



ECFG15

ROME • ITALY 2020



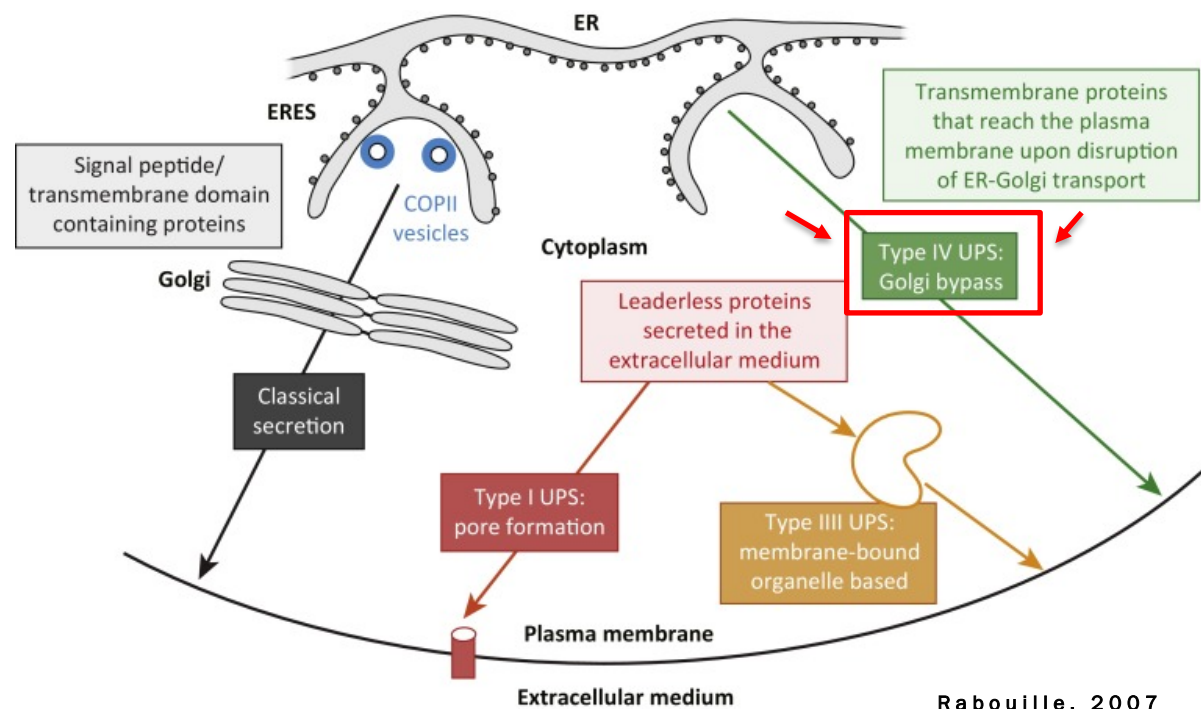
National & Kapodistrian
University of Athens

Faculty of Biology

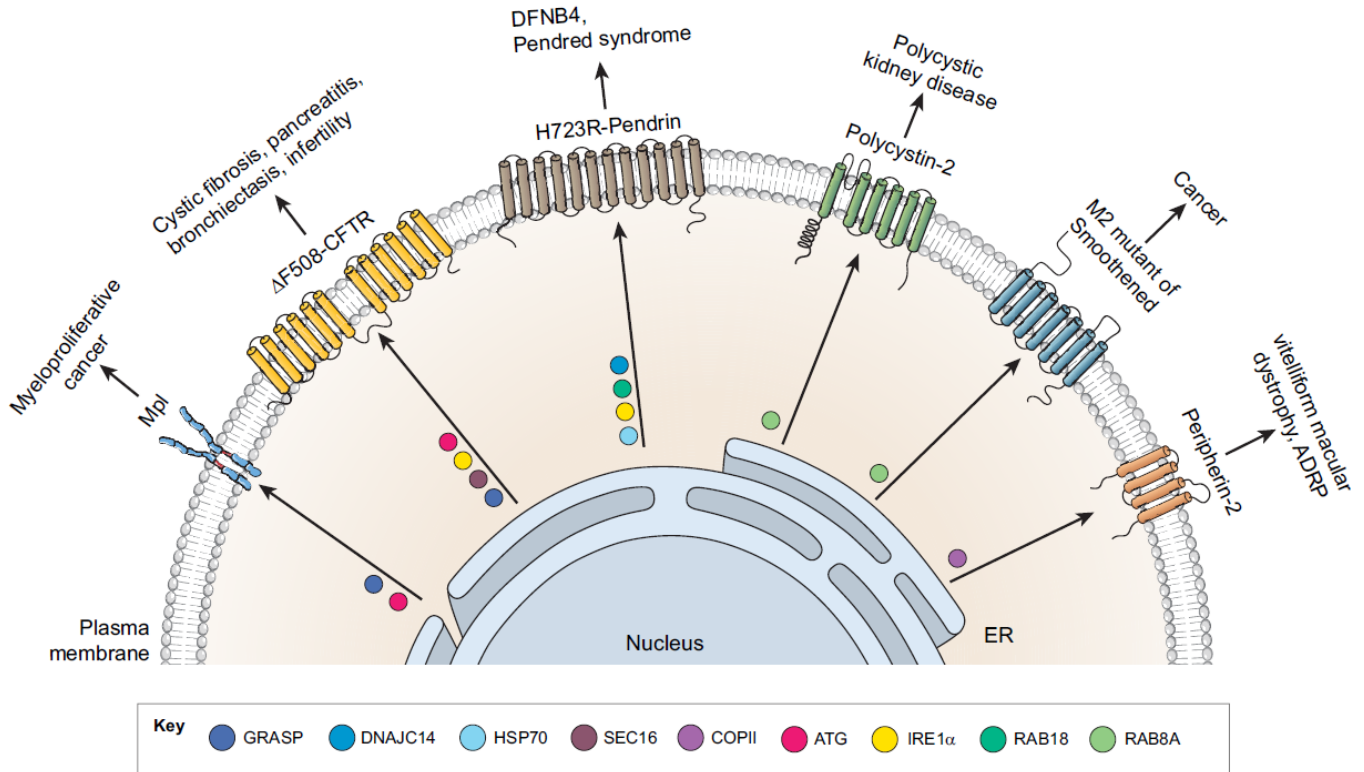
**Nutrient transporter
translocation to the plasma
membrane via Golgi bypass in
*Aspergillus nidulans***

Sofia Dimou
PhD student

Conventional VS Unconventional protein secretion (UPS)

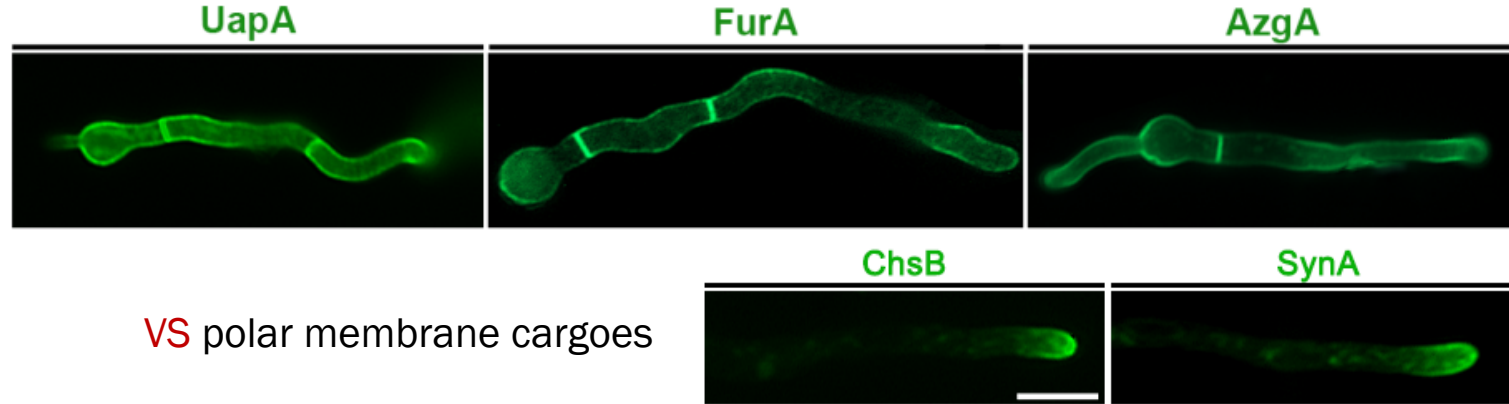


UPS (type IV) of transmembrane proteins



How de novo made transporters are sorted to the plasma membrane (PM)

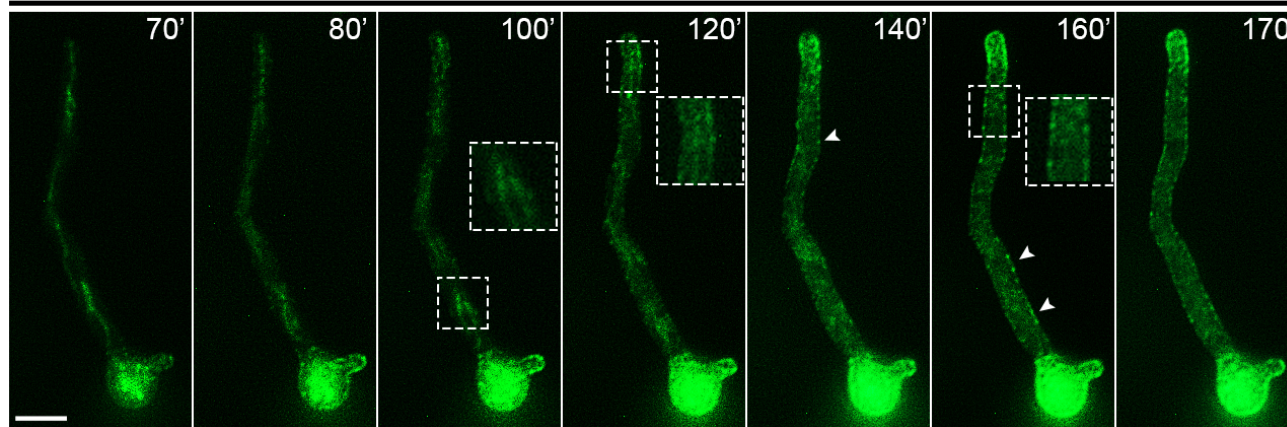
Nutrient Transporters localize homogeneously in the PM of growing *Aspergillus* hyphae.



- No Golgi-like structures during transporter sorting to PM.
- No mutation or condition blocks transporters in Golgi-like structures (unlike frequent obtained blocks at the ER).

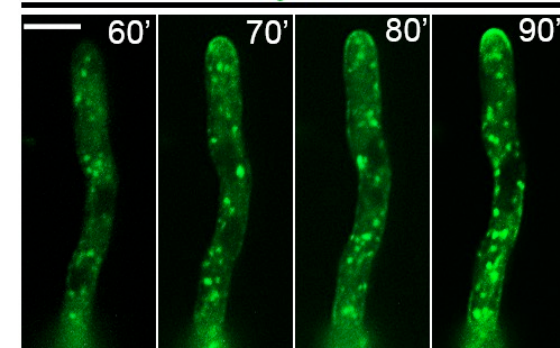
In vivo trafficking of polar & non-polar membrane cargoes

UapA



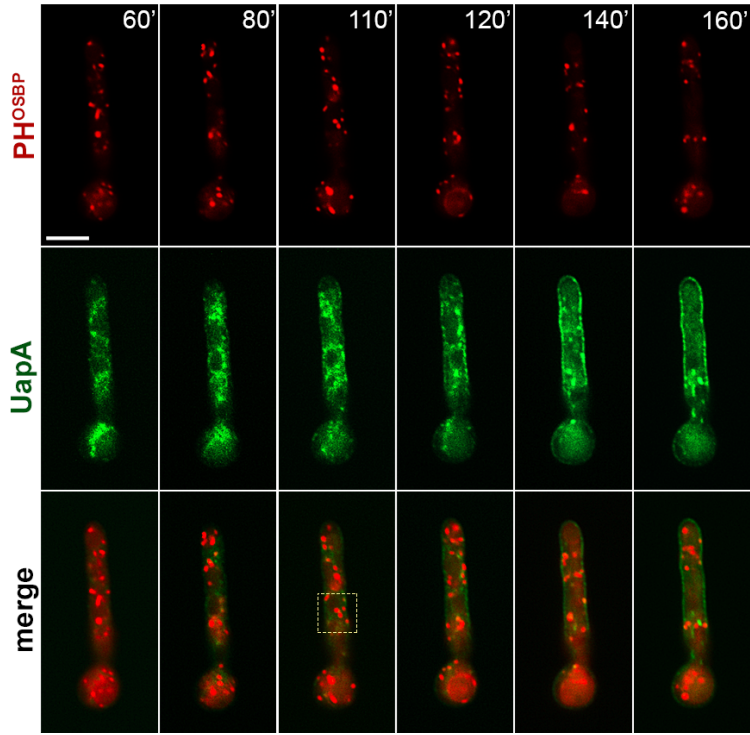
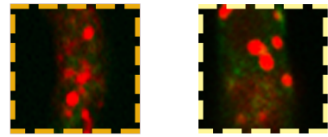
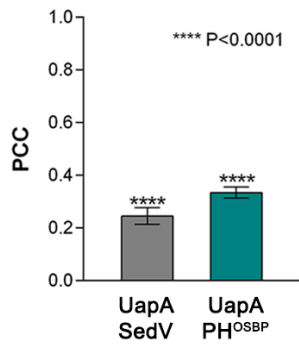
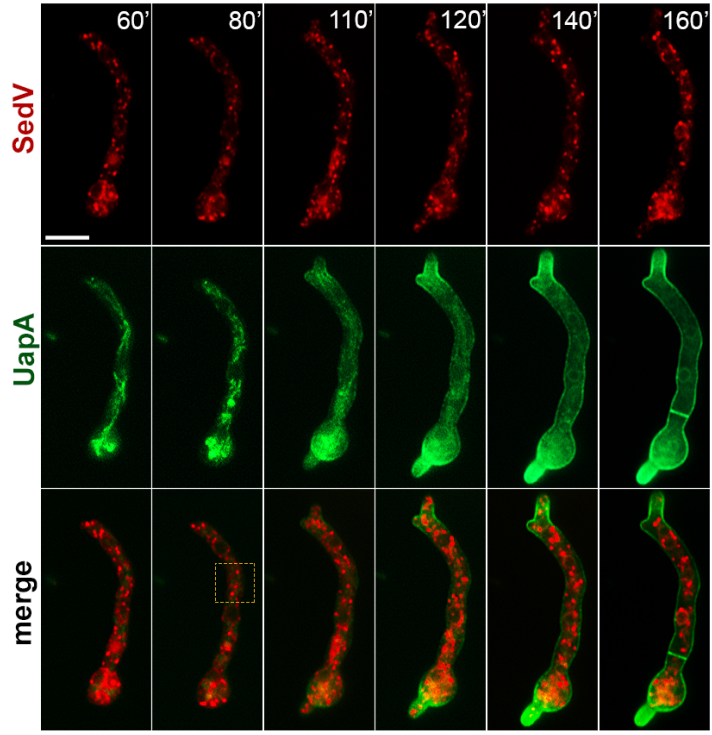
← Unconventional pathway ??

SynA

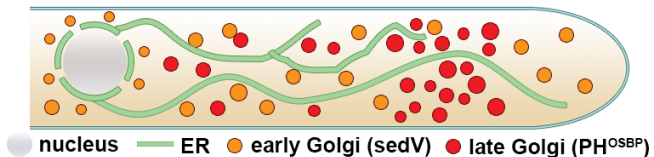
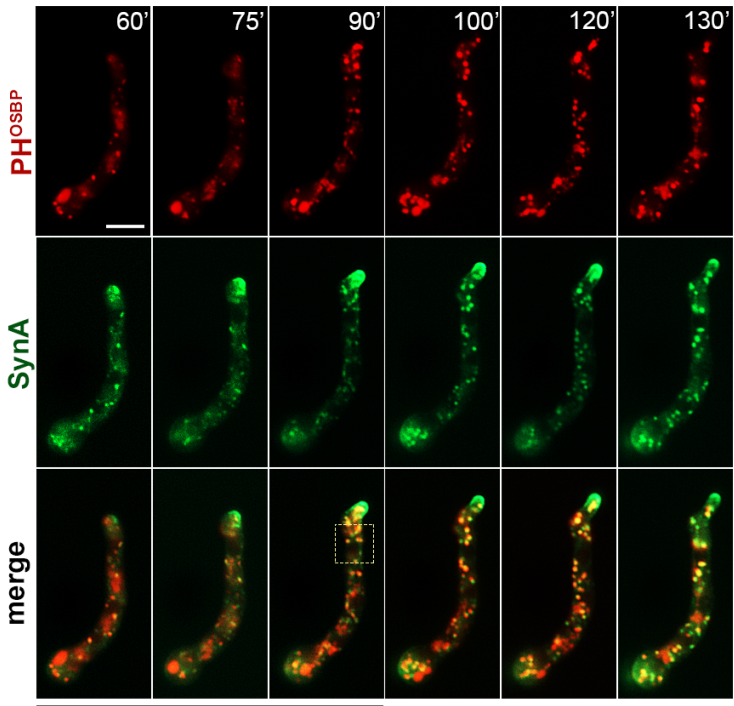
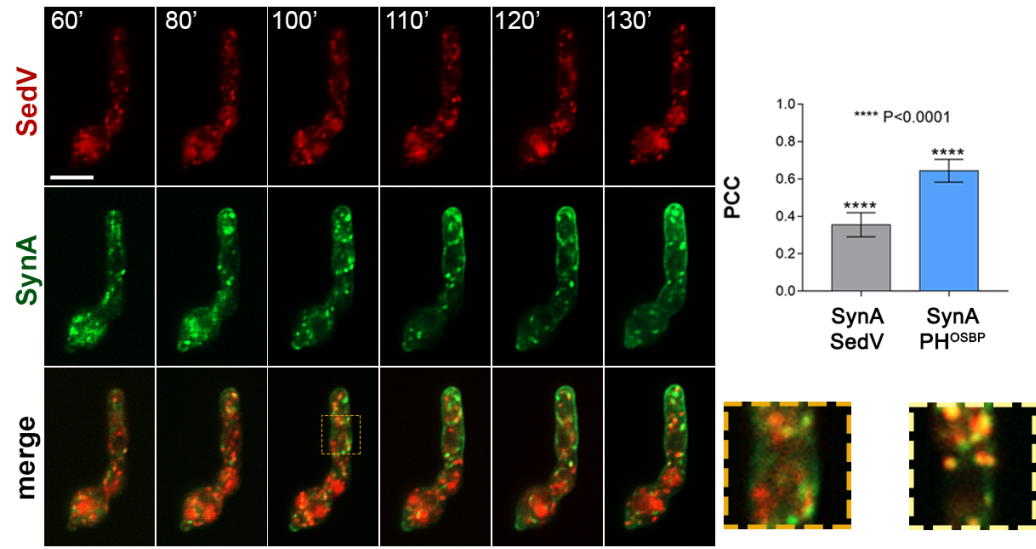


Conventional Golgi-dependent pathway →

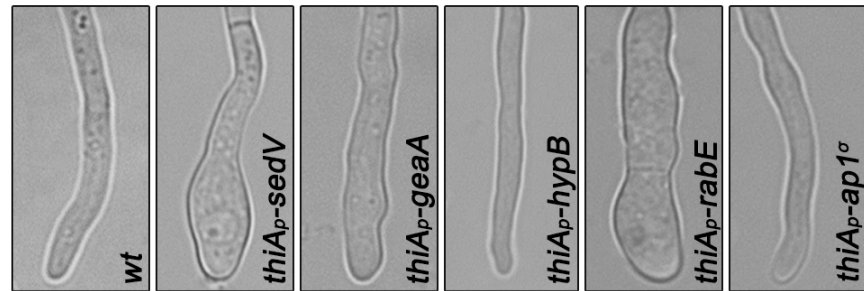
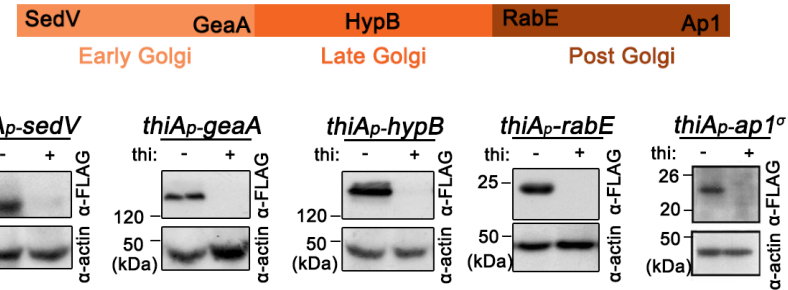
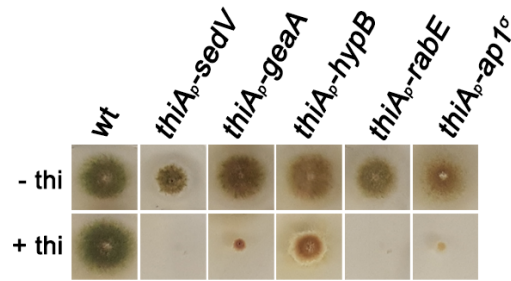
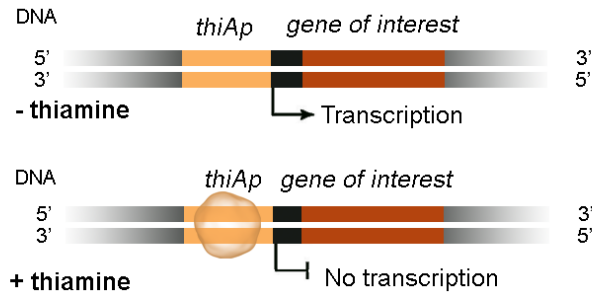
Neosynthesized UapA does not co-localize with Golgi markers



.. but SynA co-localizes with late Golgi markers

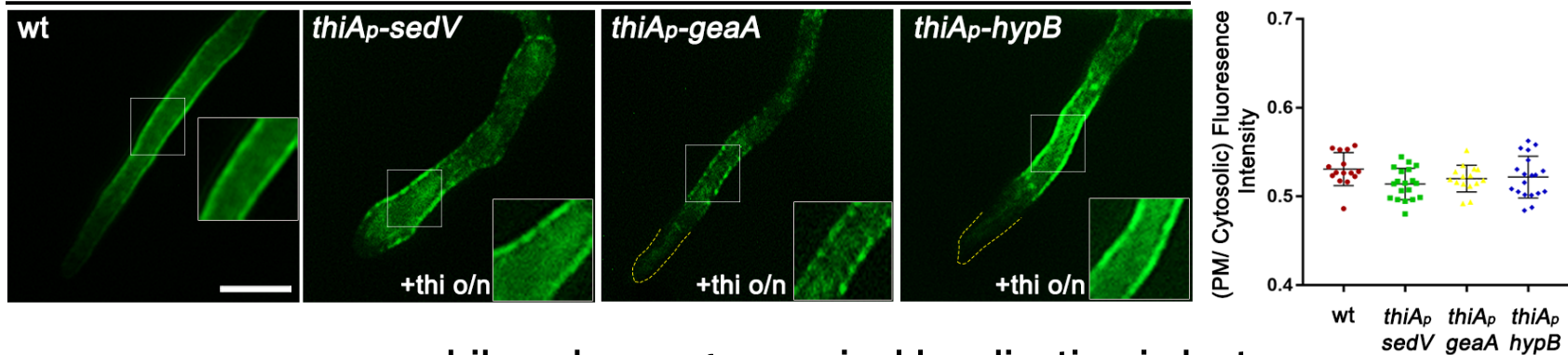


Our system for following the trafficking of newly made transporters & polar cargoes

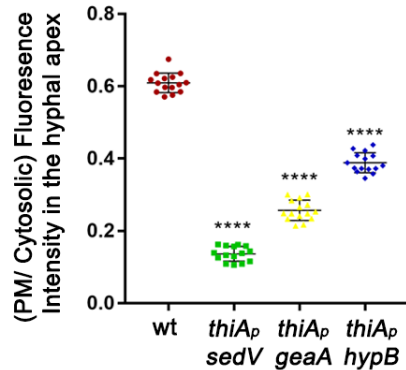


UapA is sorted to the plasma membrane (PM) when **Golgi** functioning is blocked

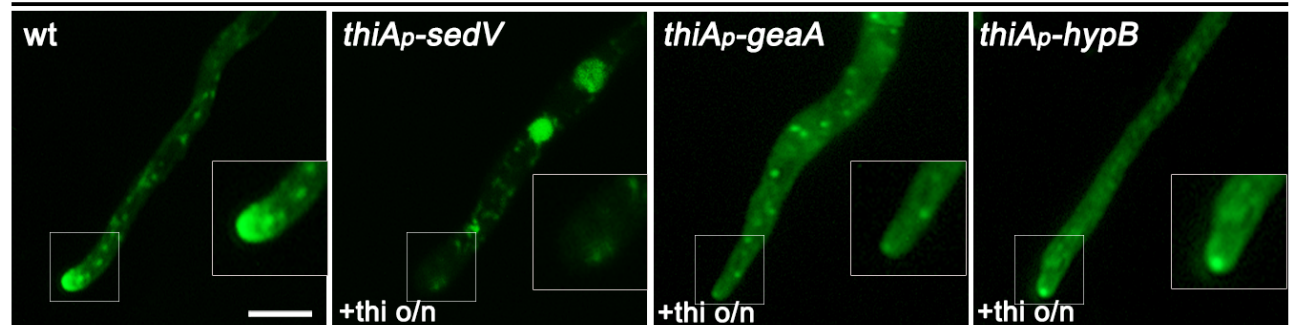
UapA



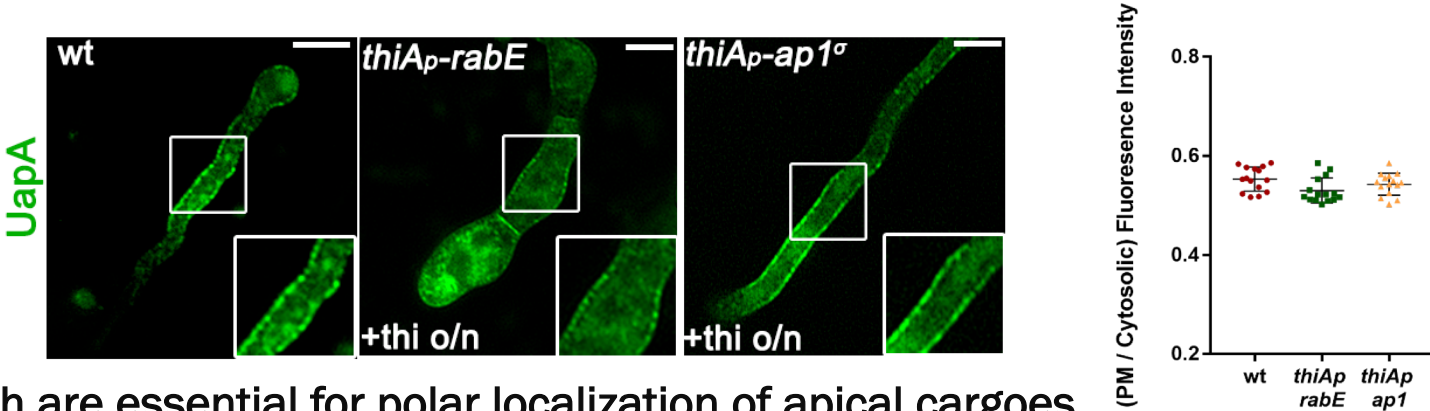
..while polar cargoes apical localization is lost



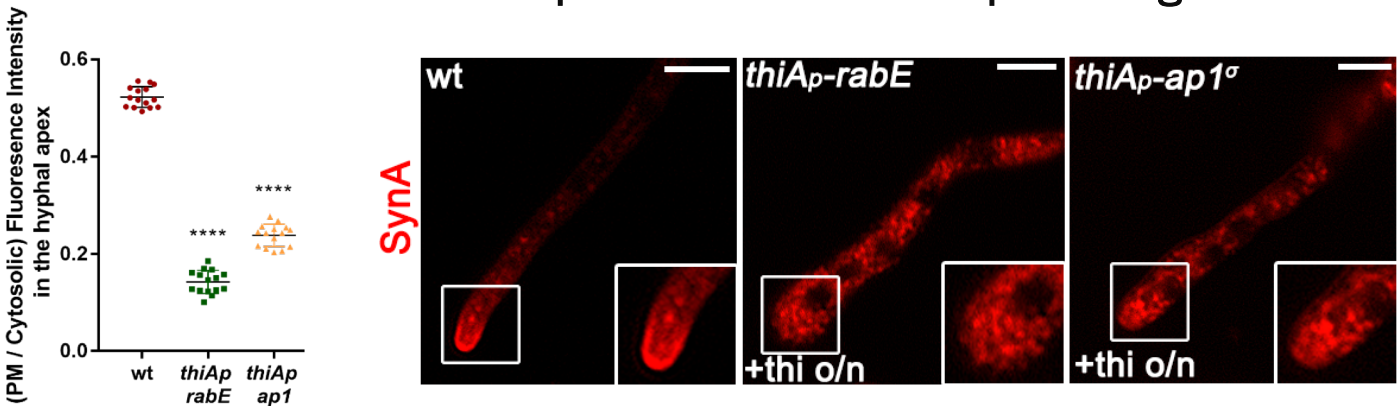
SynA



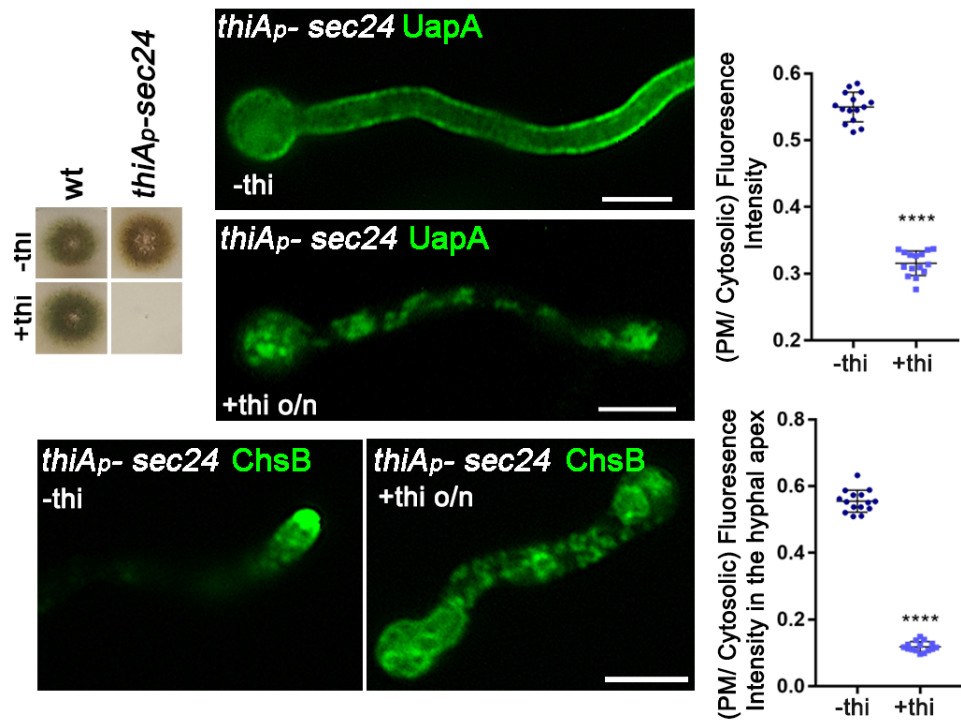
Sorting of UapA to the PM does not require conventional post-Golgi factors



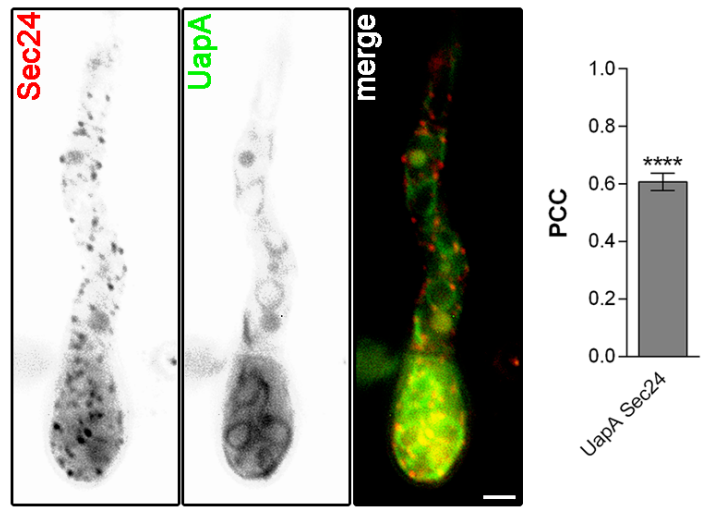
...which are essential for polar localization of apical cargoes



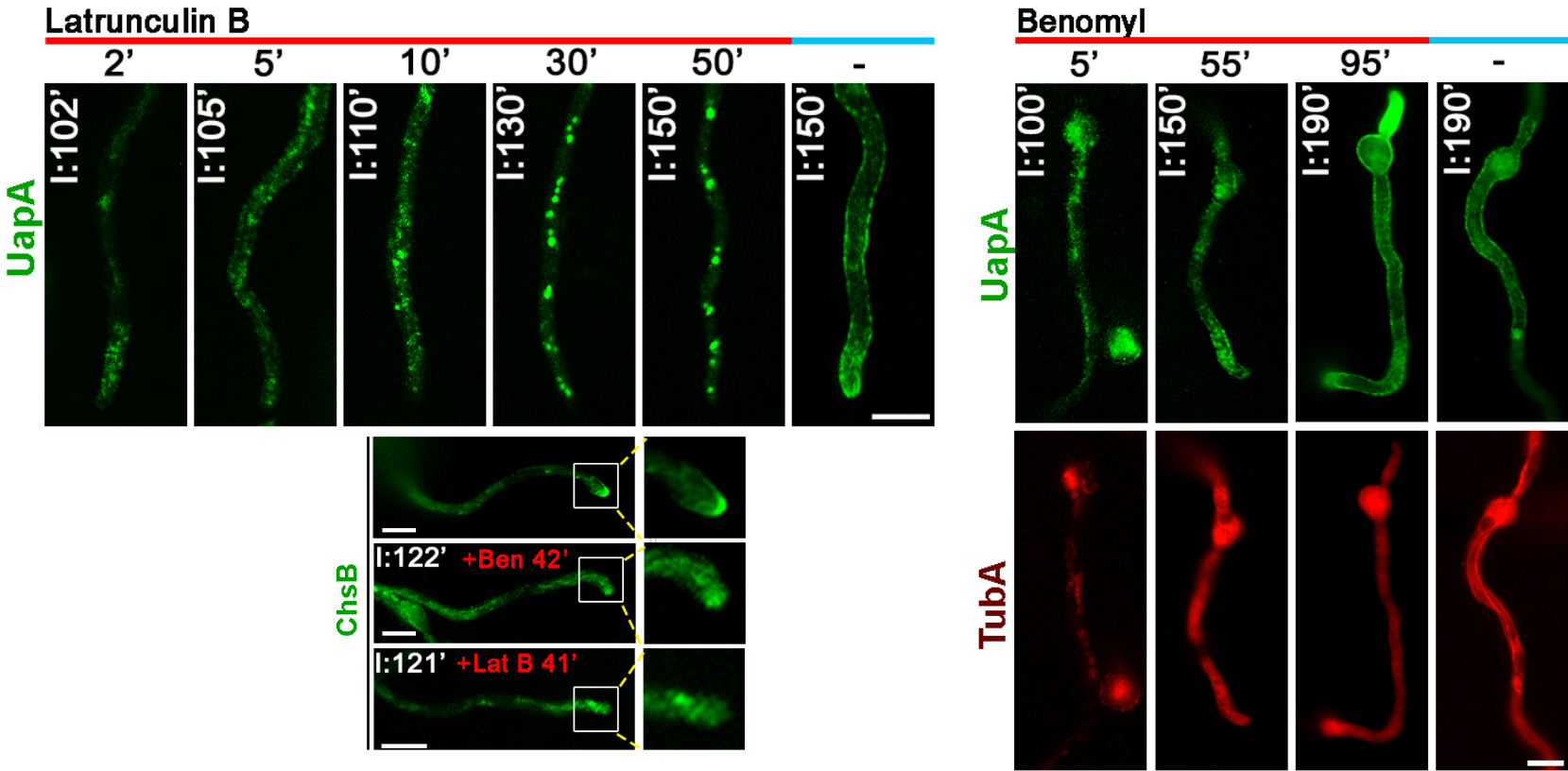
UapA translocation to the PM is COPII-dependent



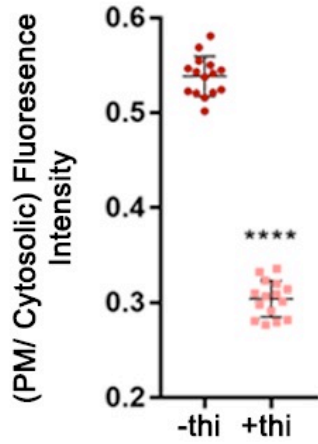
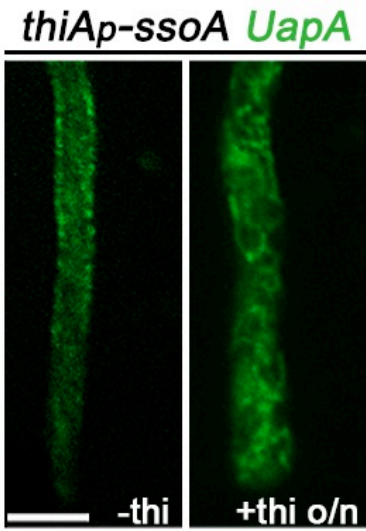
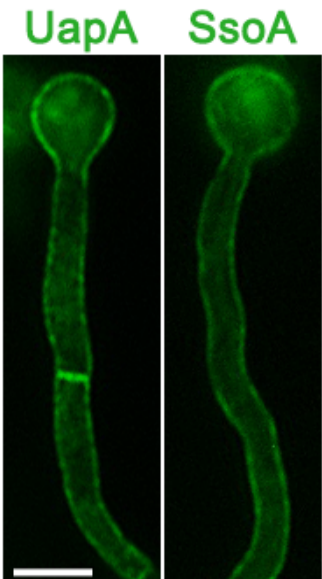
UapA colocalizes with Eres (Sec24)



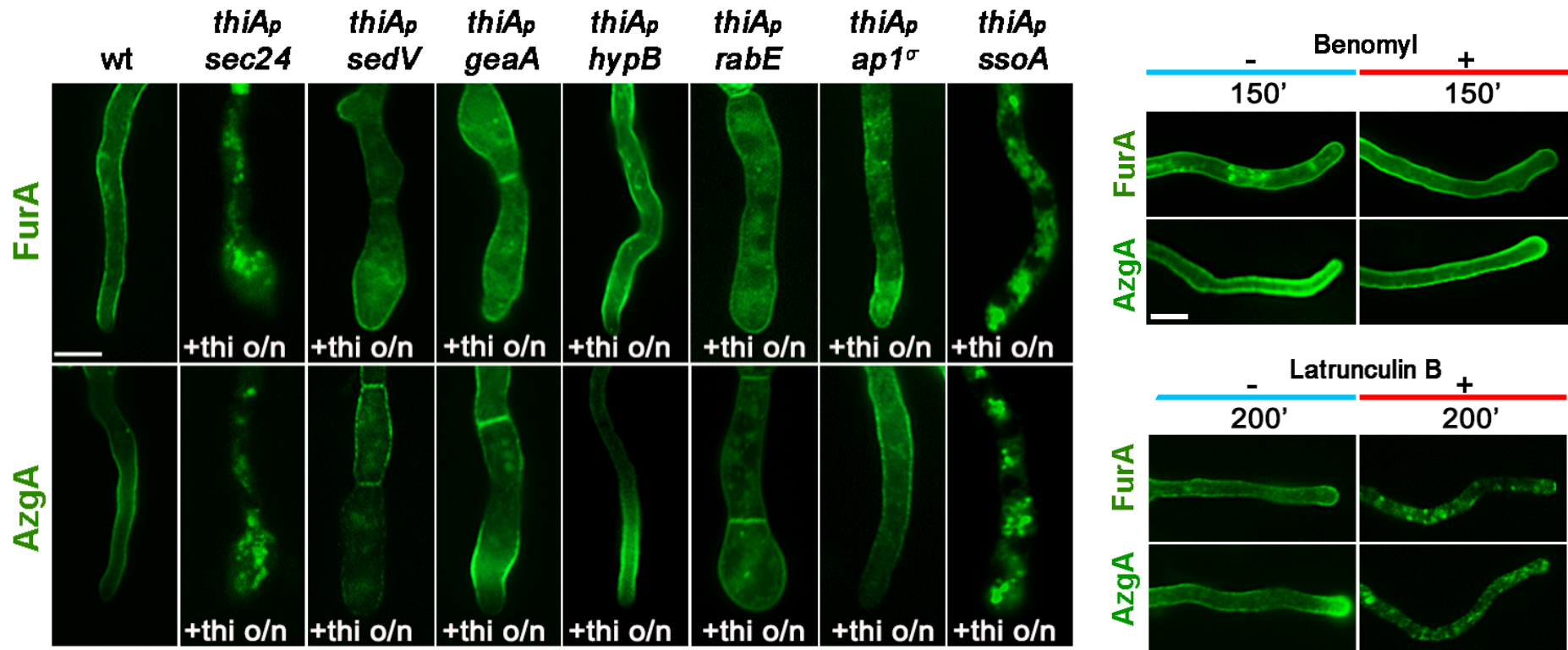
UapA translocation to the PM is actin-**dependent** but microtubule **independent**



UapA translocation to the PM is SsoA-dependent

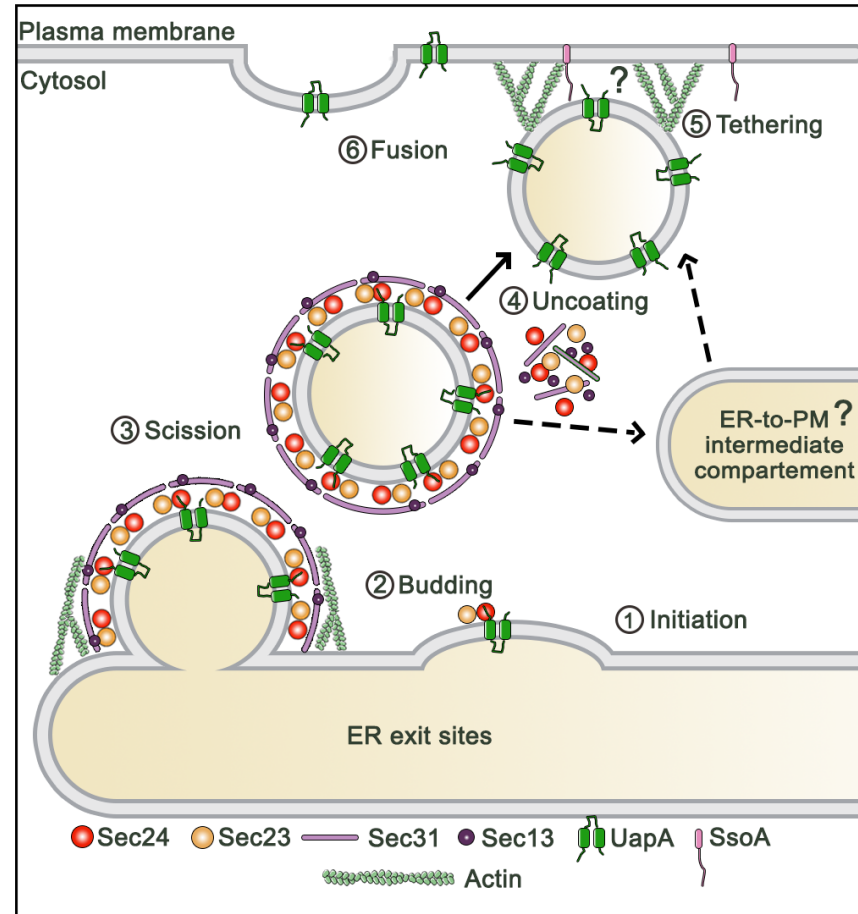


Other nutrient transporters follow the same route



Conclusion

- Sorting of UAPA & other nutrient transporters to the PM of *A. nidulans* occurs via Golgi bypass
- Transporter sorting requires COPII, actin & the t-SNARE SSoA
- Distinct COPII subpopulations? How?
- Cargo-centric mechanism?
- The sorting route discovered might prove to be a major conventional pathway for transporters and other house-keeping membrane proteins





Aspergillus genetics Lab

George Dhallinas, PI

Sotiris Amillis

Olga Martzoukou

Mariangela Dionysopoulou

Vangelis Bouris



Thank you for your attention!



FONDATION SANTÉ