

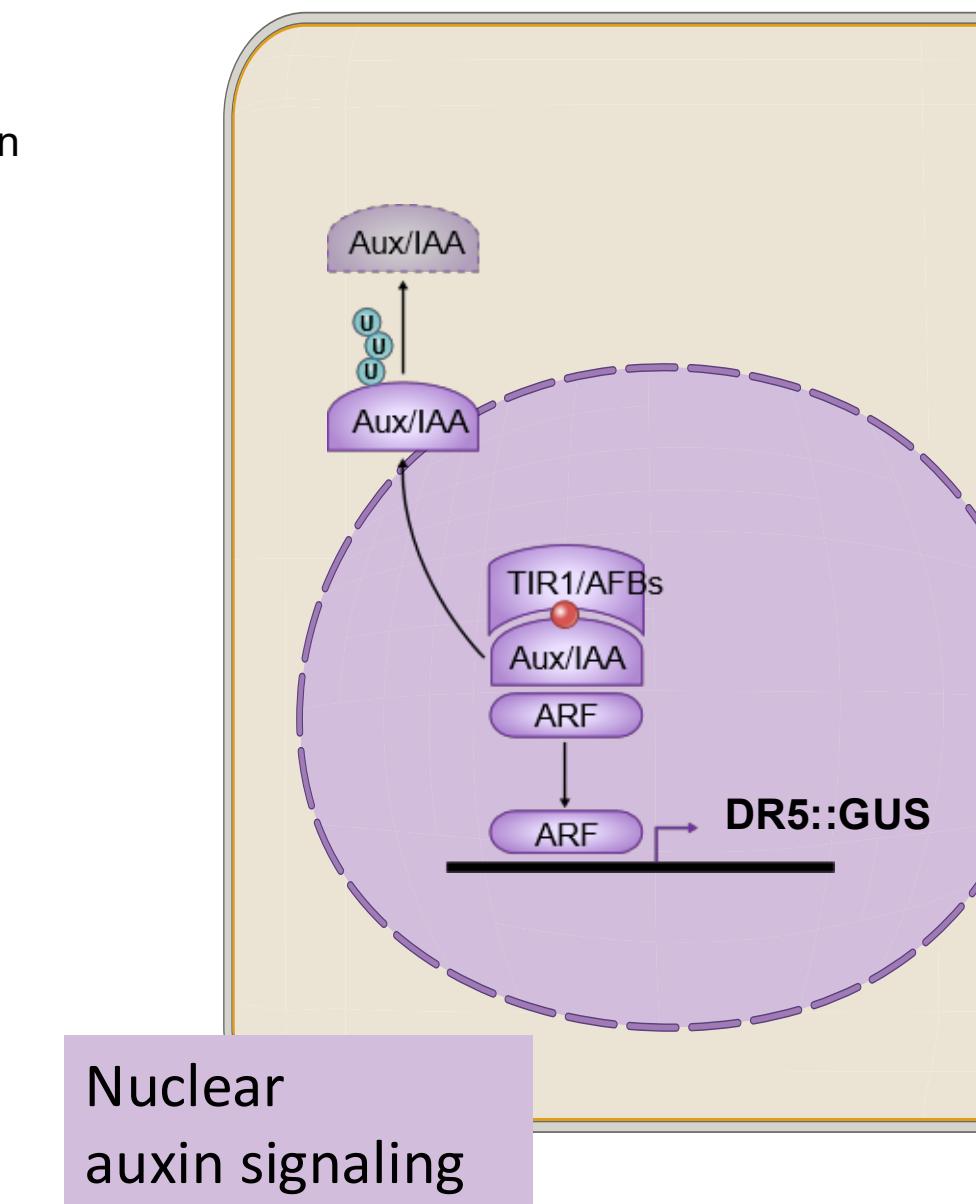
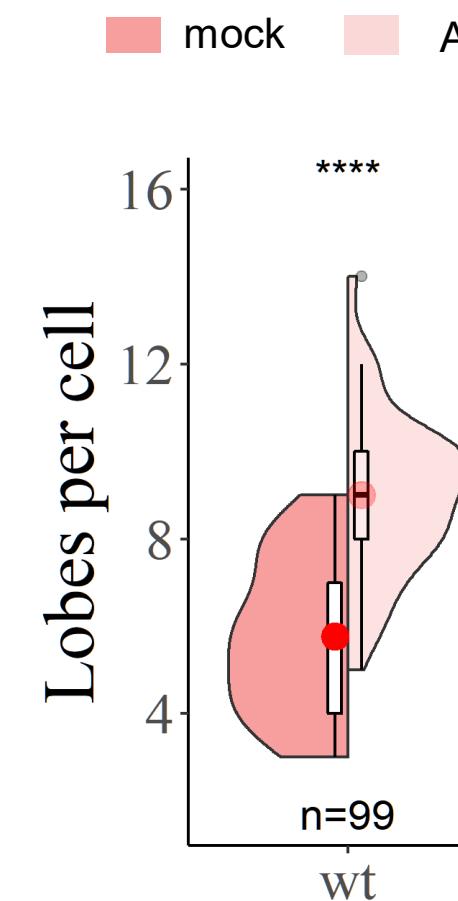
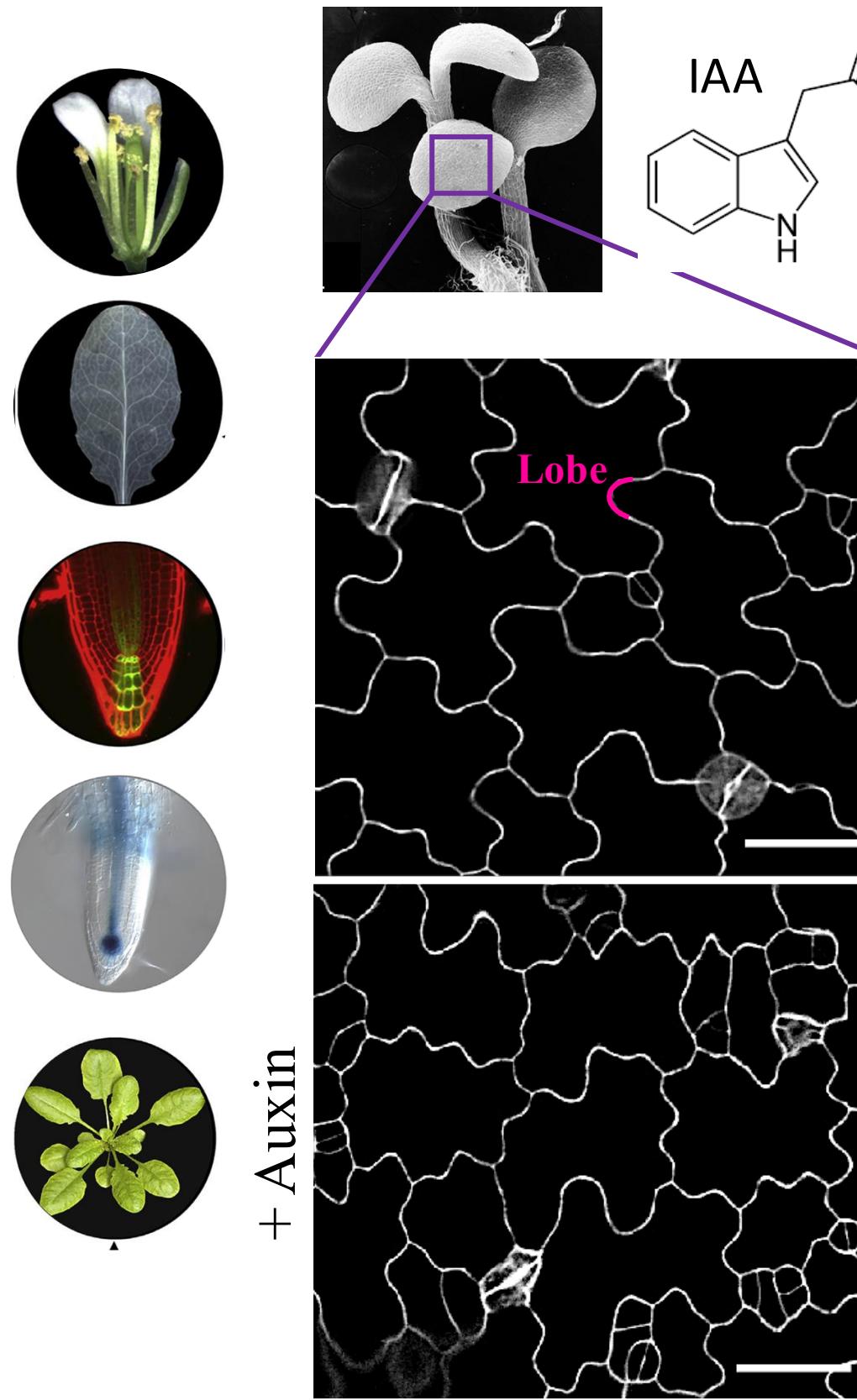
# **PIN2-mediated self-organizing transient auxin flow contributes to the auxin maxima at the tip of the *Arabidopsis* cotyledons**

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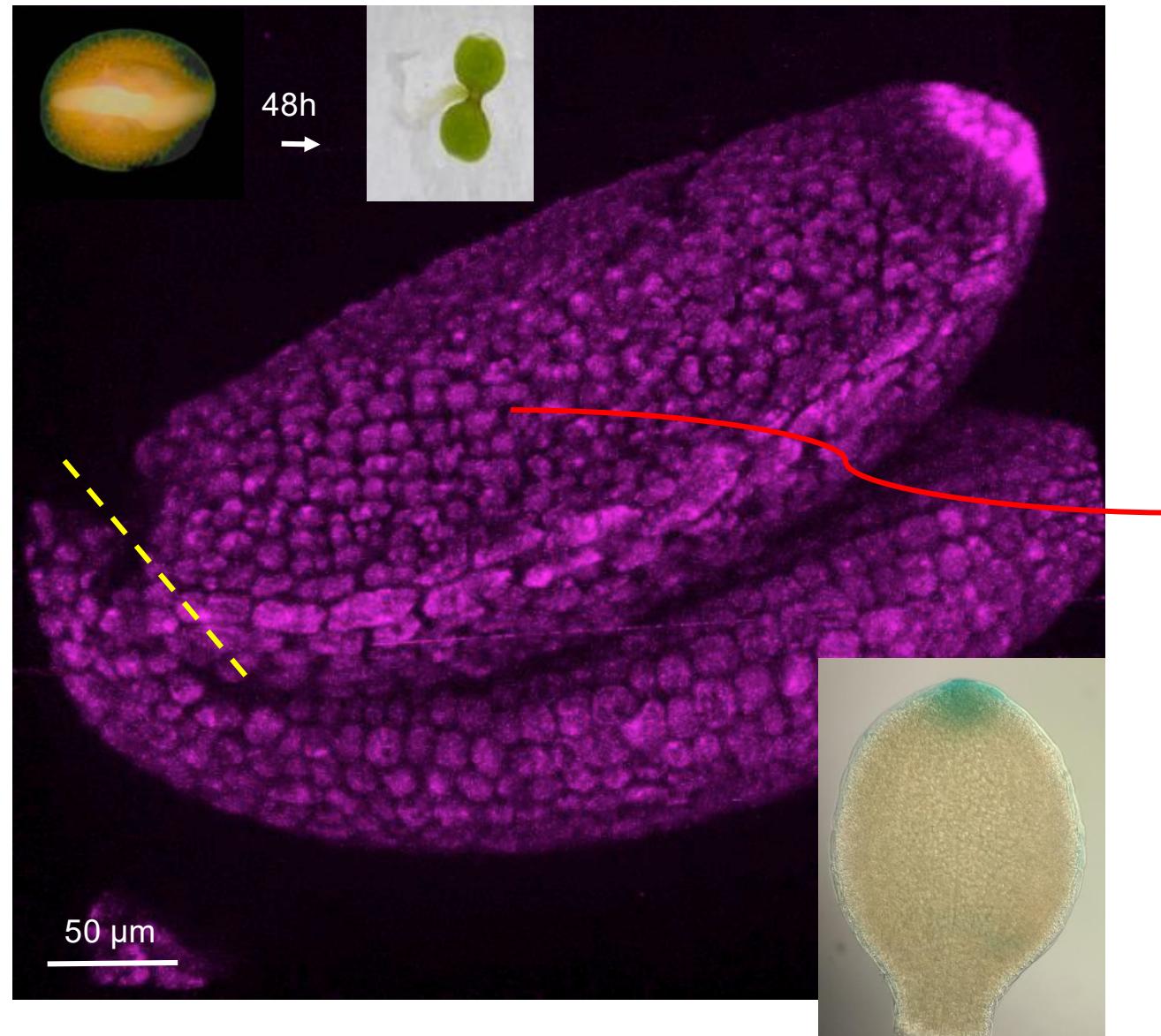
Zhenbiao Yang Lab  
Jaimie Van Norman Lab

Development presents 2023

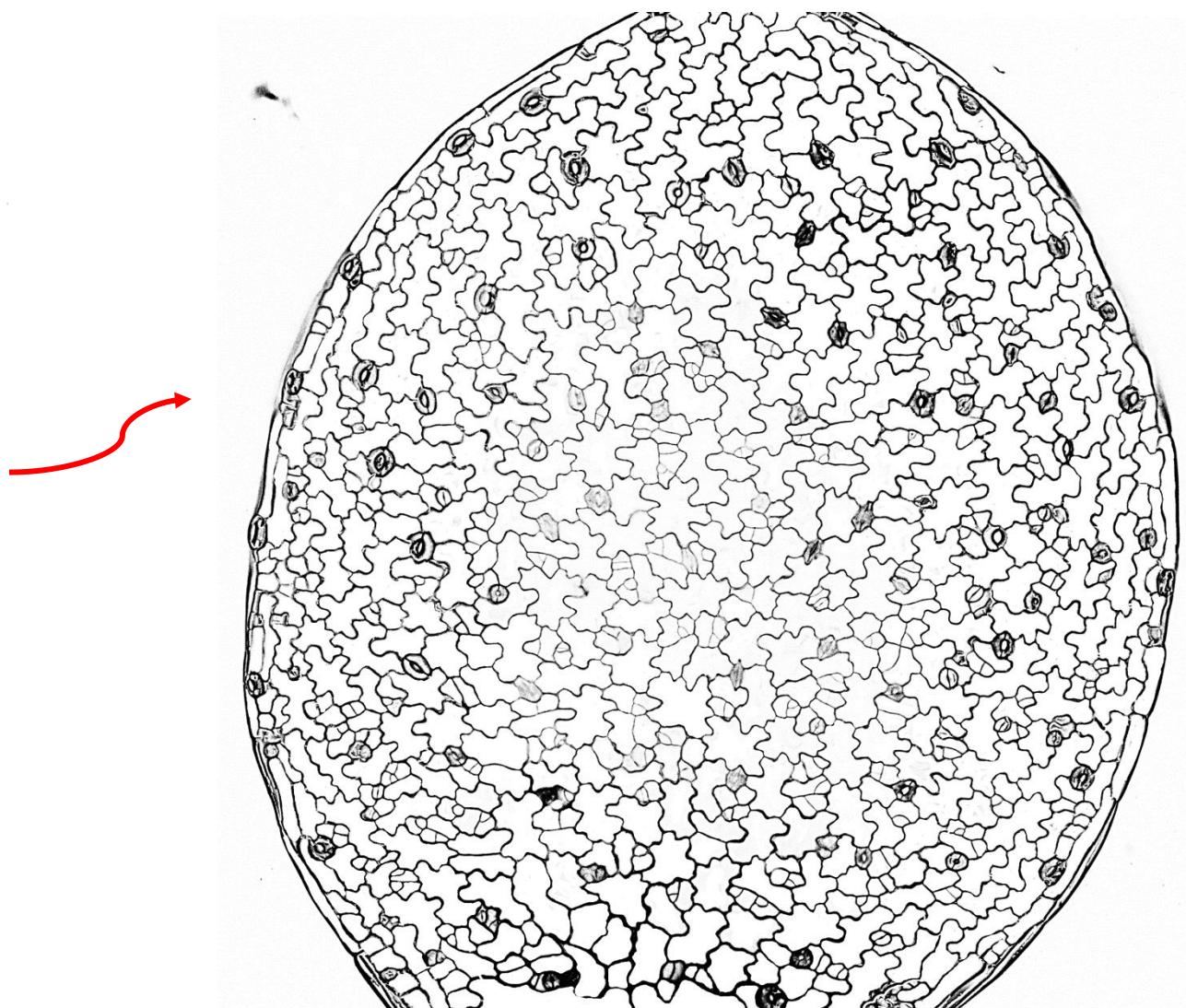
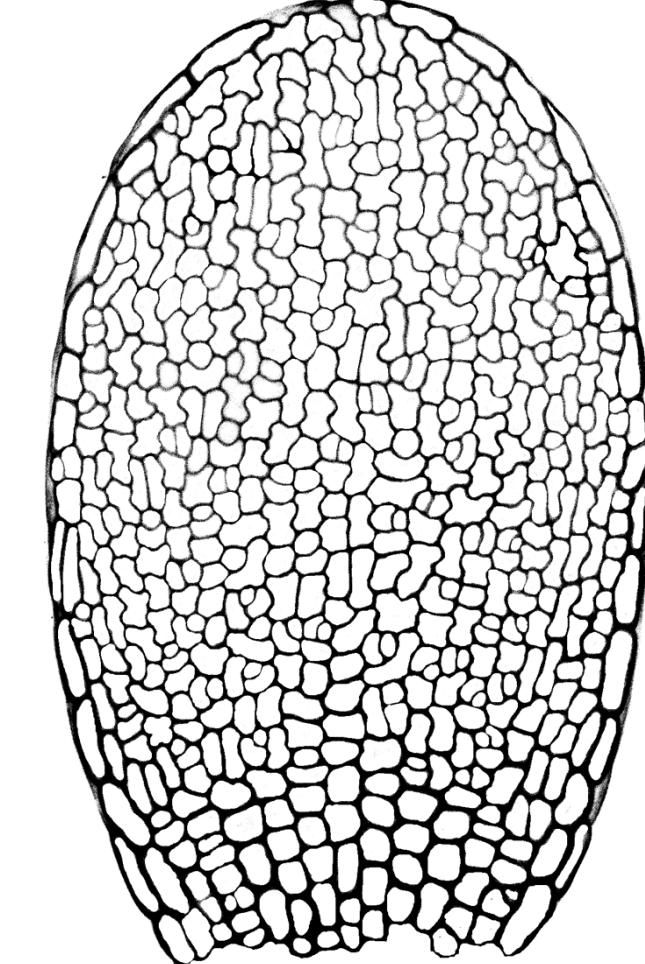
# Auxin signaling and pavement cell morphogenesis



# Auxin maxima at the tip coordinates early cotyledon expansion



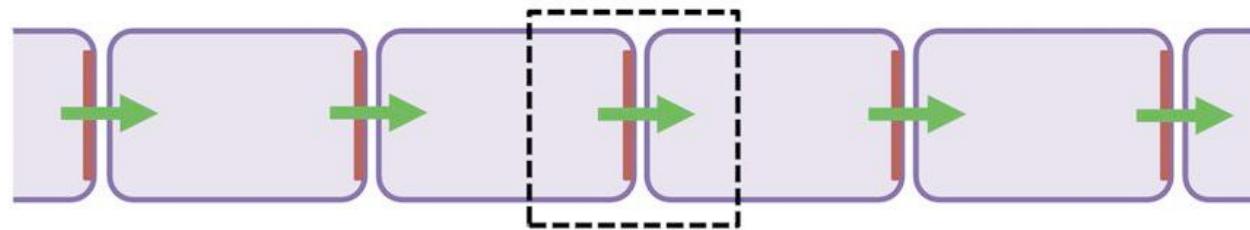
DR5::GUS



How is the auxin maxima at the tip formed?

# PIN-based auxin transport

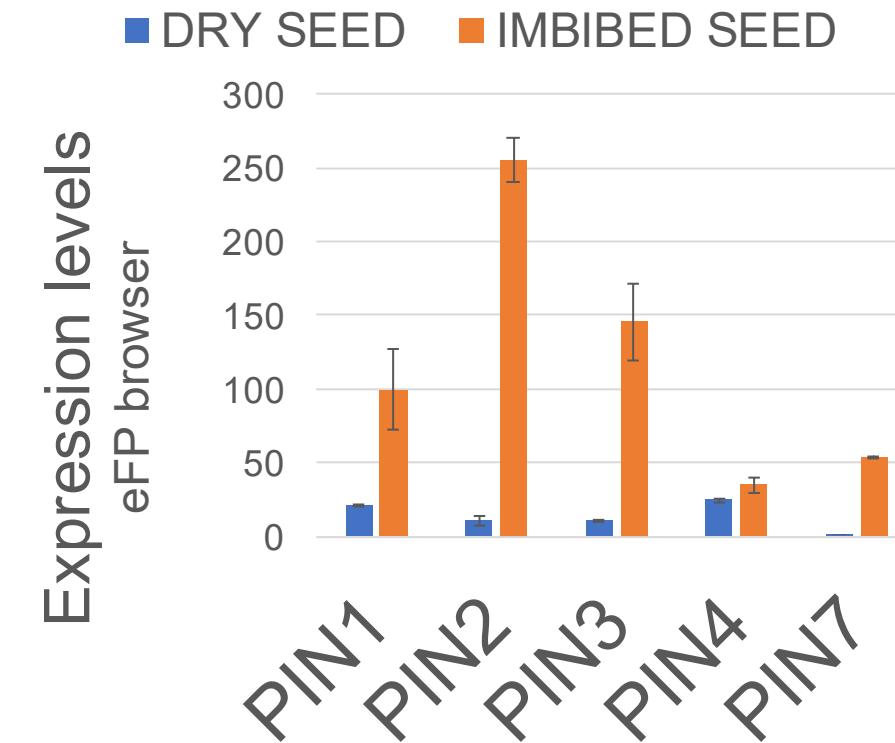
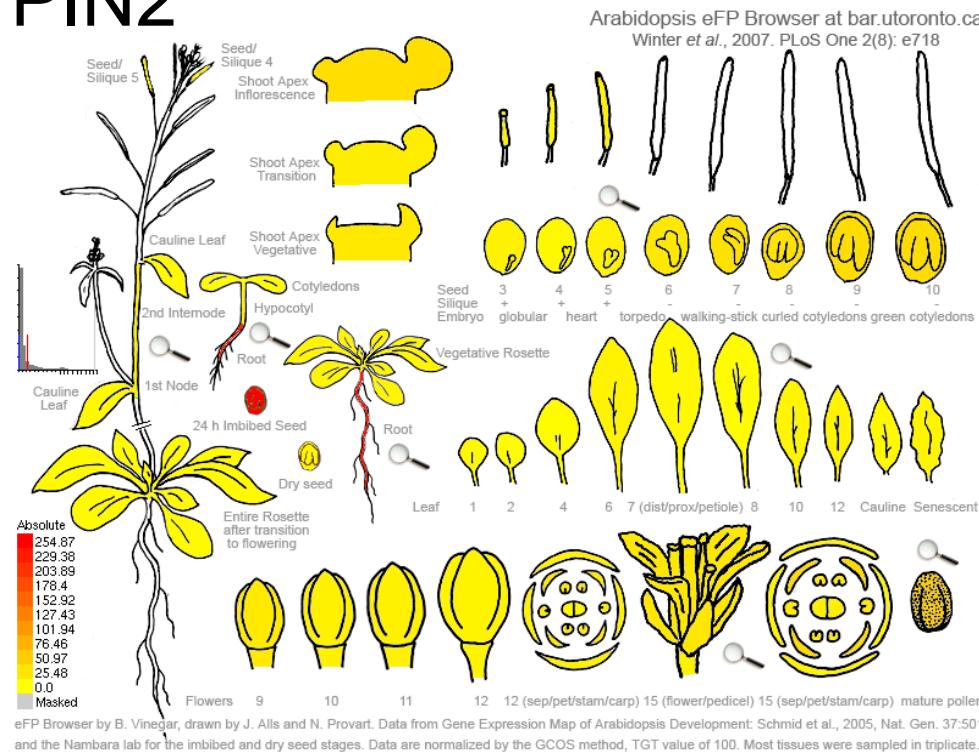
Source  
Synthesis



Sink  
Signaling

Friml and Jones. 2010. Plant Phys  
Adamowski and Friml 2015. The Plant Cell

PIN2



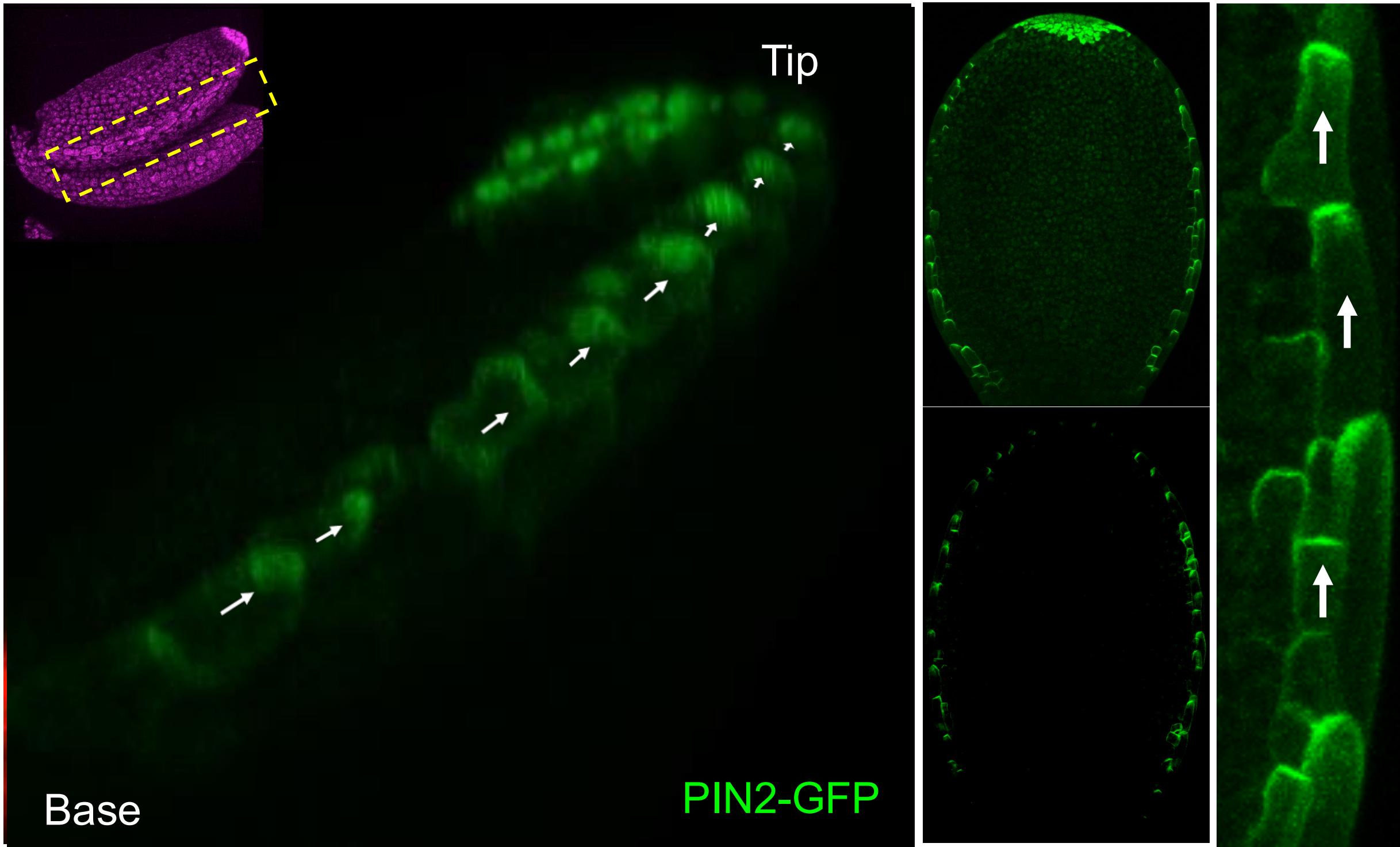
DR5::GUS



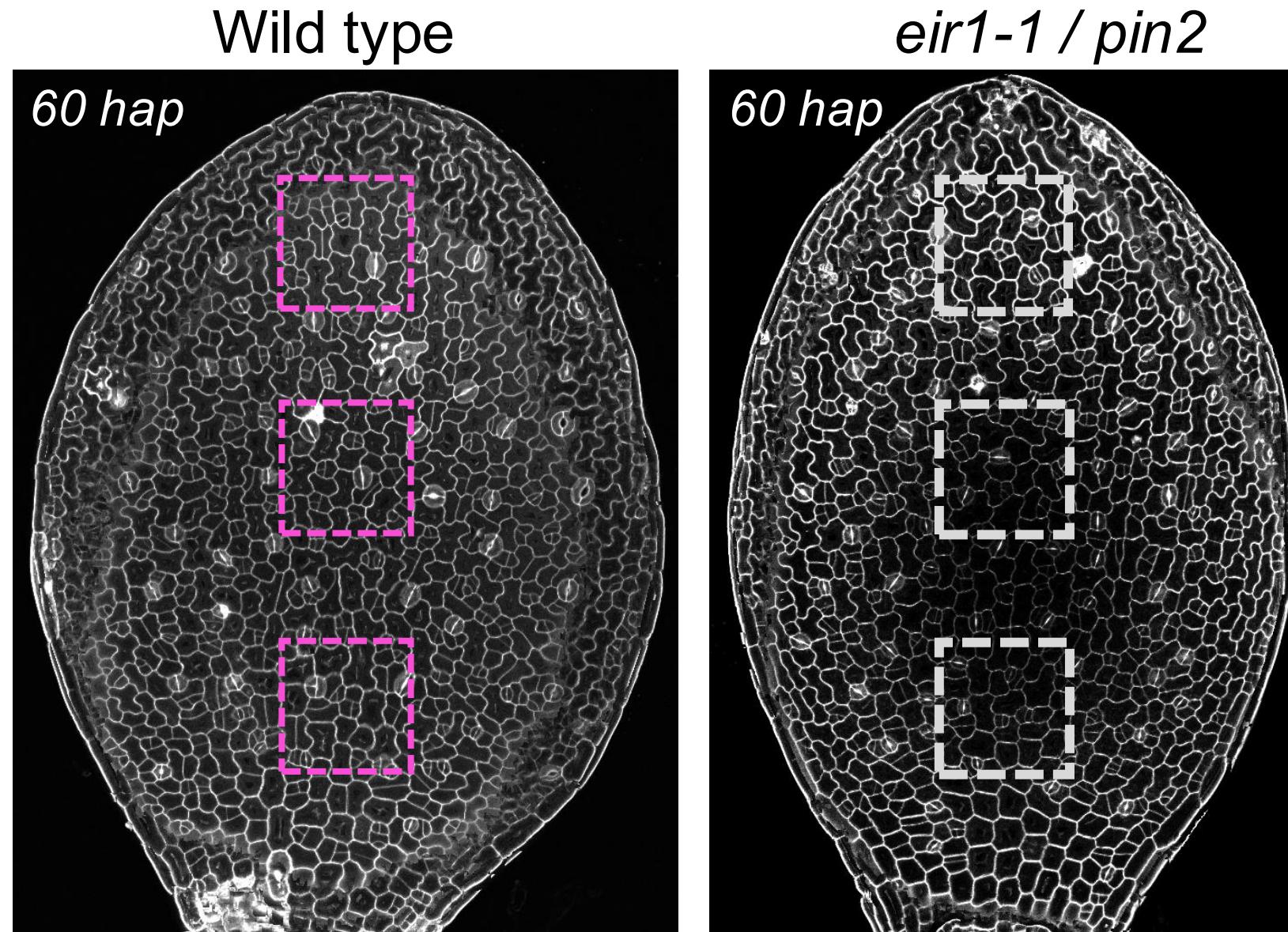
*eir1-1/pin2*  
DR5::GUS



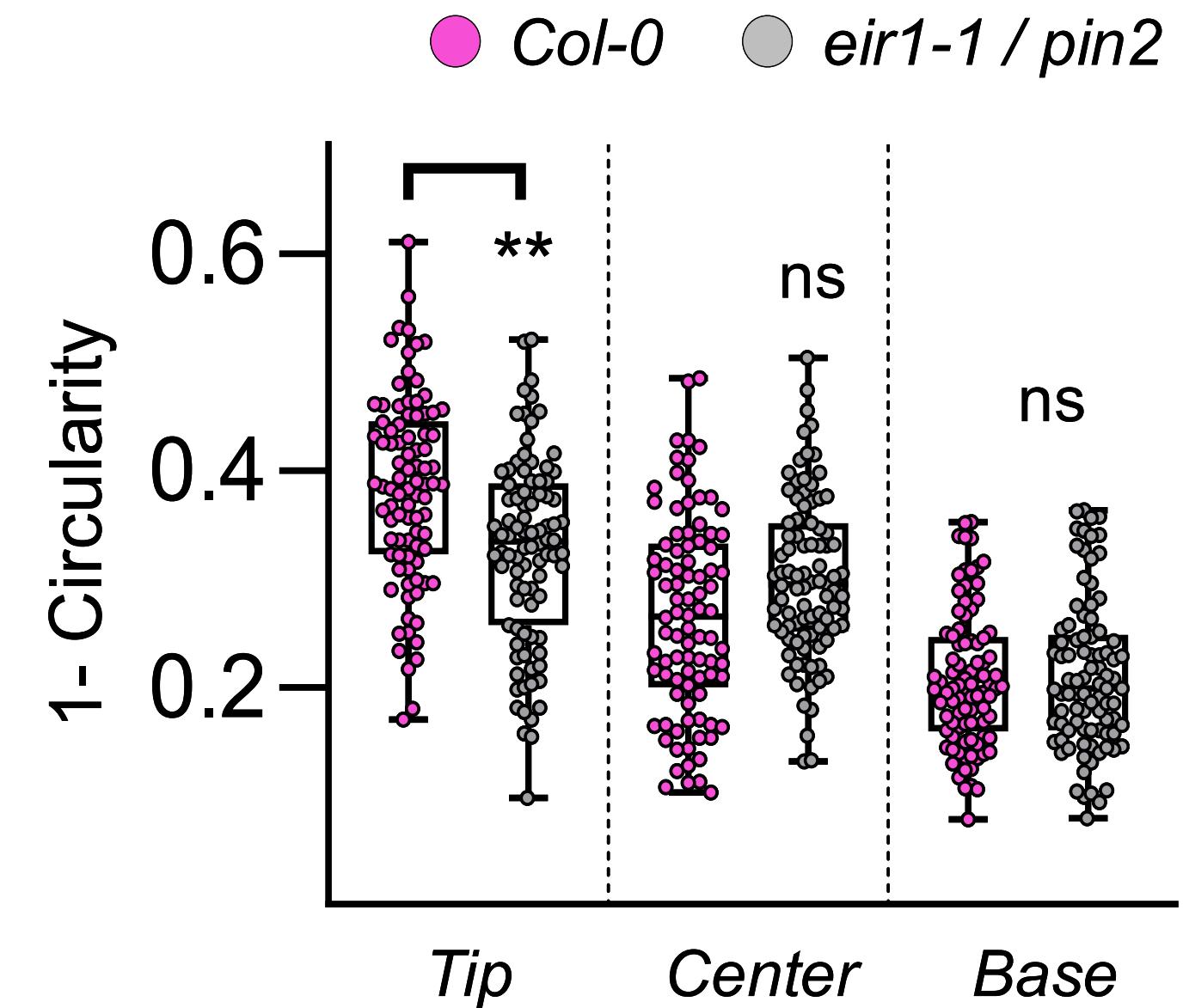
# PIN2 is expressed in margin cells (MCs)



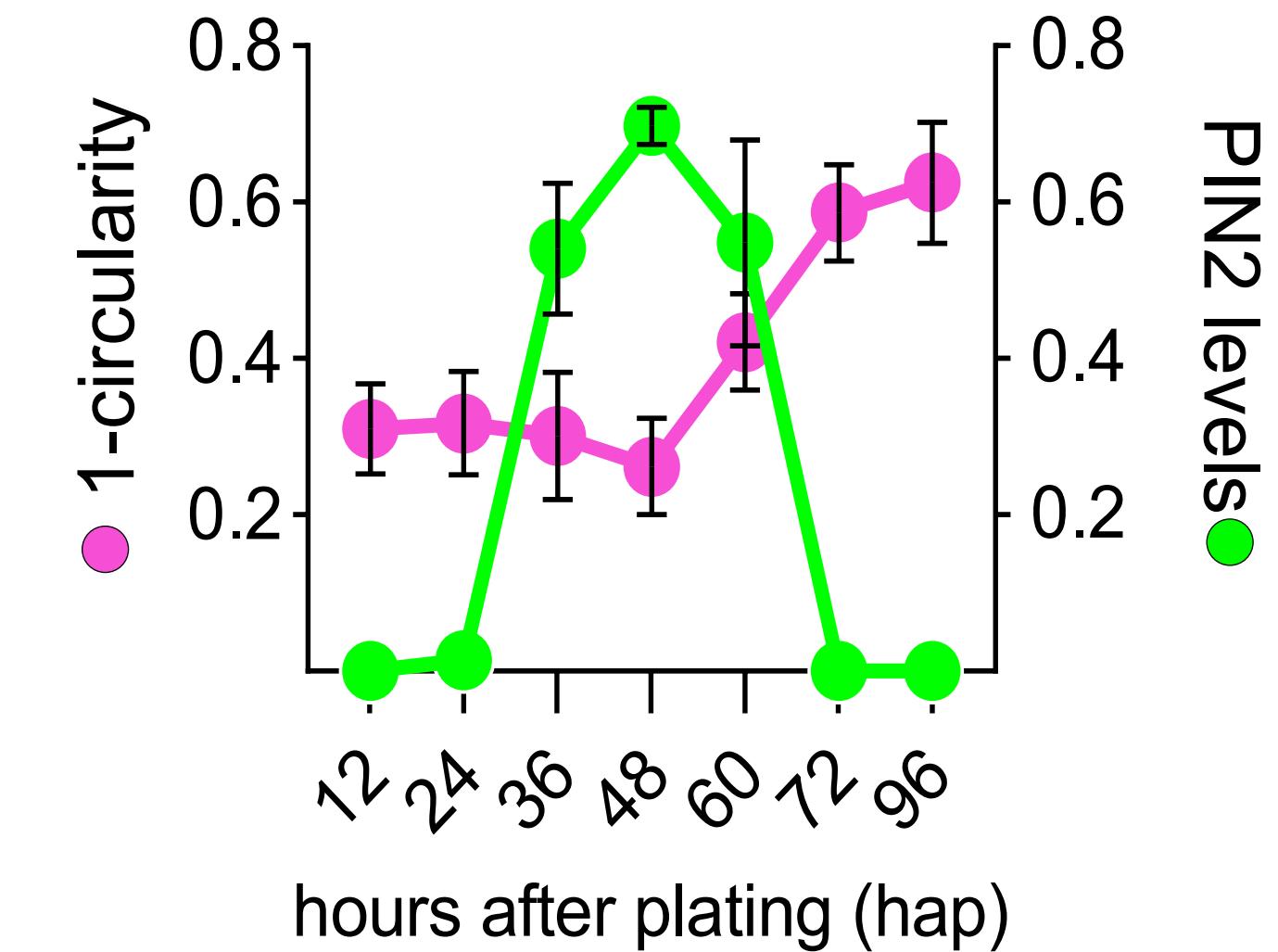
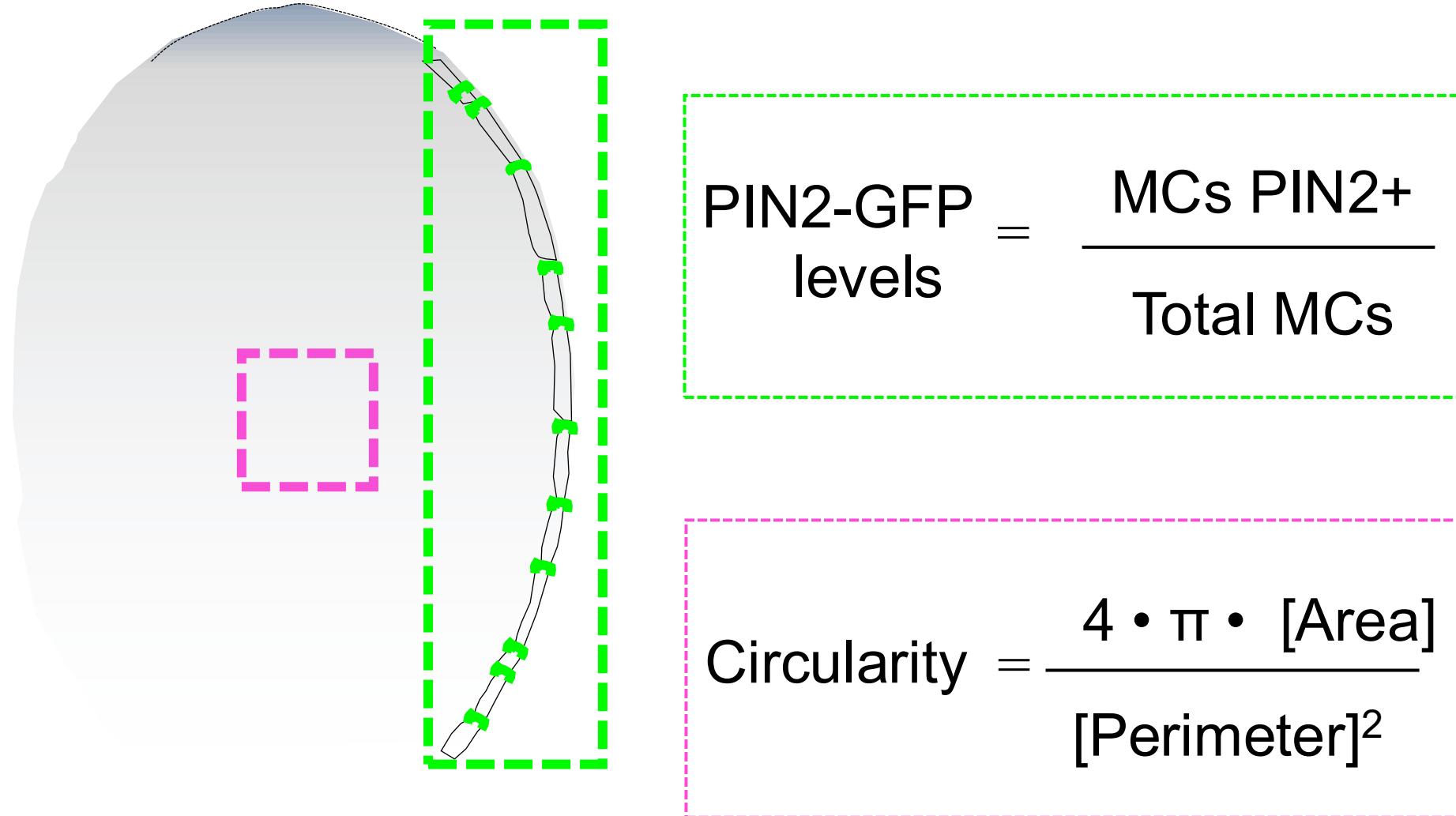
# Interdigitation phenotype of *eir1-1 / pin2* mutant



$$\text{Circularity} = \frac{4 \cdot \pi \cdot [\text{Area}]}{[\text{Perimeter}]^2}$$



# PIN2 precedes the start of interdigitation

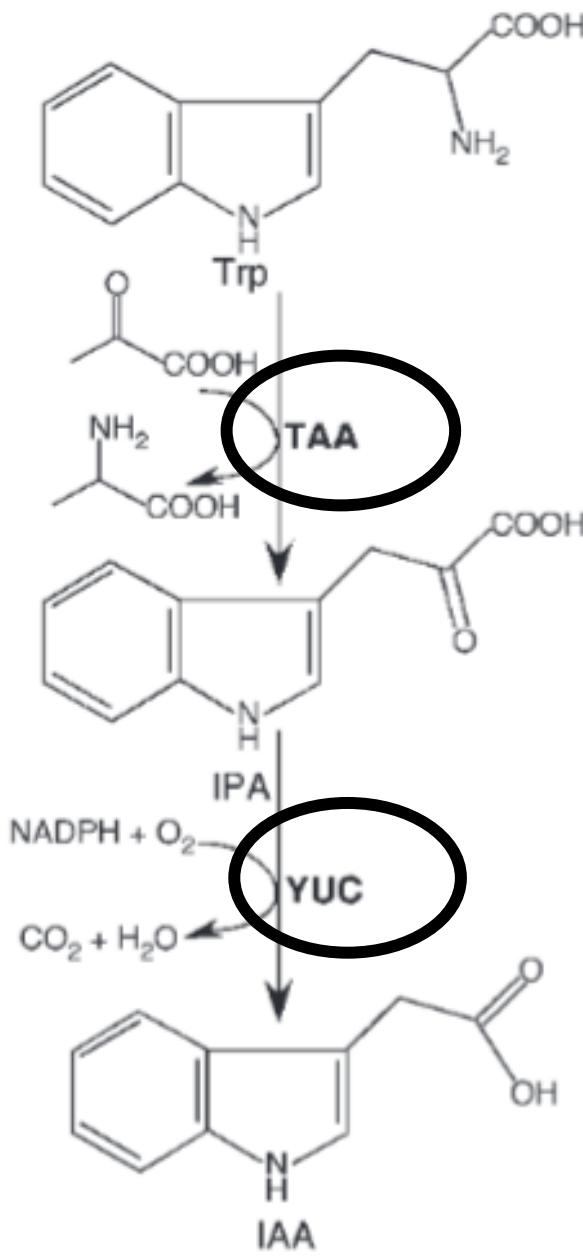


This system is transient BUT how?

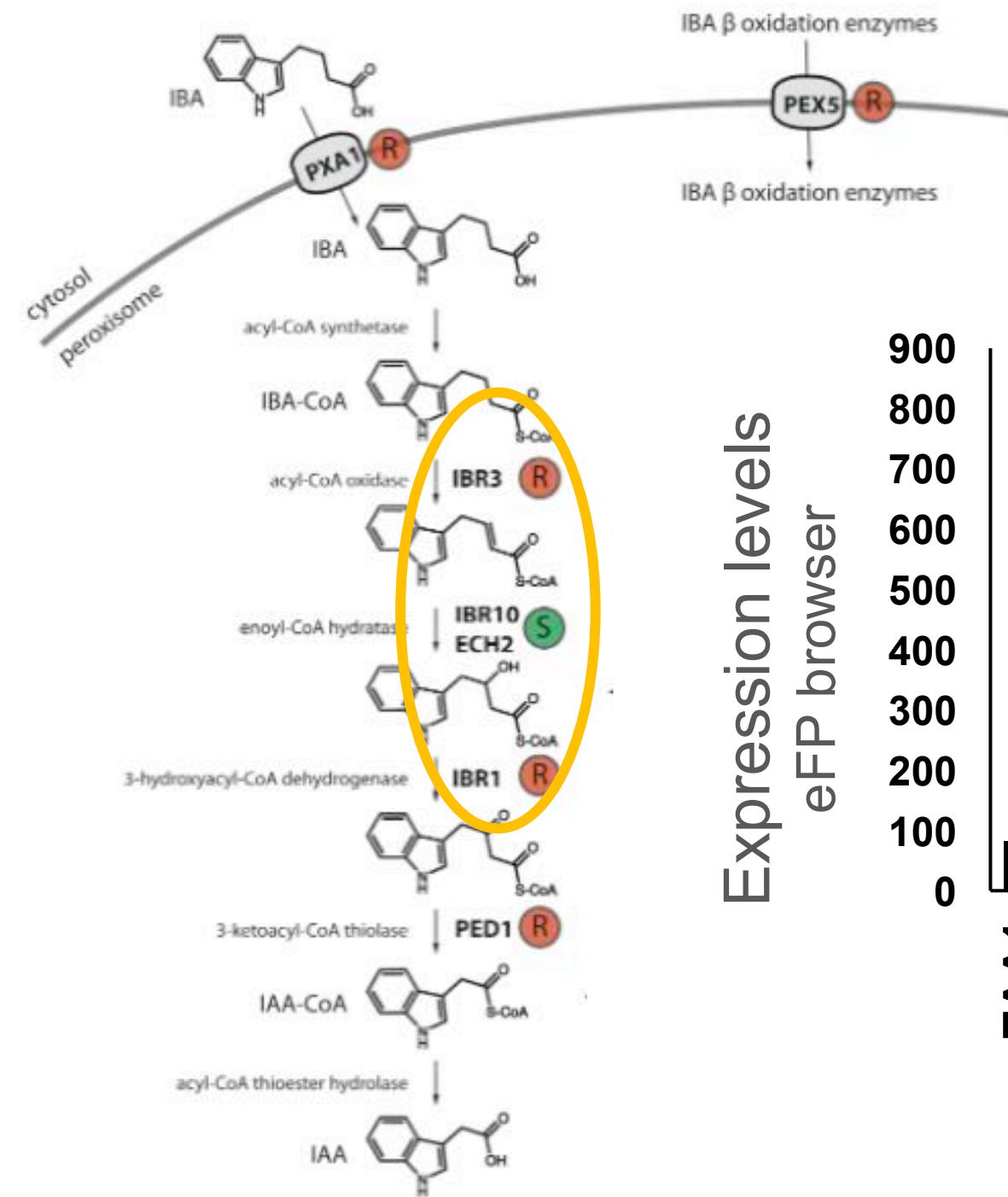
What are the initiating and terminating signals for the transient PIN2-based auxin transport system?

# What is the initiating signal?

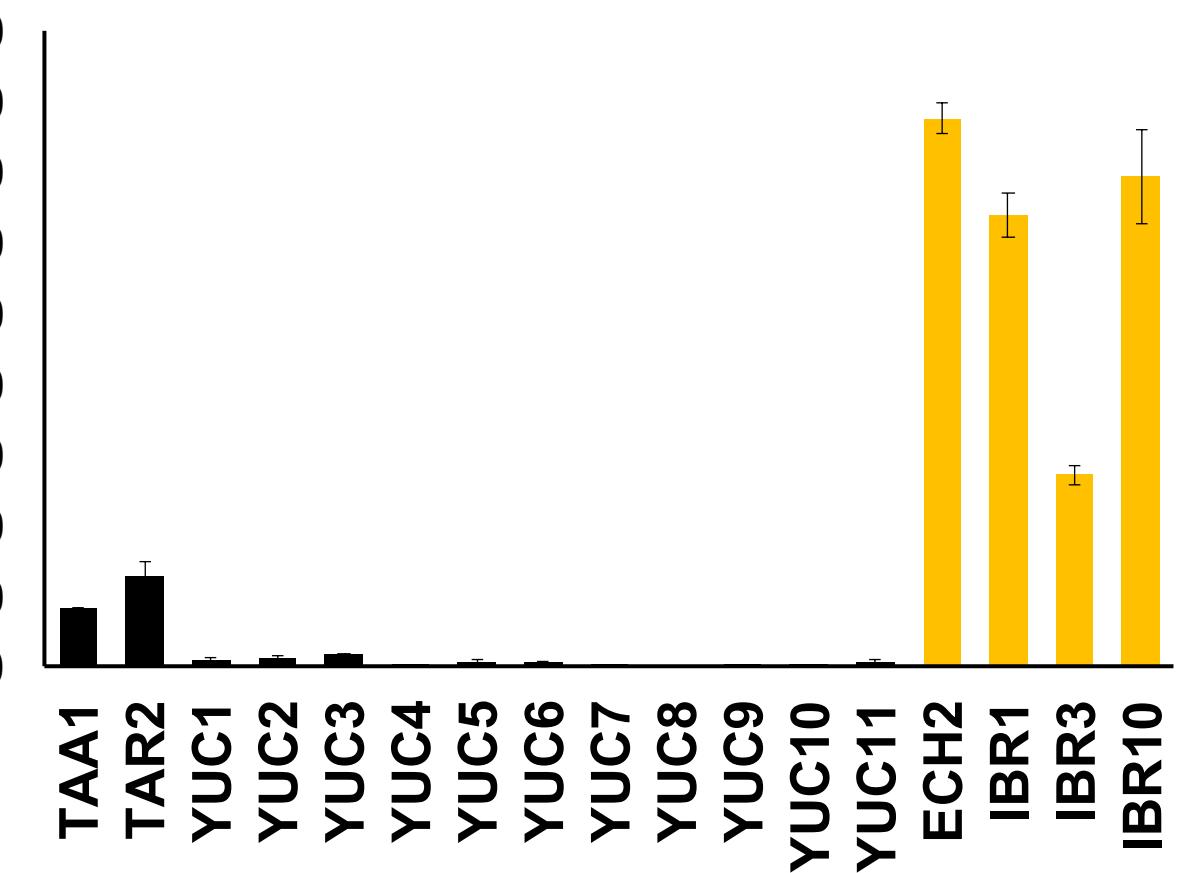
## IPA pathway



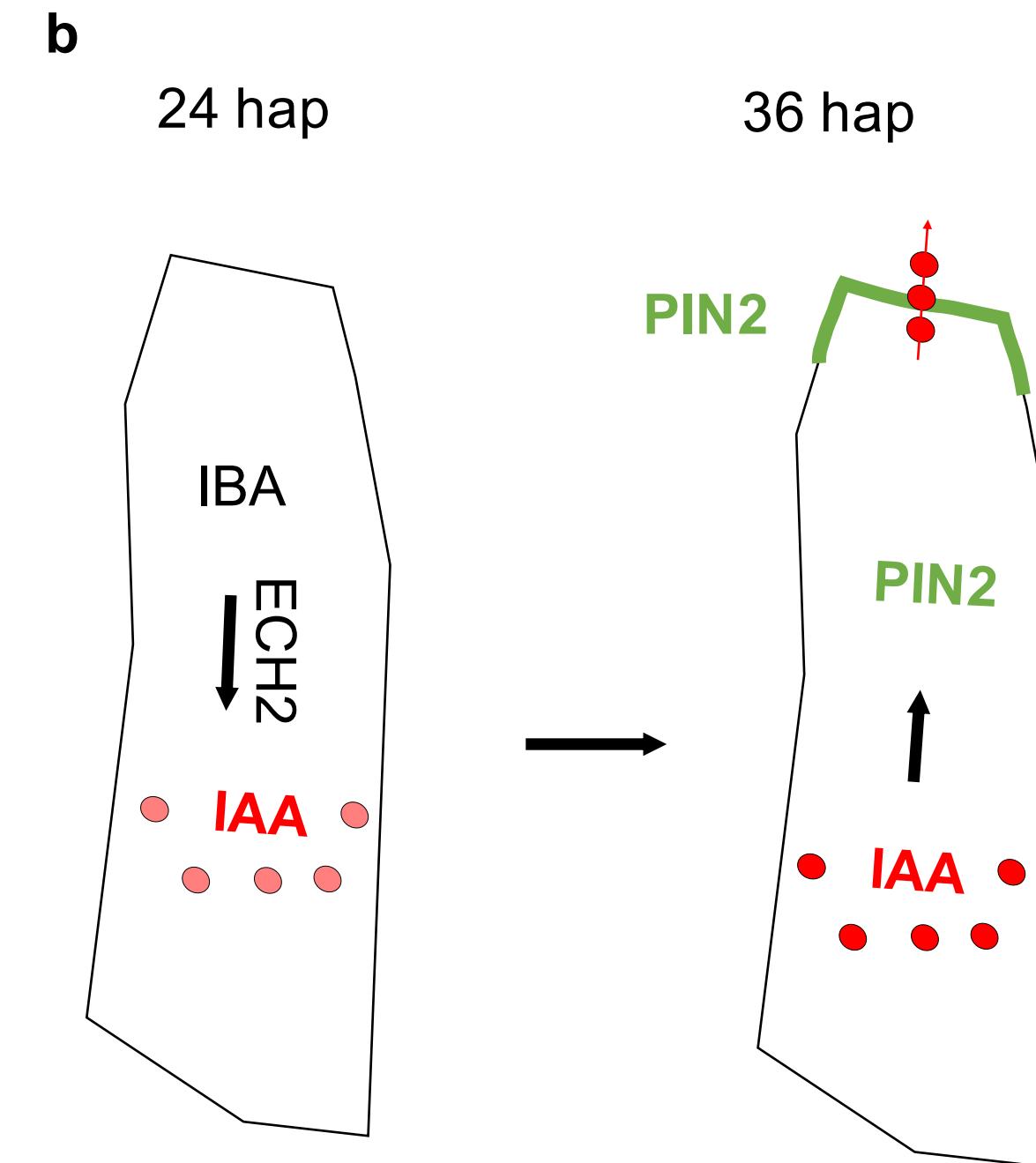
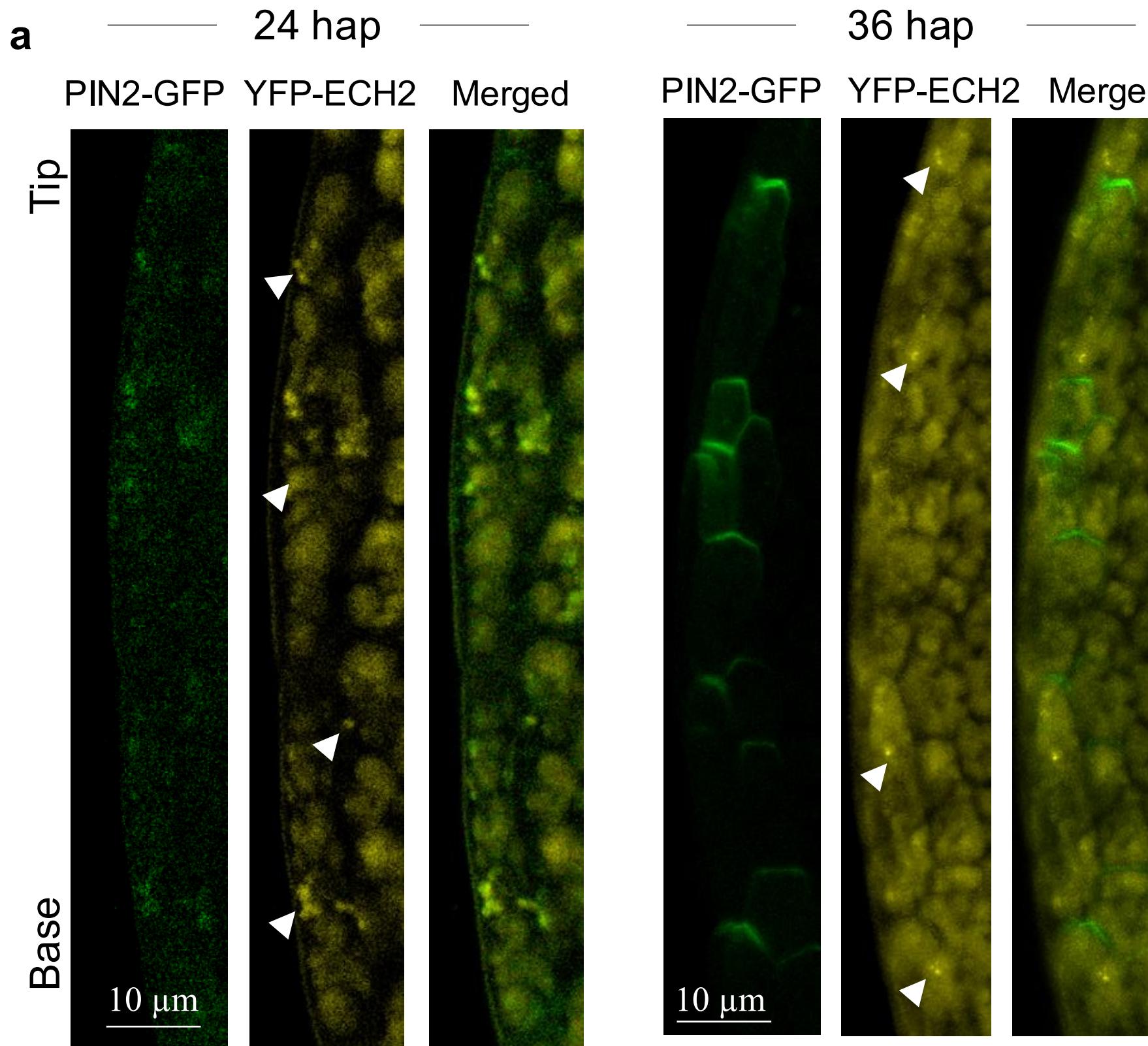
## IBA-to-IAA conversion



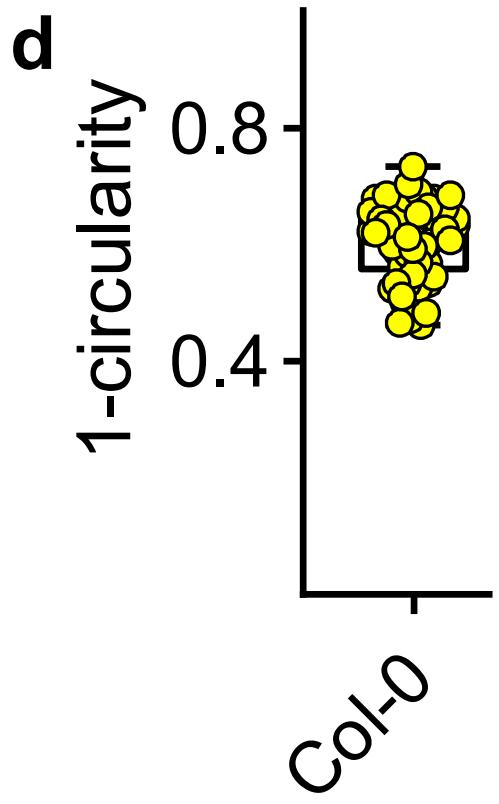
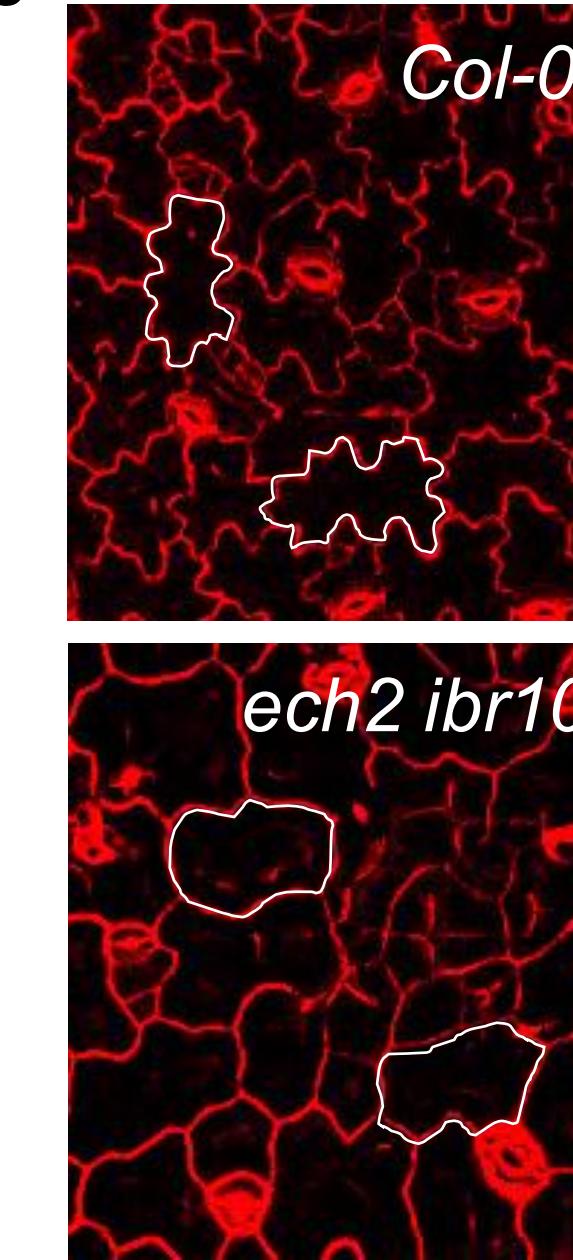
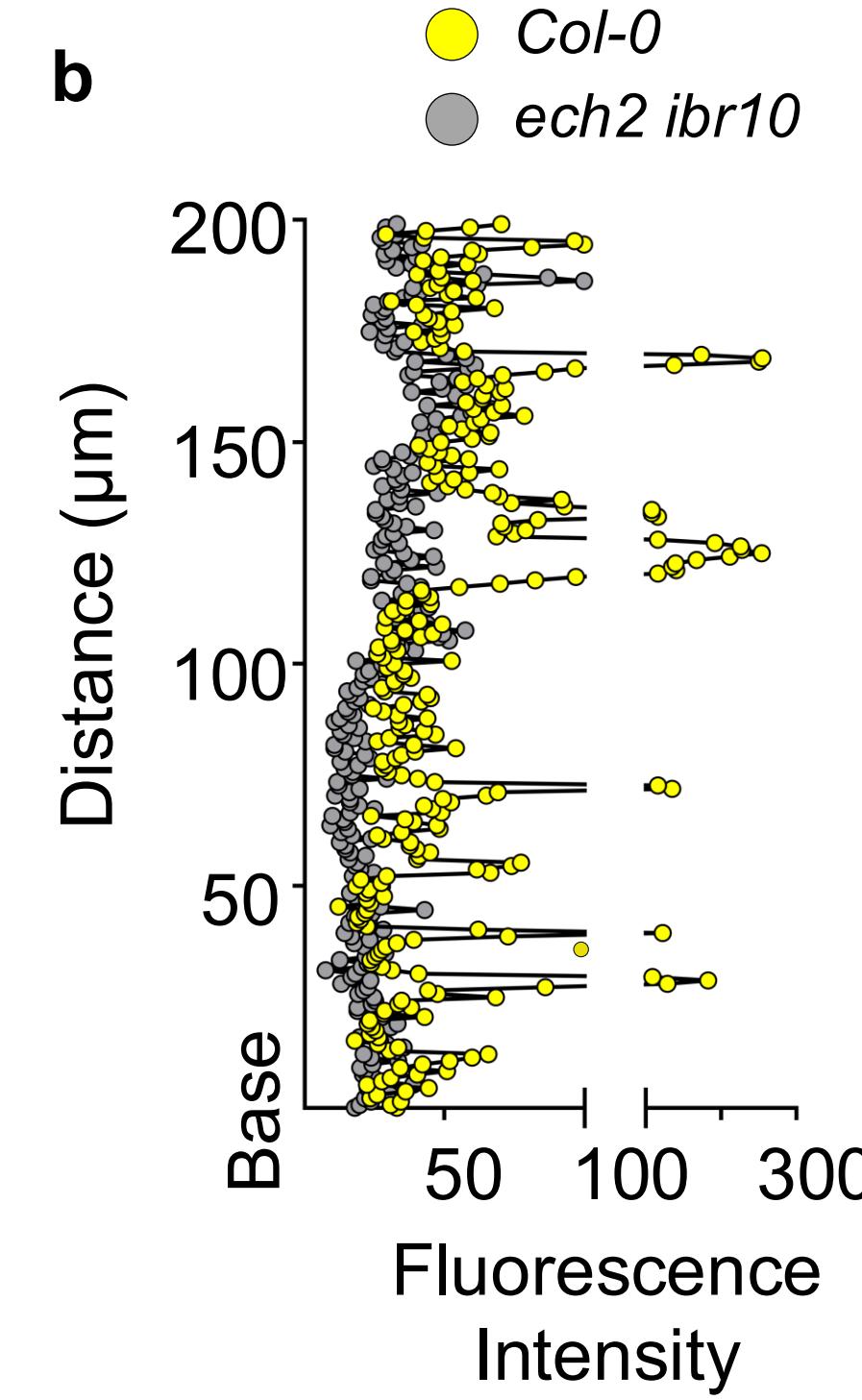
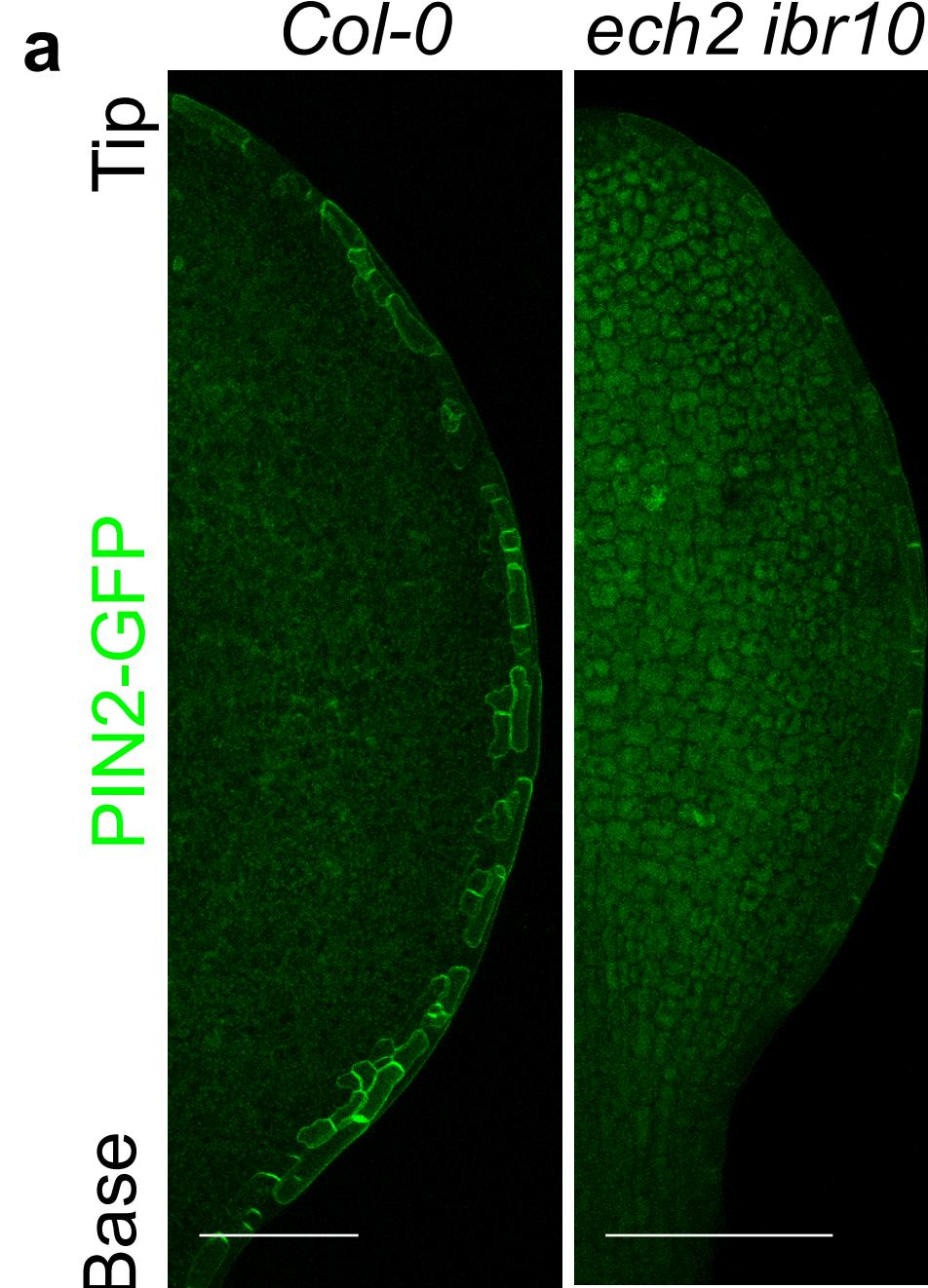
Expression levels  
eFP browser



# IBA-derived auxin precedes PIN2 levels

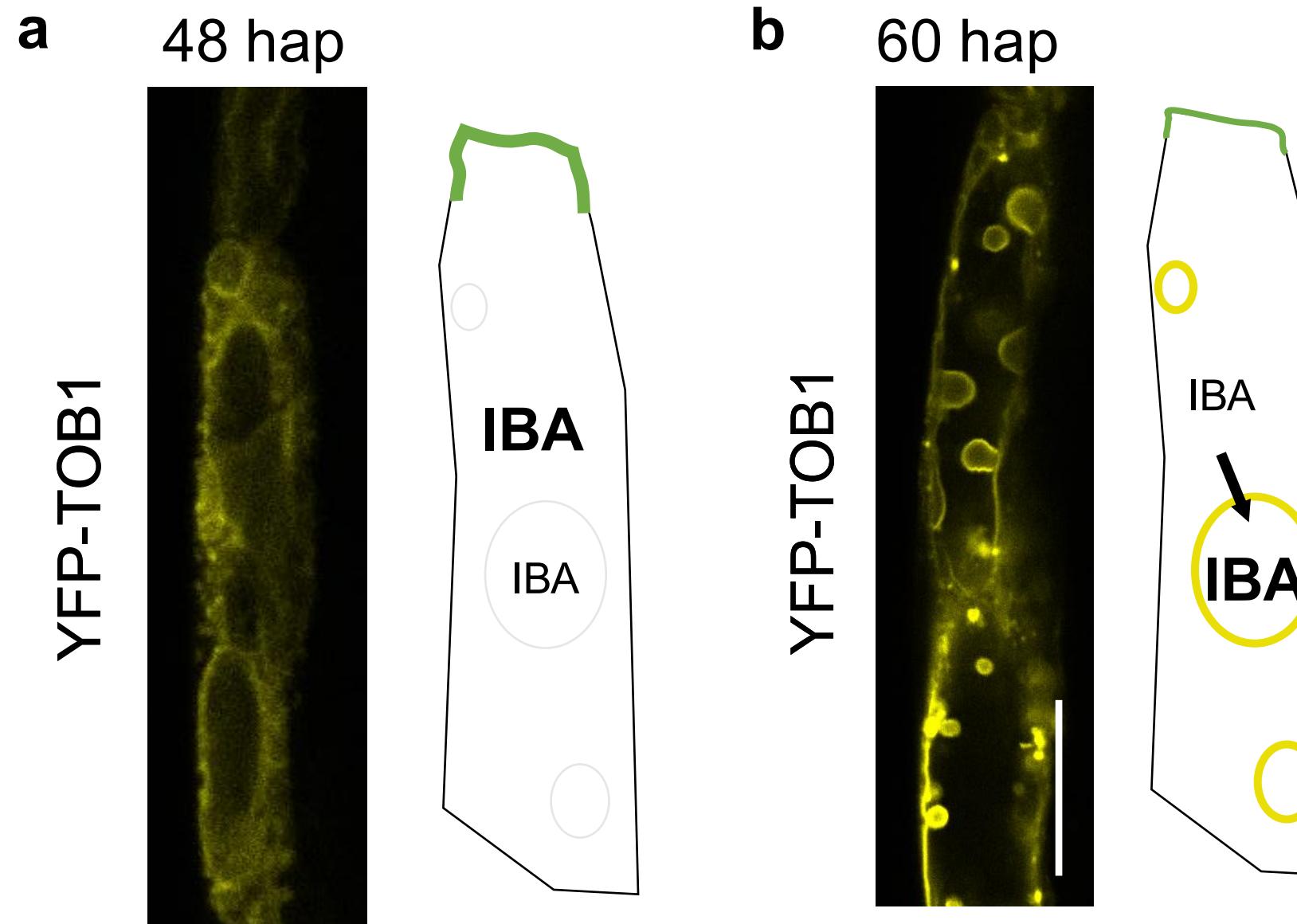


# IBA-derived auxin regulates PIN2 levels at MCs



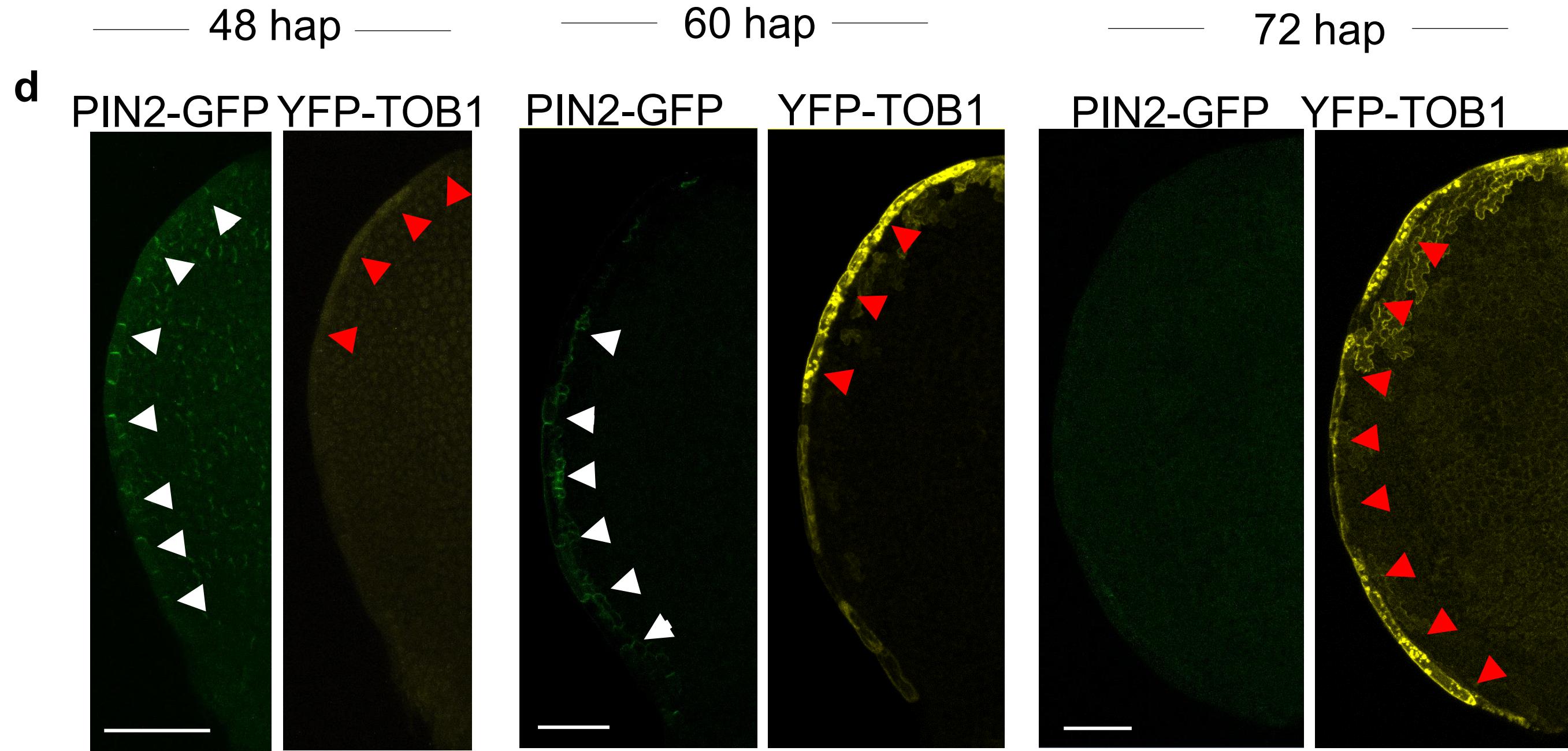
The initiating signal IBA-derived auxin BUT what is the terminating signal?

# Vacuole-localized TOB1 correlates with reduced PIN2 levels

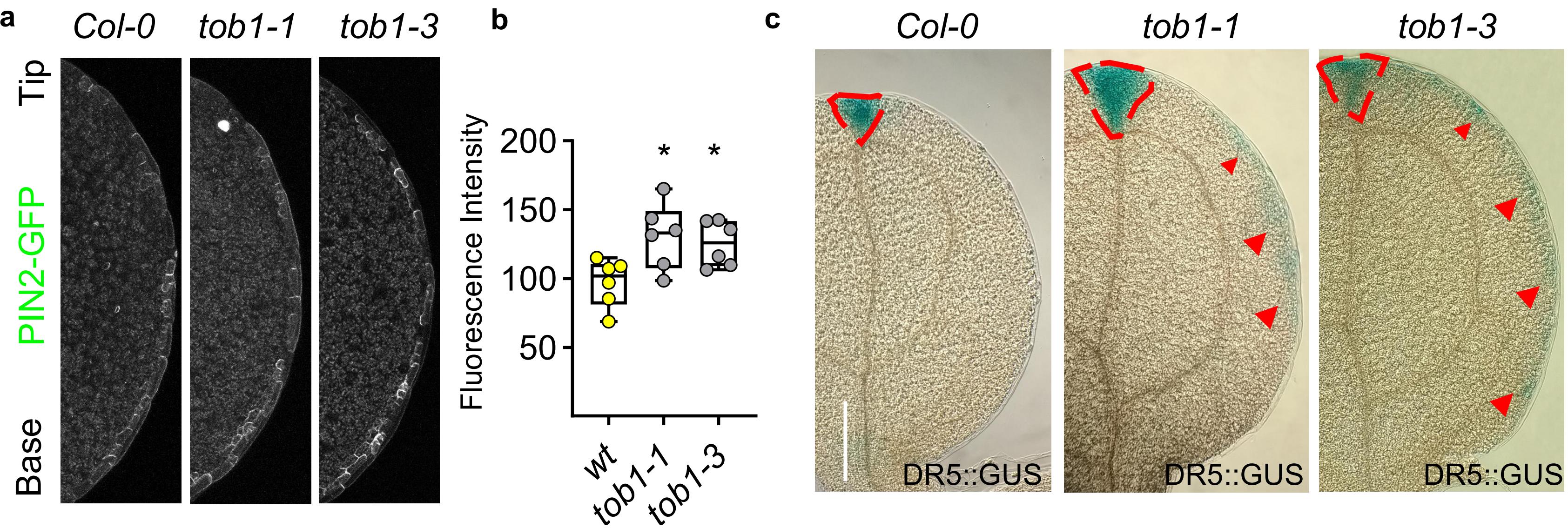


The hypothesis might be correct ...

# Vacuole-localized TOB1 correlates with reduced PIN2 levels

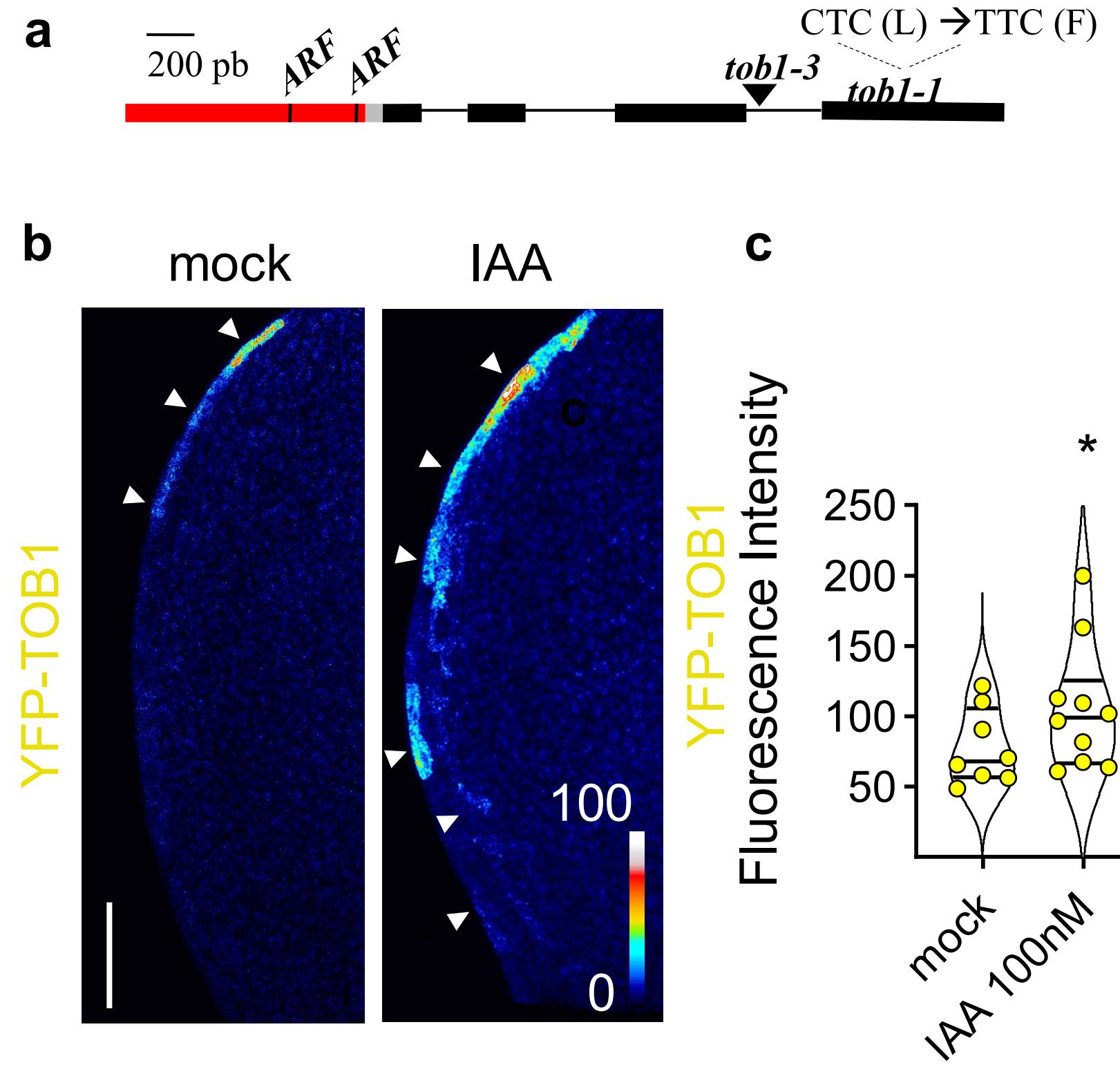


# TOB1 regulates PIN2 levels in margin cells

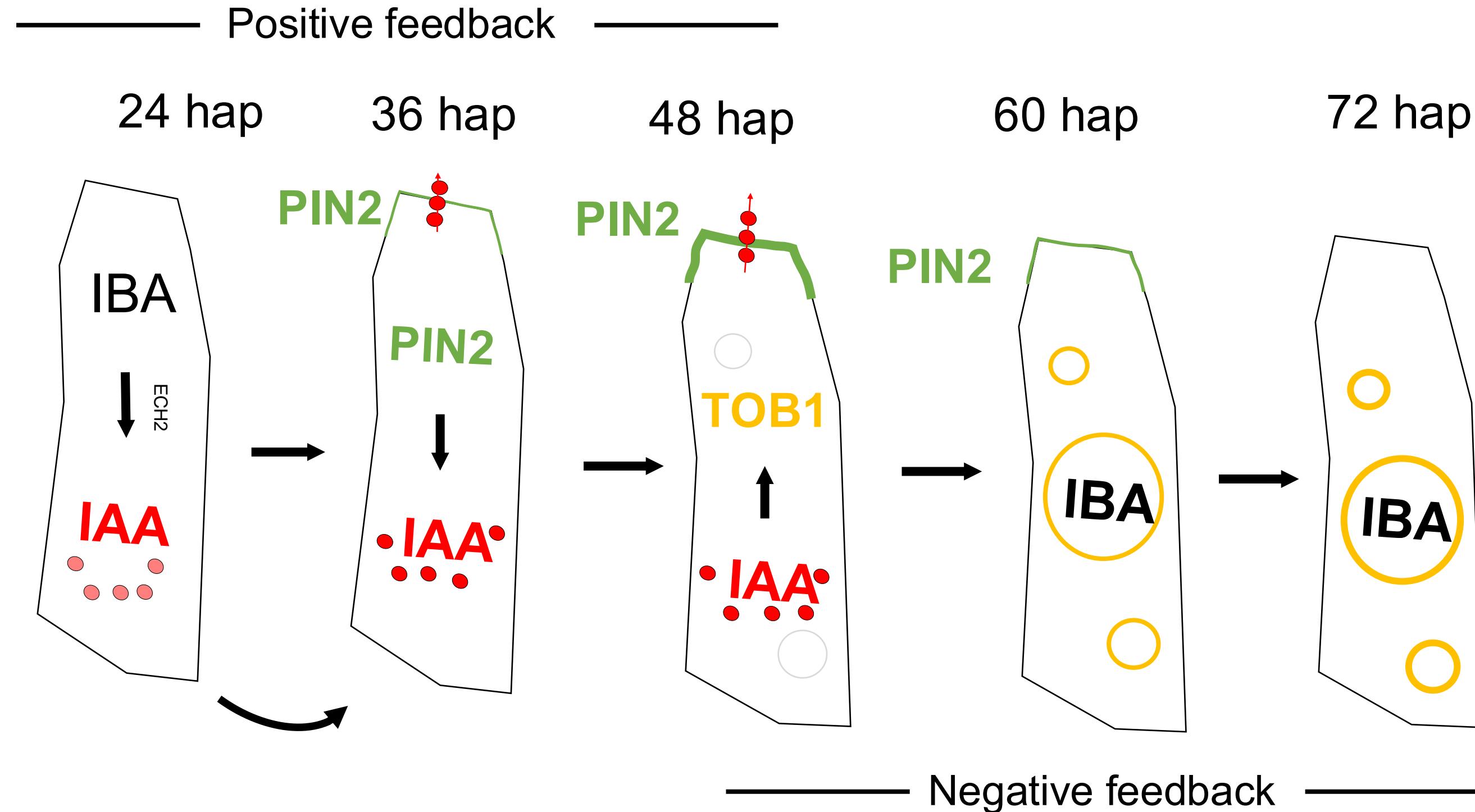


TOB1-mediated IBA internalization into vacuoles is the terminating signal

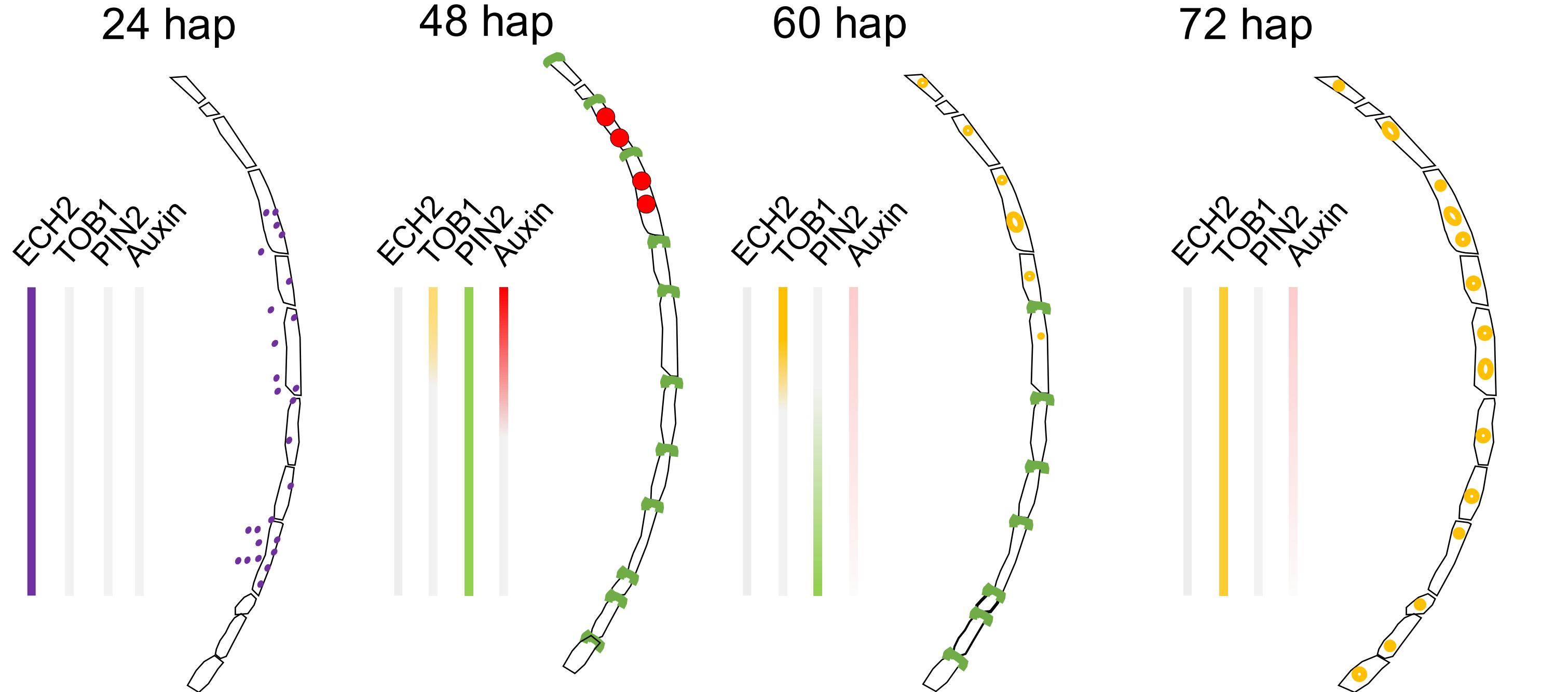
# Auxin regulates TOB1 levels



# Working model for self-organizing transient auxin flow at MCs



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# Acknowledgments

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