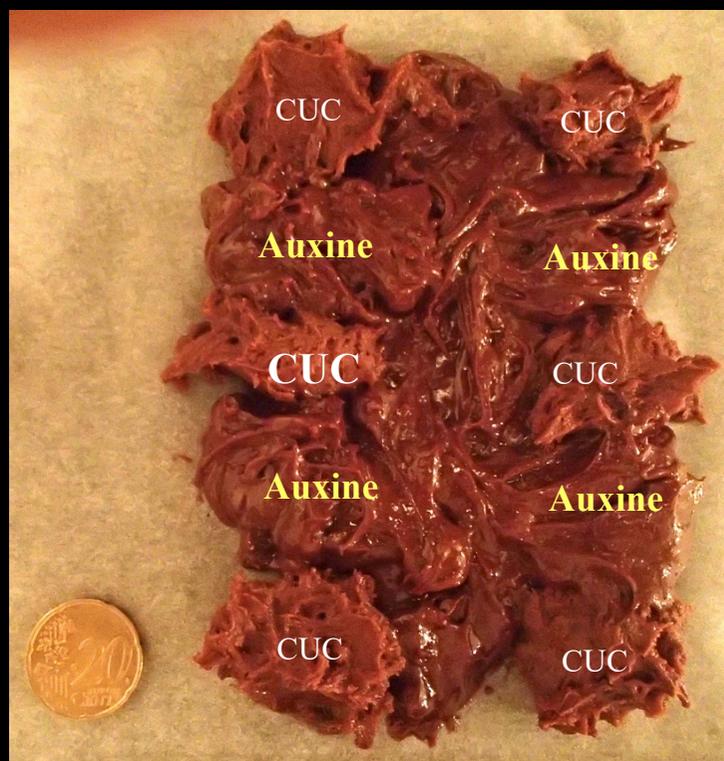


# Le développement des feuilles, c'est du gâteau !



Une alternance de zones de forte et faible croissance génère les dents des feuilles

# Le développement des feuilles, c'est du gâteau !

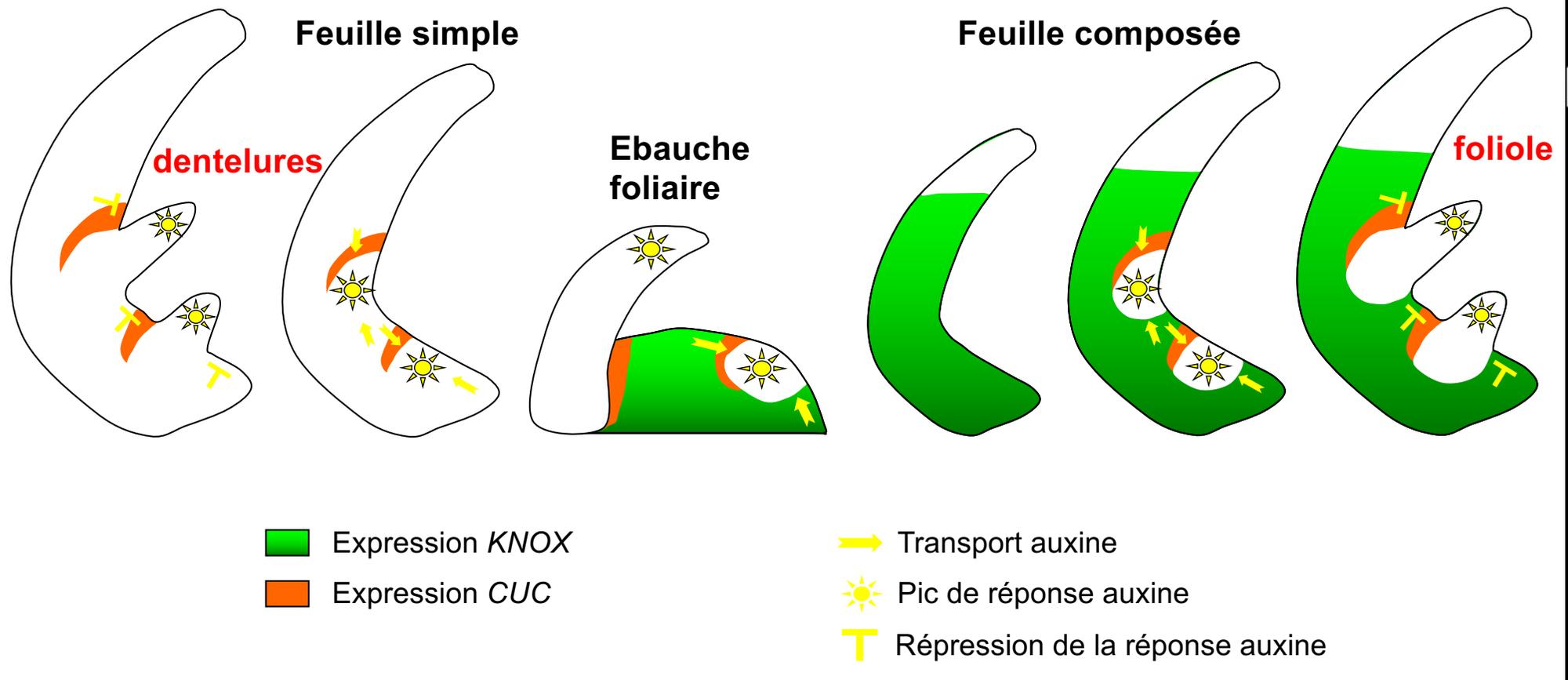


Une alternance de zones de forte et faible croissance génère les dents des feuilles

Merci !







Un même module régulateur (*KNOX*, *CUC*, auxine) agit lors de l'initiation des feuilles et de l'acquisition de leur forme.

Des variations au sein de ce module contribuent à la différence de morphologie foliaire entre espèces