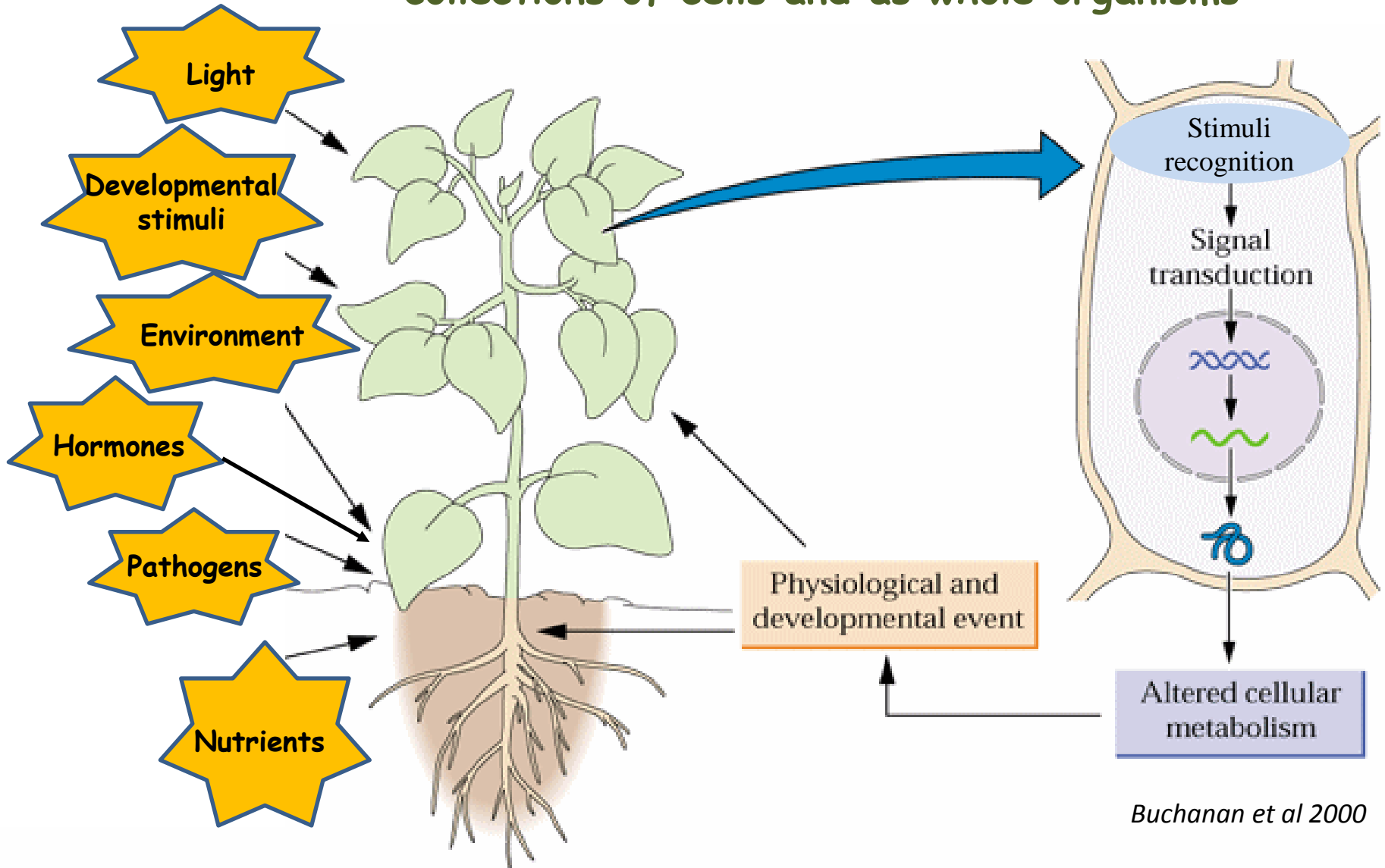


# **LABORATORIO DI FISIOLOGIA E BIOLOGIA MOLECOLARE DELLE PIANTE**

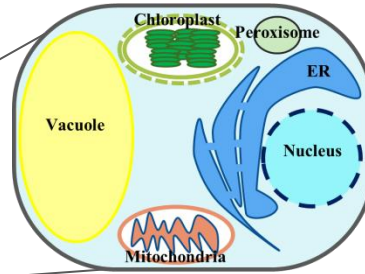
**Michela Zottini - Fiorella Lo Schiavo**

**Sesto piano SUD (st. 9-10-15)**

# Plants respond to internal/external stimuli both as collections of cells and as whole organisms



## Different approaches to study this topic:

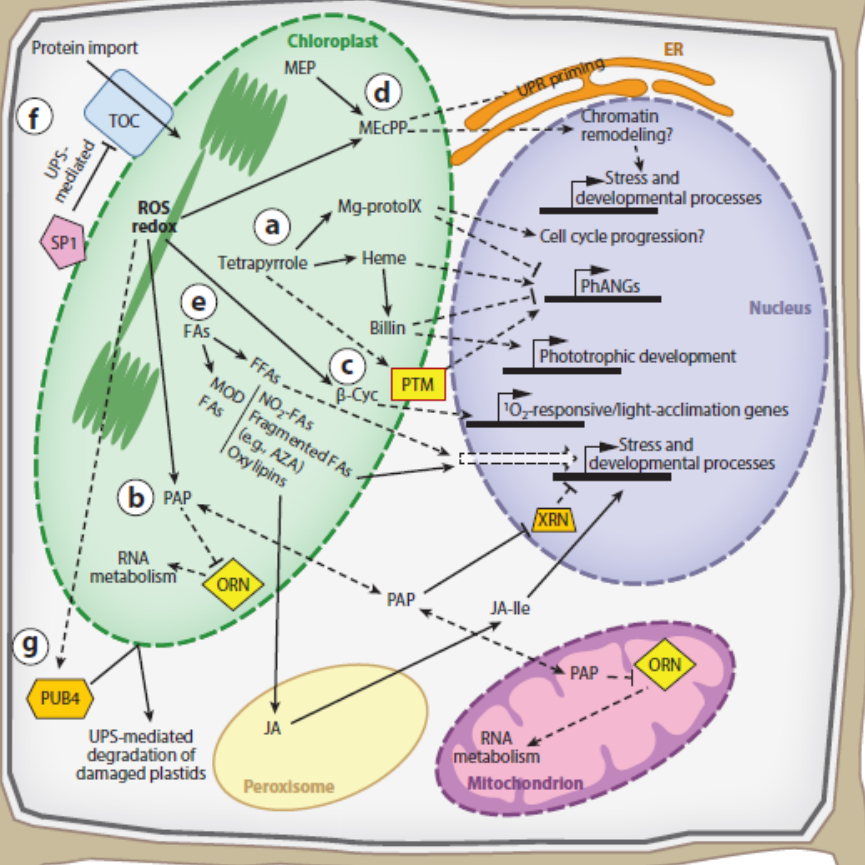


Signaling factors

- Calcium
- H<sub>2</sub>O<sub>2</sub>
- Nitric Oxide

Organelle dynamics

- Organelle movements
- Physical interactions



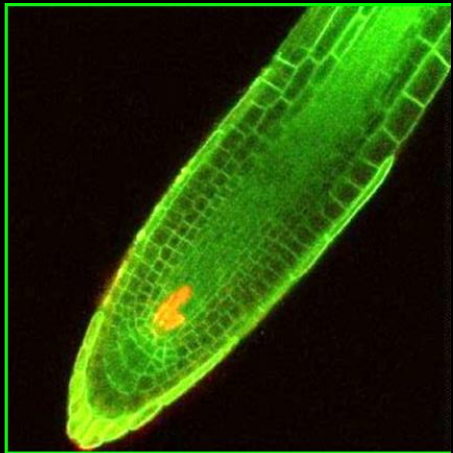
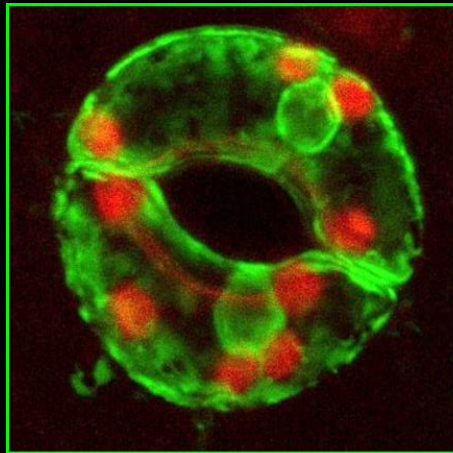
→ Established induction    - - - -> Proposed induction    ·····| Proposed inhibition  
 - - - -> Collective effect of various types of FAs and derivatives

## Progetto 1:

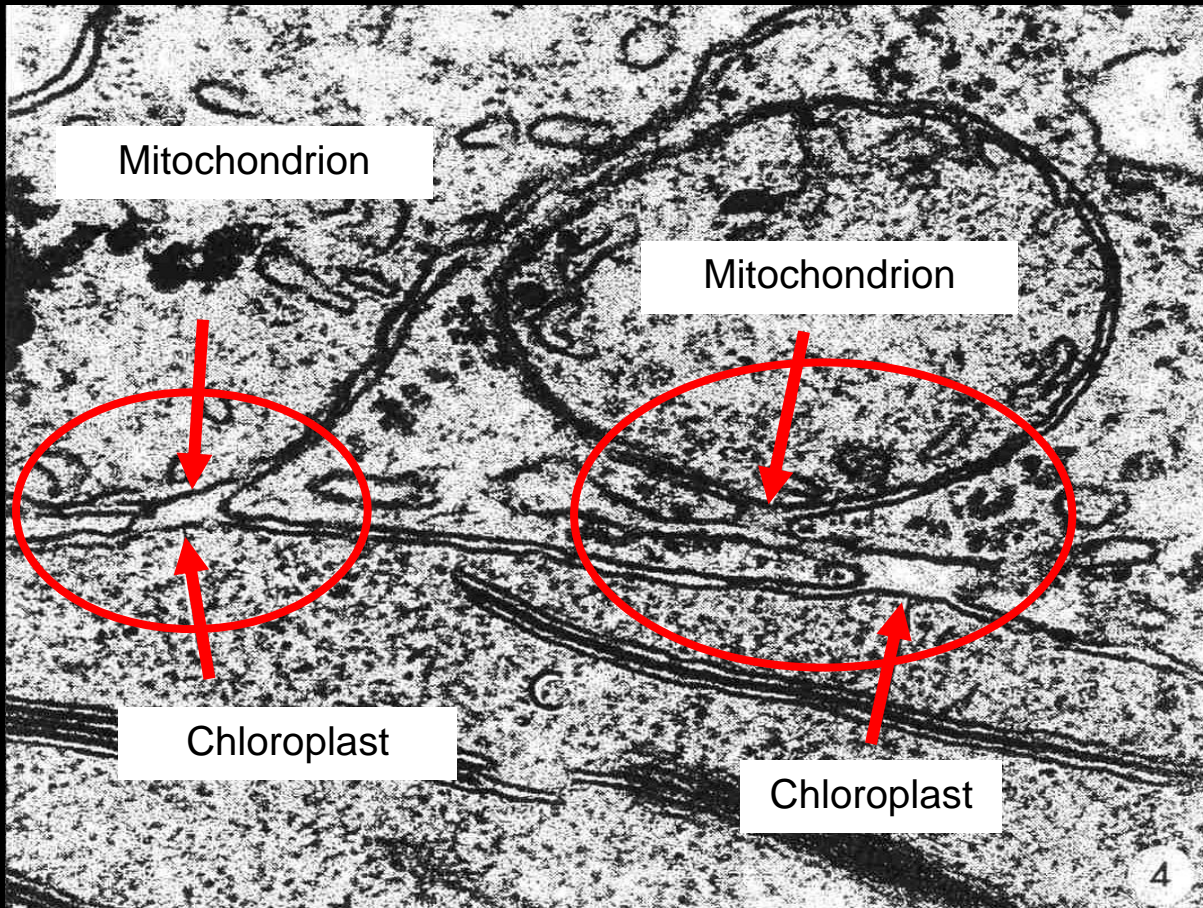
Studio del ruolo del calcio nella risposta retrograda (RS) attivata da stress abiotici.

- Calcium imaging
- Biologia molecolare
- Studi fisiologici in mutanti RS

Trangenic plants expressing Cameleon targeted to different sub-cellular compartments

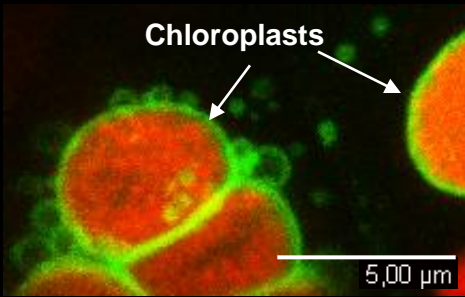


# Do physical interactions exist among organelles?

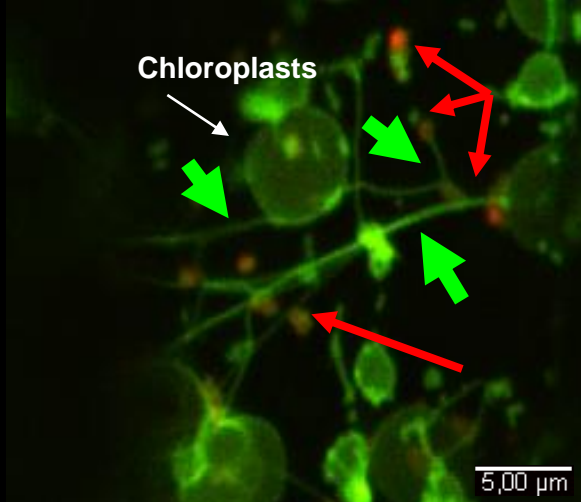


*Crotty WJ and Ledbetter MC, Plant Cells Science 1973*

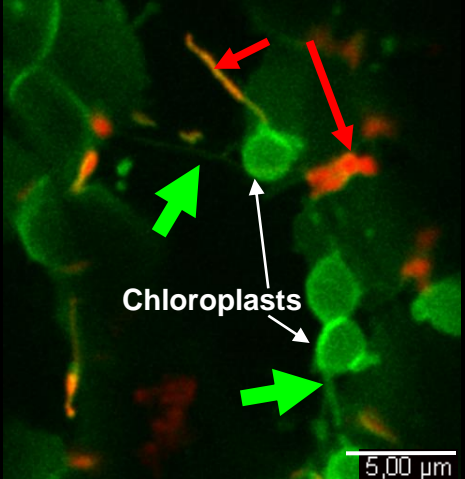
pFIS1A:YFP-FIS1A Chl



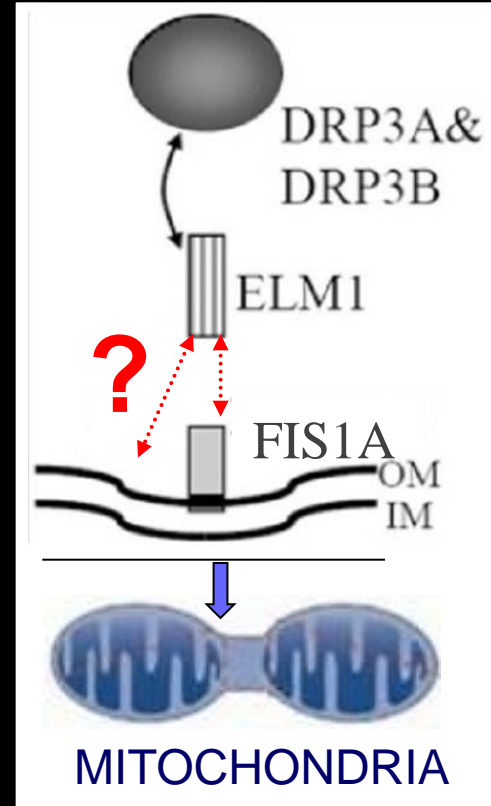
pFIS1A:YFP-FIS1A Mito-RFP

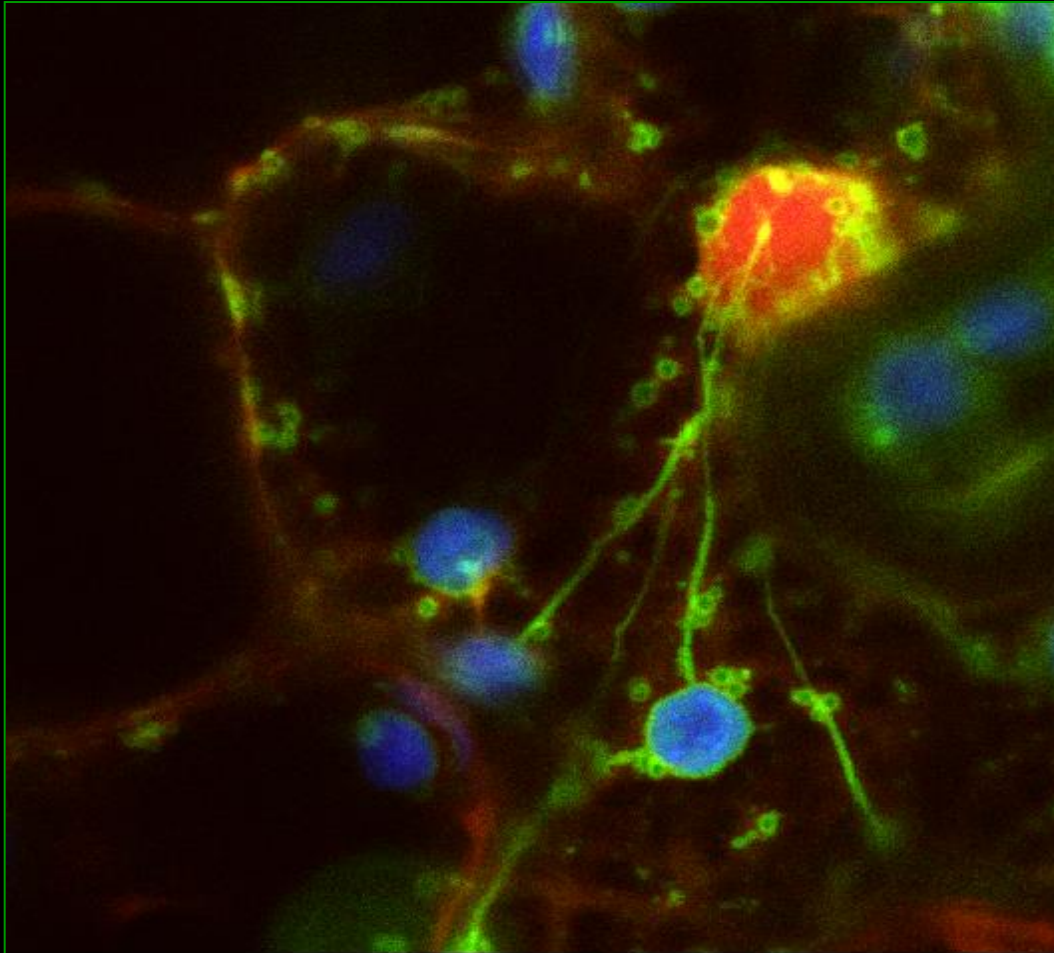


pFIS1A:YFP-FIS1A Peroxisomal-RFP



FIS1A is a proteins involved in organellar fission that co-localizes with mitochondria, chloroplasts, peroxisome





## Progetto 2:

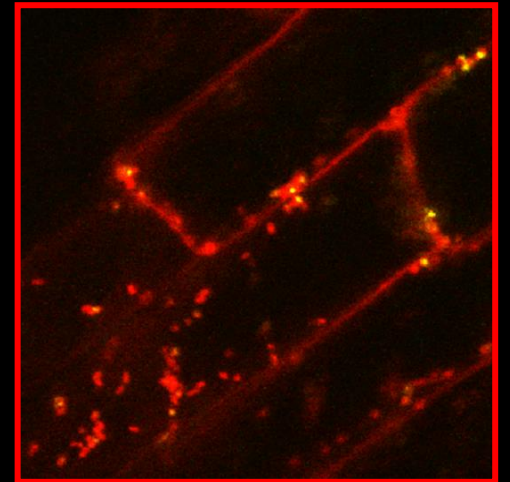
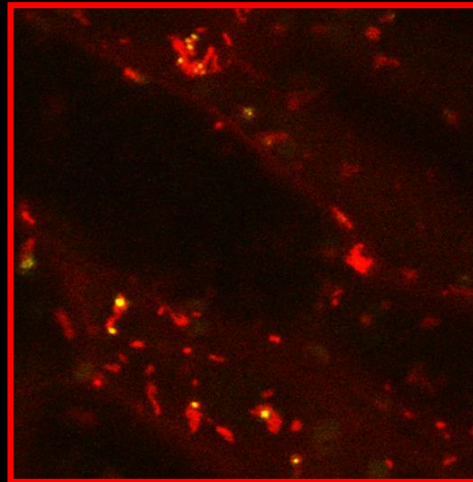
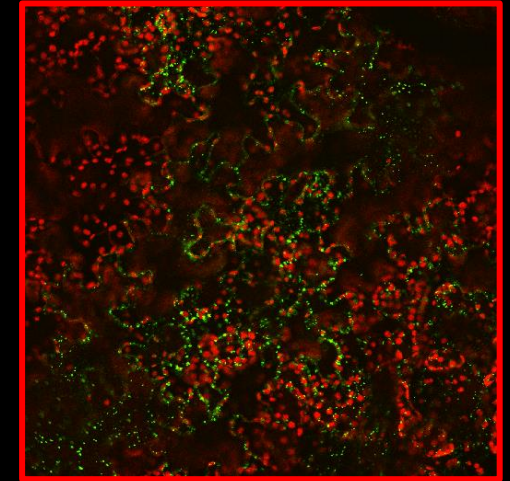
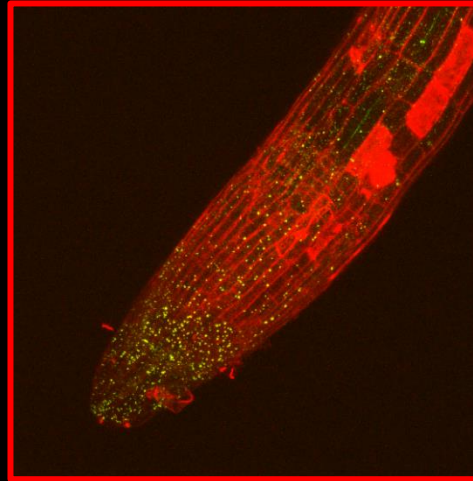
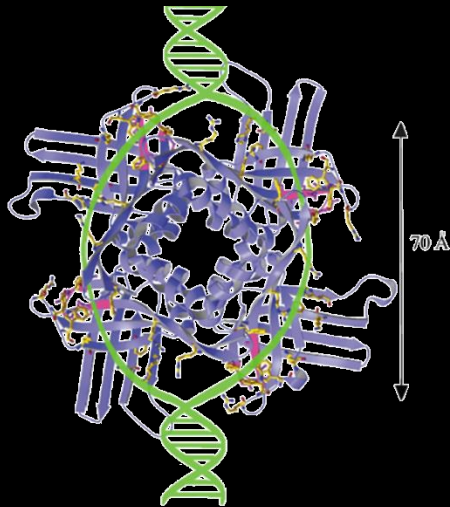
Studio del ruolo di FISSION1A nella formazione di protrusioni inter-organellari nella risposta retrograda attivata da diverse condizioni fisiologiche e di sviluppo.

- Microscopia confocale
- Profili d'espressione genica
- Analisi fisiologiche di linee mutanti

### Progetto 3:

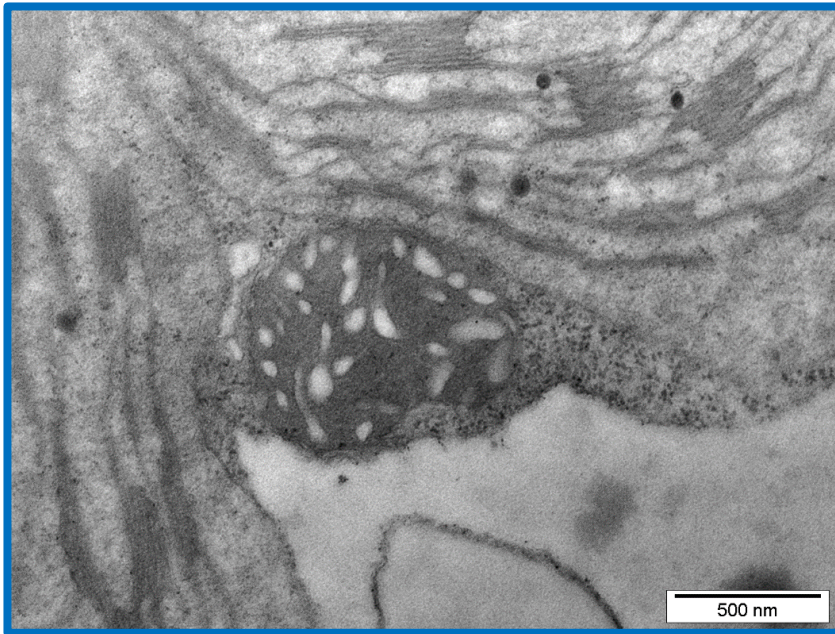
Studio del ruolo di WHIRLY 2 nella risposta retrograda in piante e colture cellulari di *Arabidopsis*.

- Microscopia confocale
- Profili d'espressione genica
- Analisi fisiologiche di linee mutanti





WT



Mutanti di *why2* mostrano una morfologia e dinamica mitocondriale alterate

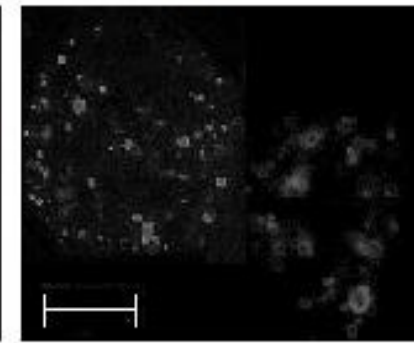
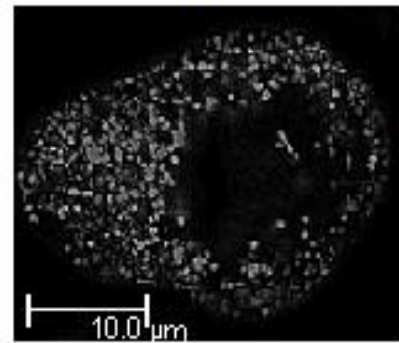
*Why2 KO*



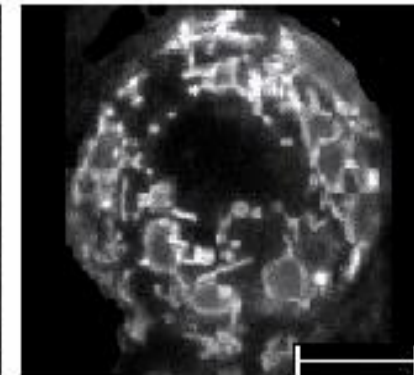
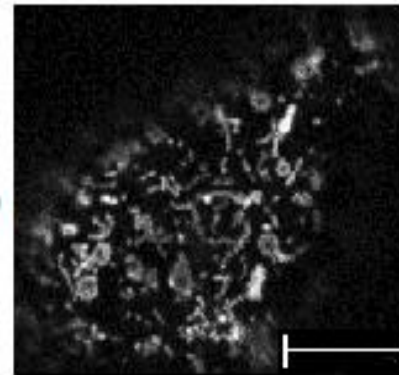
1 week

2 weeks

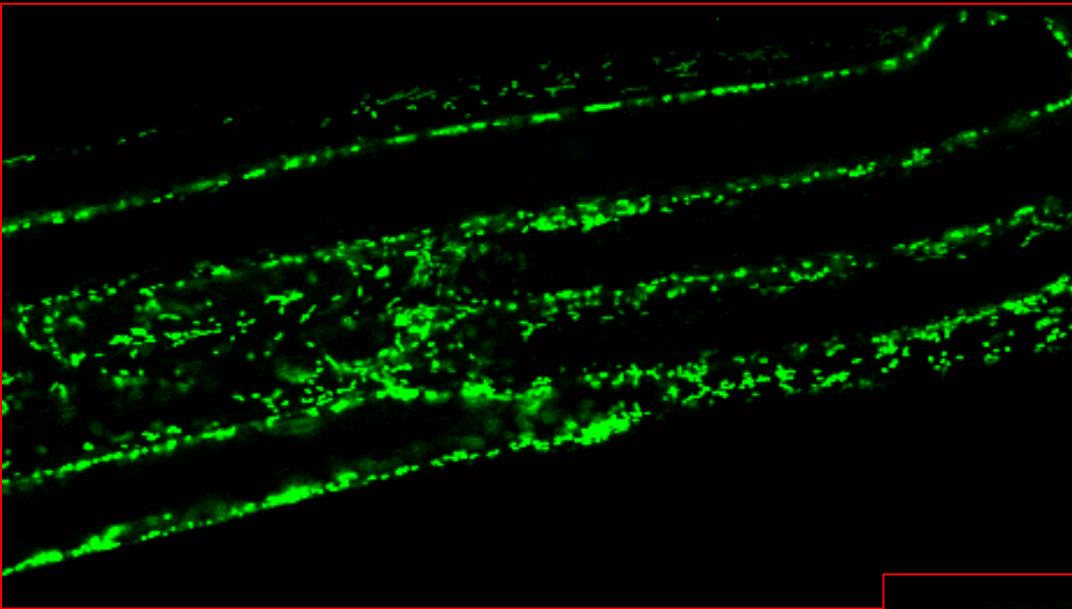
WT



W2KO

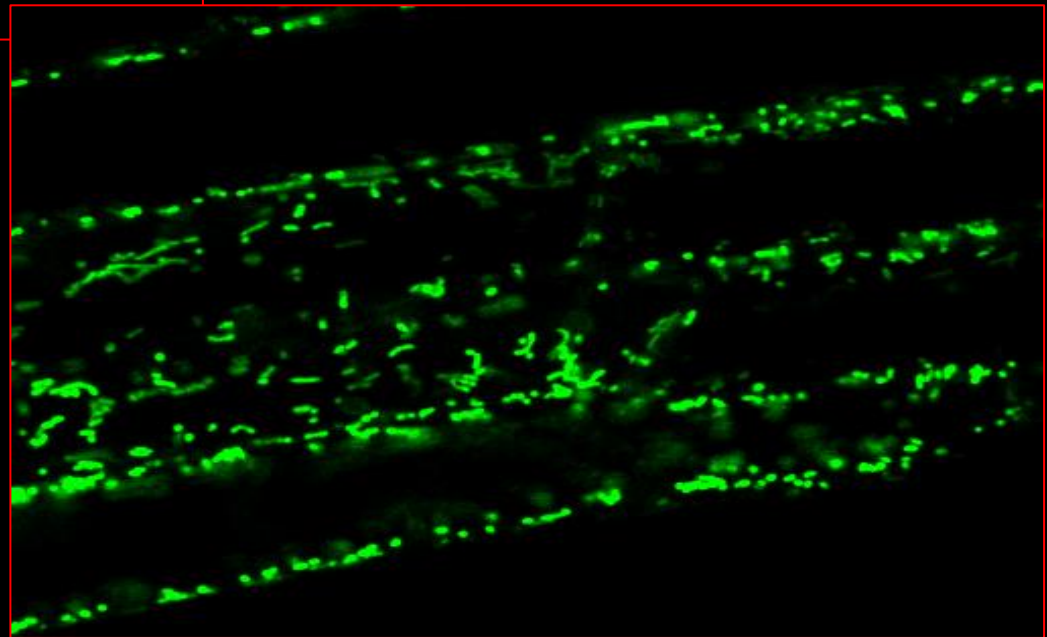


# Dinamica dei mitocondri in radice di Arabidopsis



WT

*Whirly2 KO*





# Plant Growth Promotion (PGP)

**Biofertilizer**

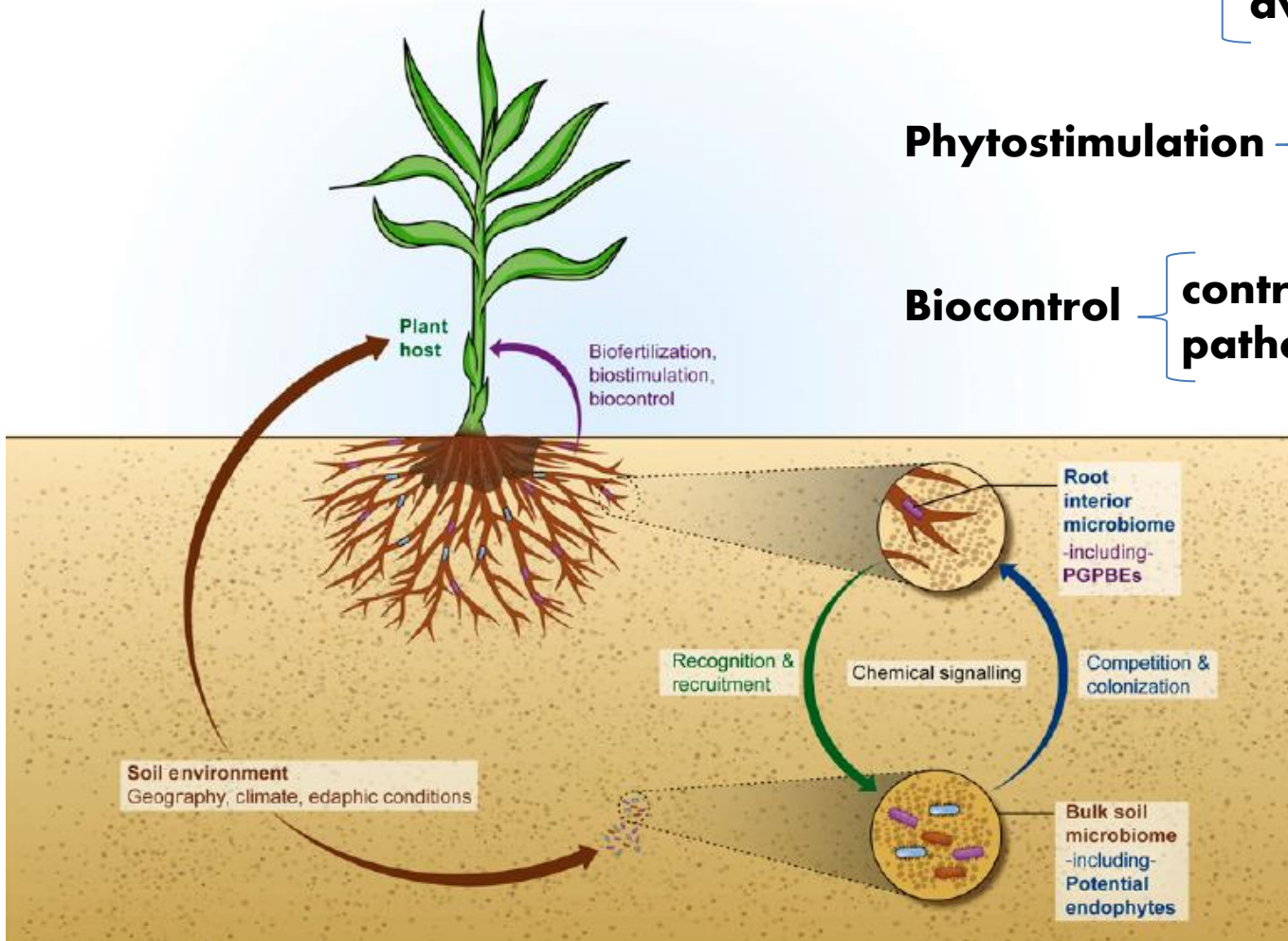
increase nutrient availability

**Phyto stimulation**

produce phytohormones

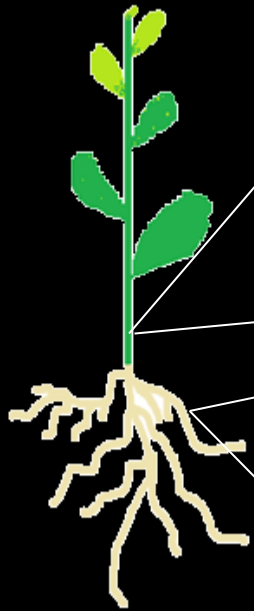
**Biocontrol**

control of pathogenic agents

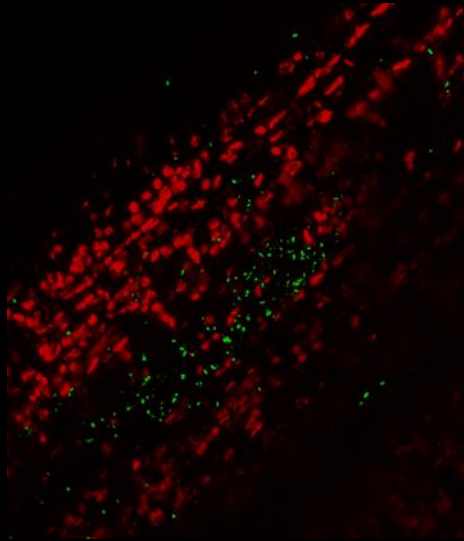


**Endophytes are conventionally defined as bacteria or fungi that reside internally in plant tissues and cause no negative effects on plant growth.**

# Analisi di piante inoculate con endofiti batterici



*P. agglomerans* GFP



*B. licheniformis* GFP

