



## THE EFFECTS OF POLYAMINE DURING THE POLARIZED CELL GROWTH OF POLLEN TUBE

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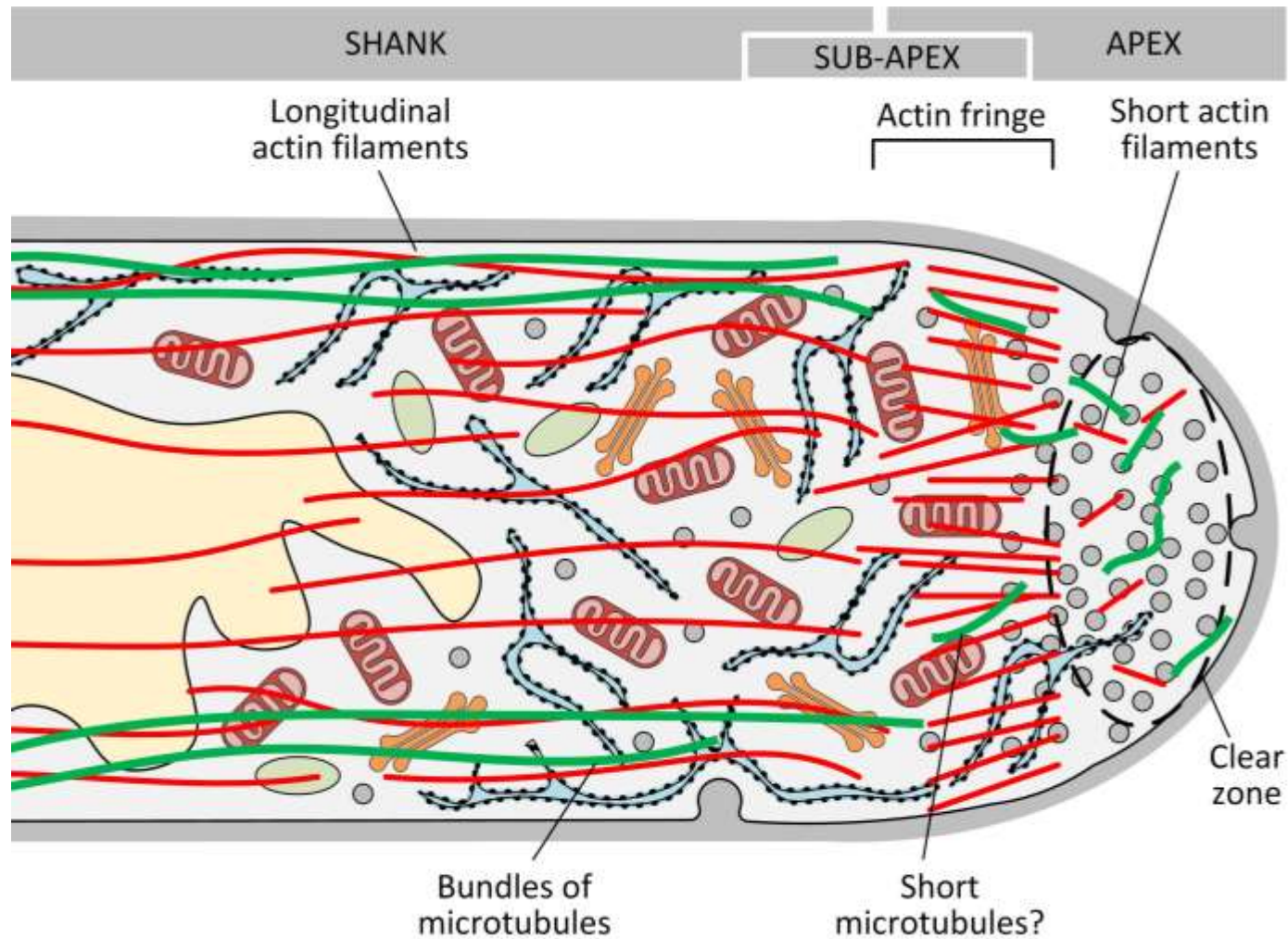
# The effects of polyamines during polarized cell growth of pollen tubes

I. Aloisi, **G. Cai**, L. Navazio, S. Del Duca

111° Congresso della Società Botanica Italiana

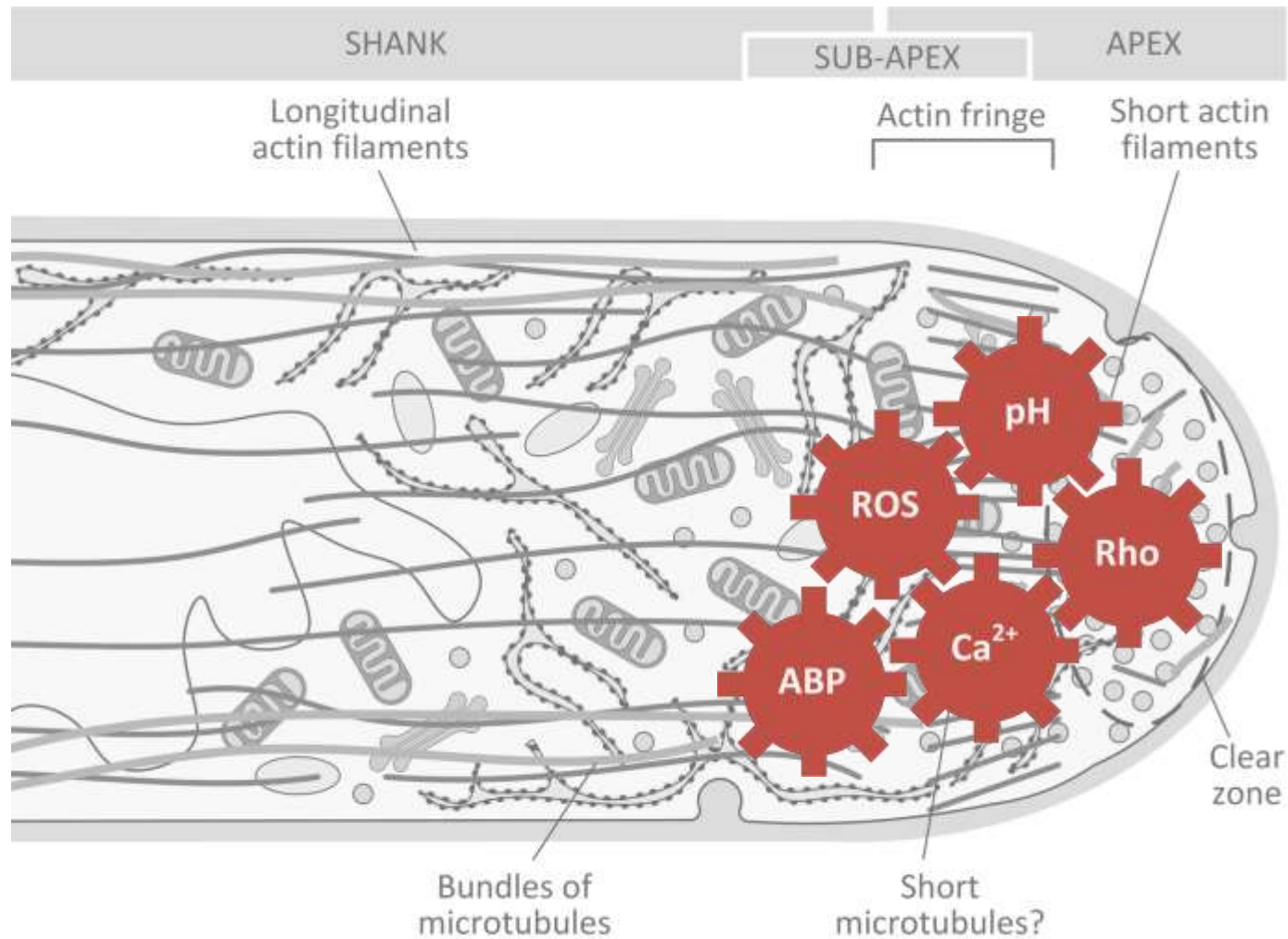
Roma, Tor Vergata, 21-23 September 2016

# The polarized structure of pollen tubes

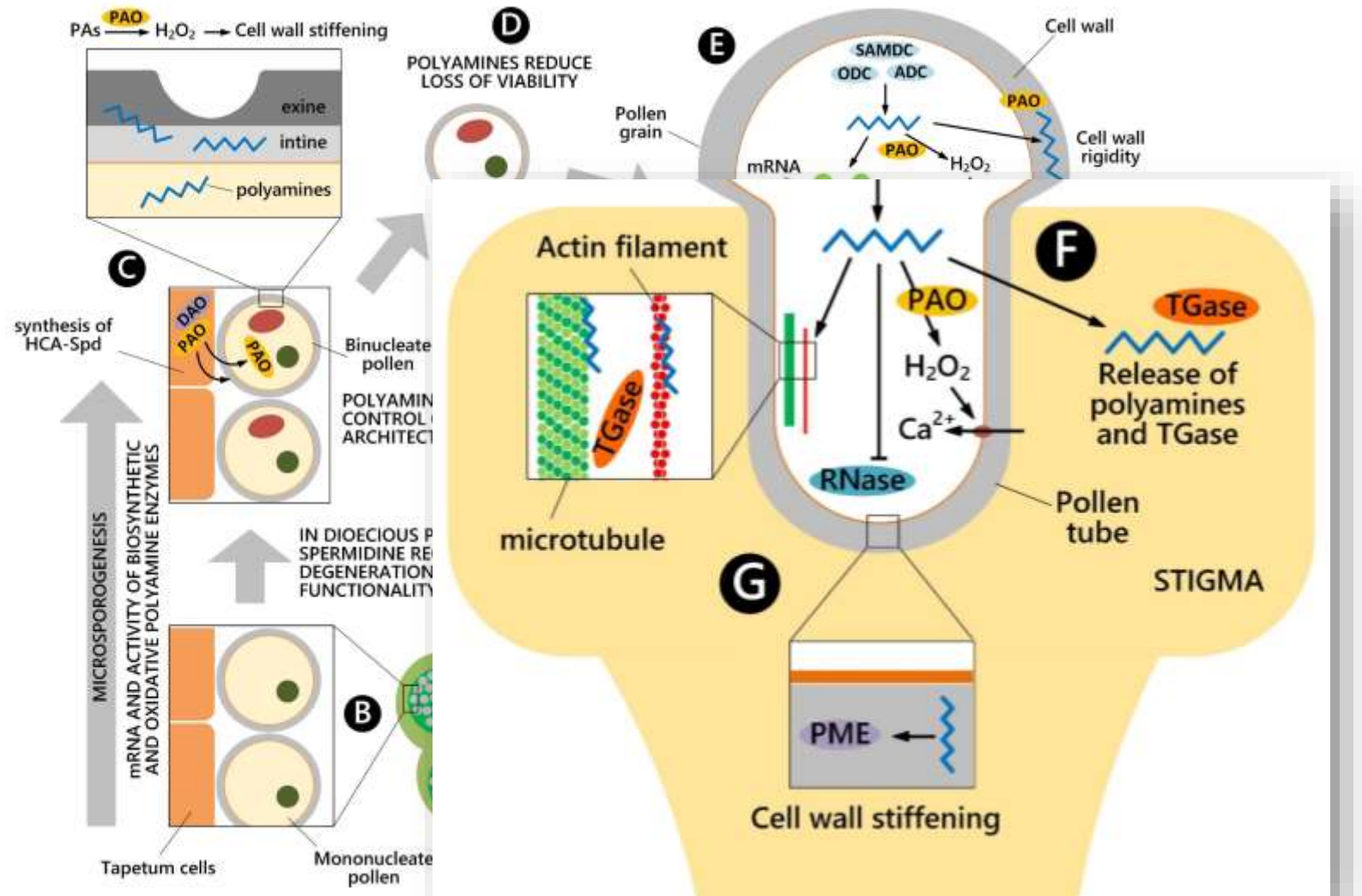


Cai, G., Parrotta, L., & Cresti, M. (2015). *Journal of Integrative Plant Biology*, 57(1), 63-78

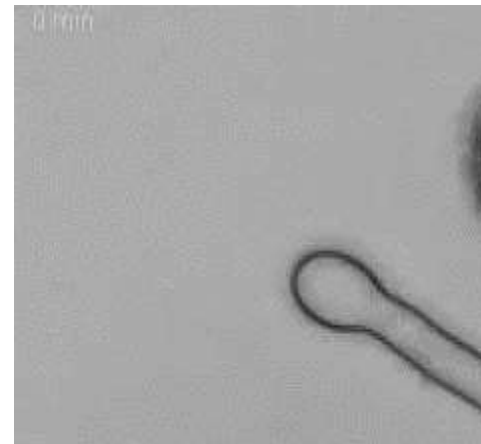
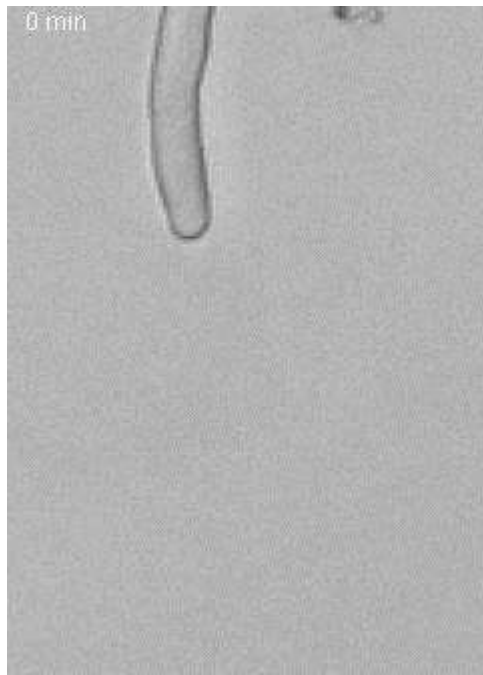
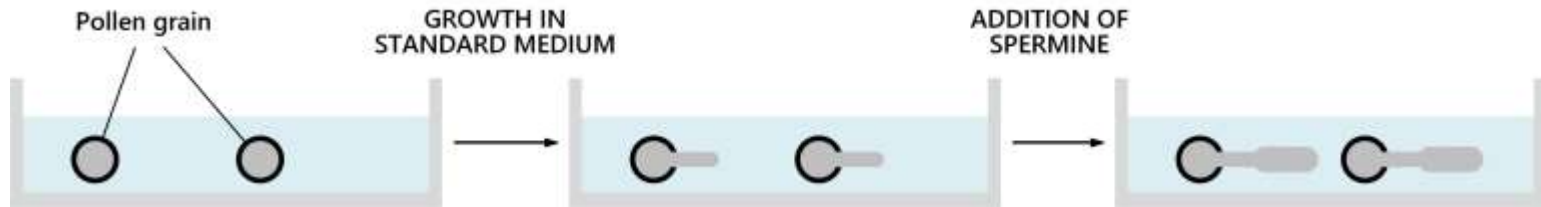
# The polarized structure of pollen tubes is determined by a «control center»



# The multifaceted role of polyamines during pollen development and functioning



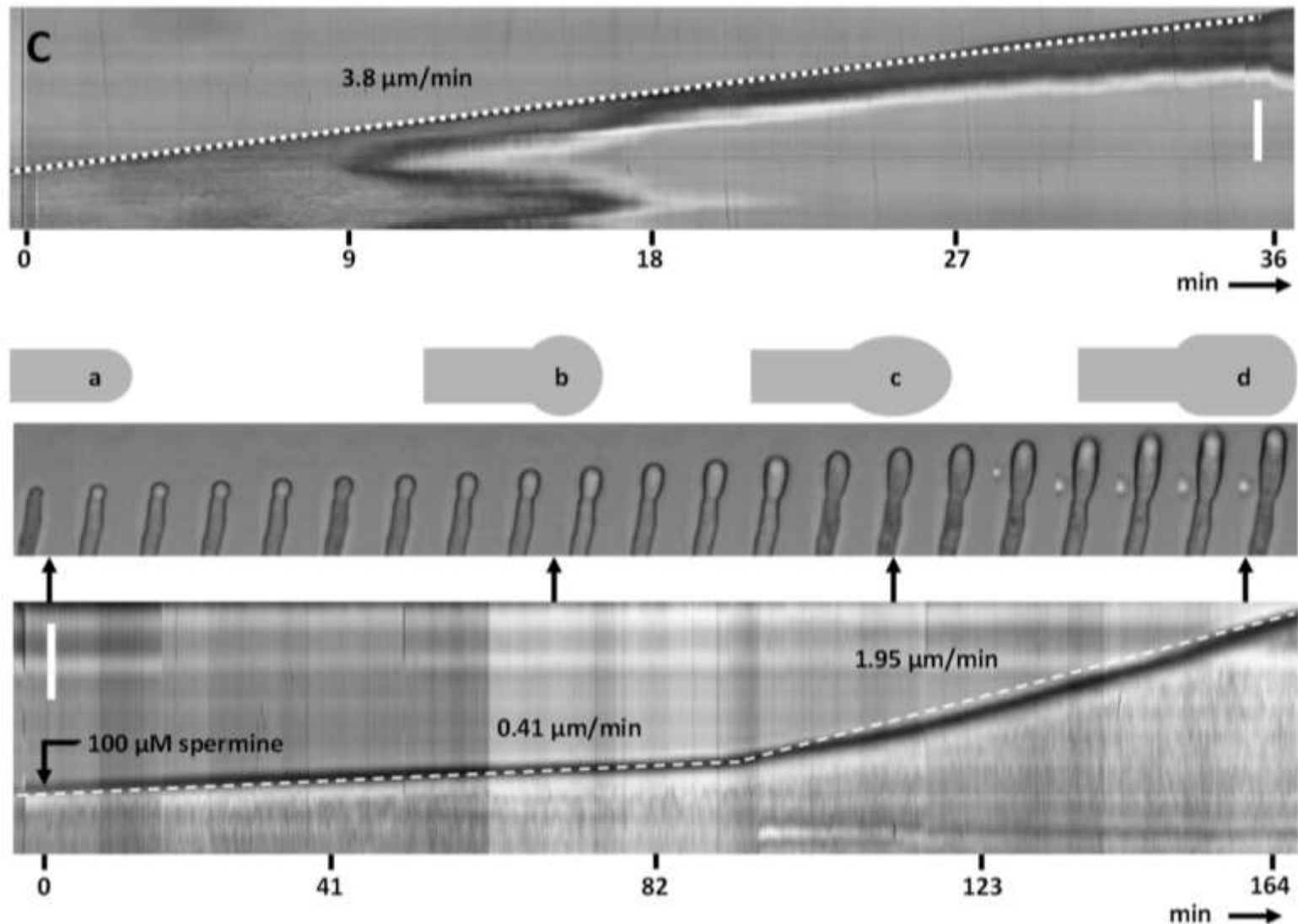
# Spermine modifies the morphology of pollen tubes



**1 frame/min, speed 120X**

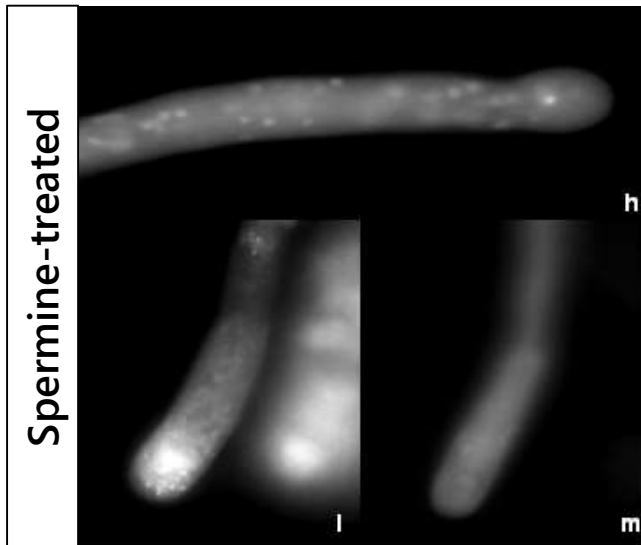
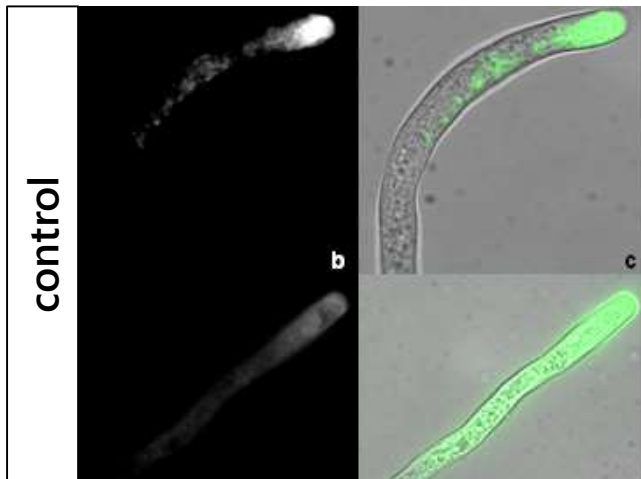


# Spermine also changes the growth speed of pear pollen tubes

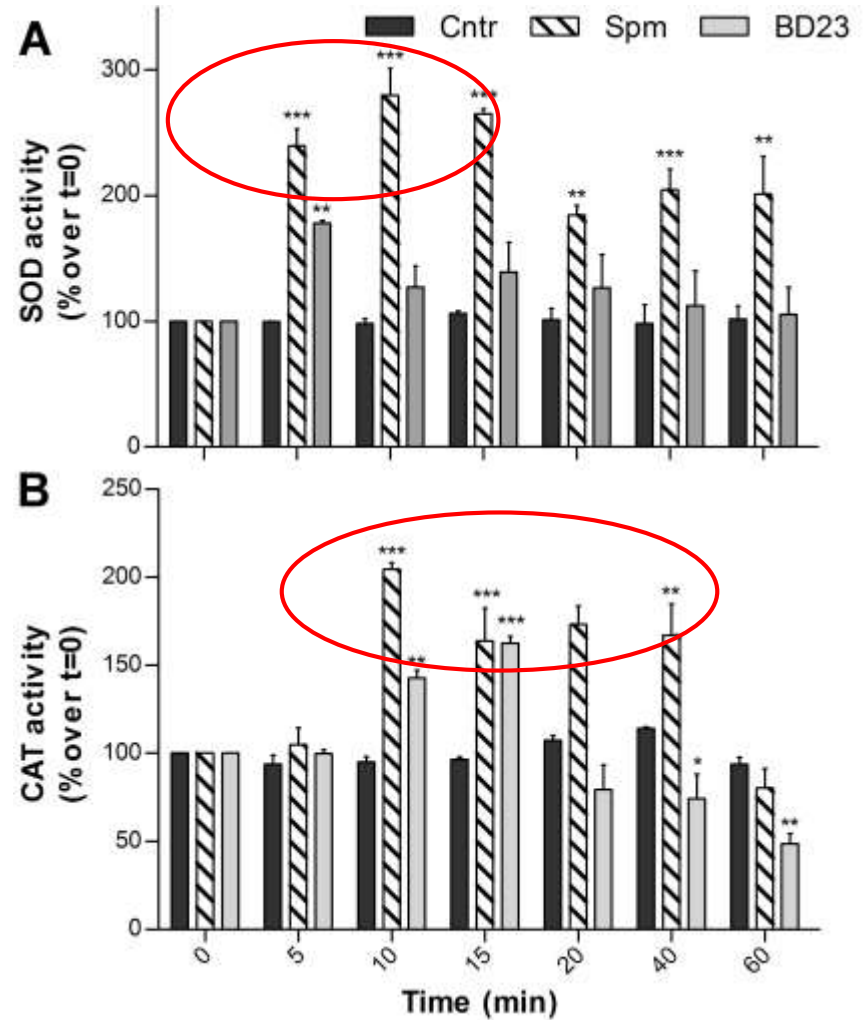


# Changes to growth and morphology of pollen tubes are accompanied by modifications in ROS levels

REACTIVE OXYGEN SPECIES

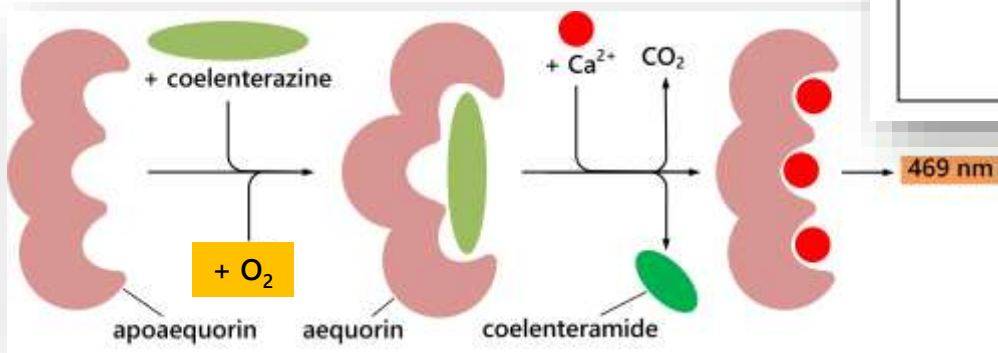
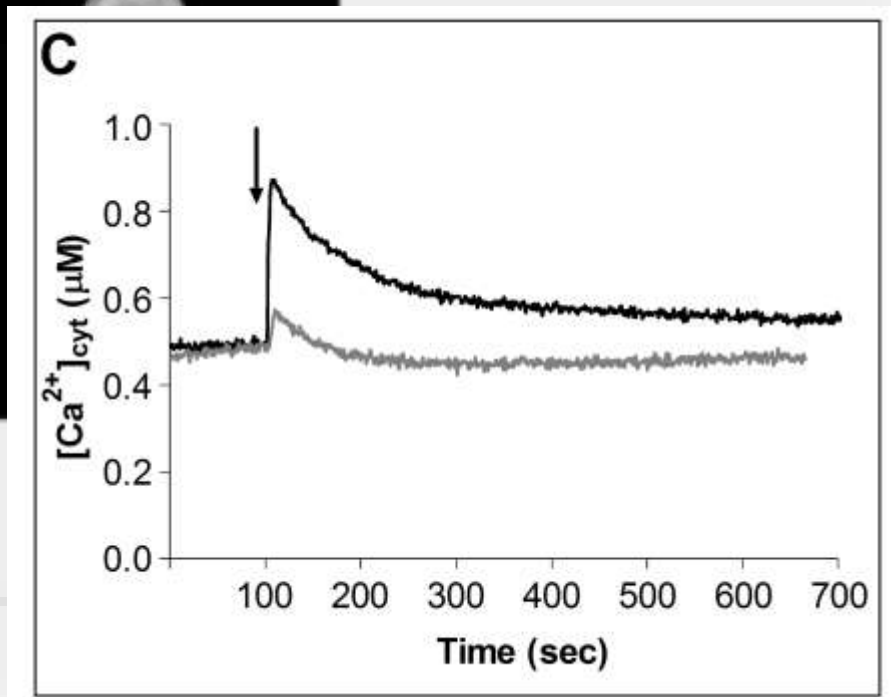
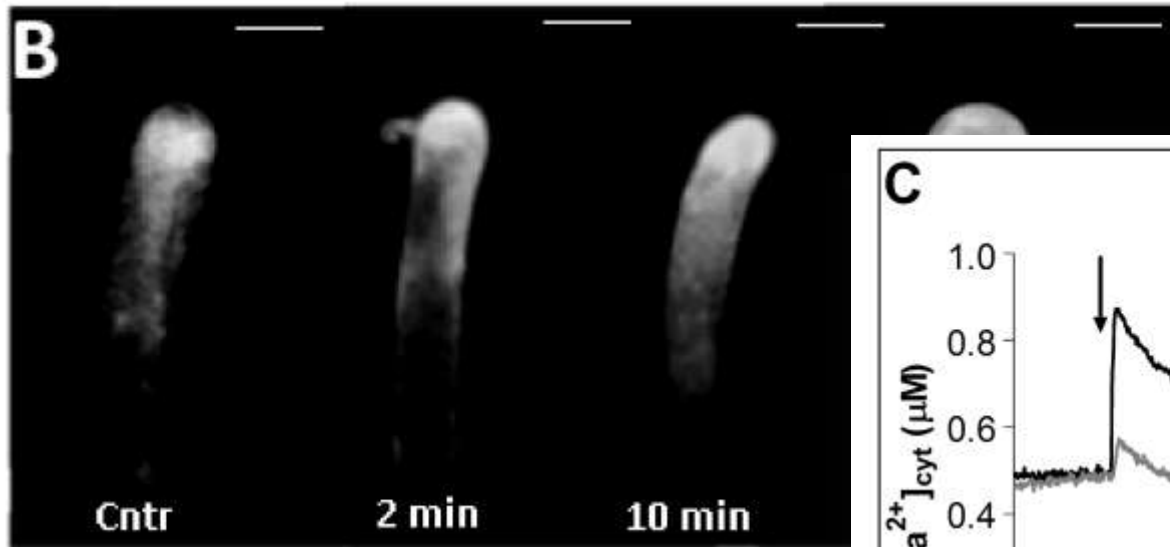


ANTI-OXIDANT ACTIVITIES



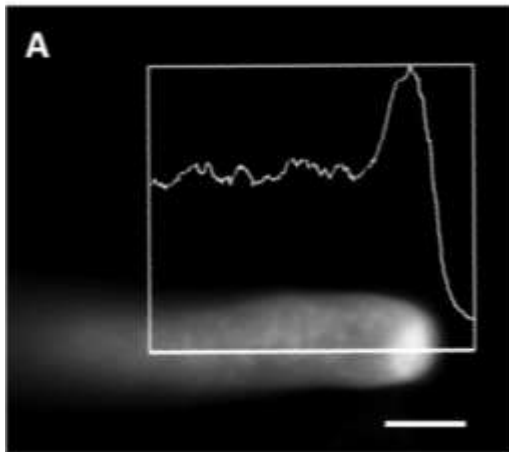


# Spermine also disrupts the tip-focused $\text{Ca}^{2+}$ gradient in germinating pollen

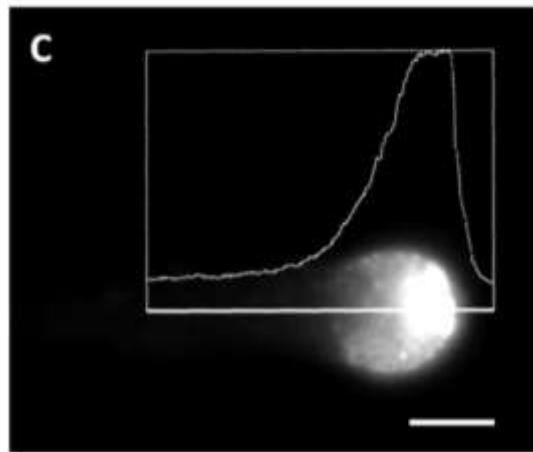


# Spermine treatment drastically alters the pH gradient at the pollen tube tip

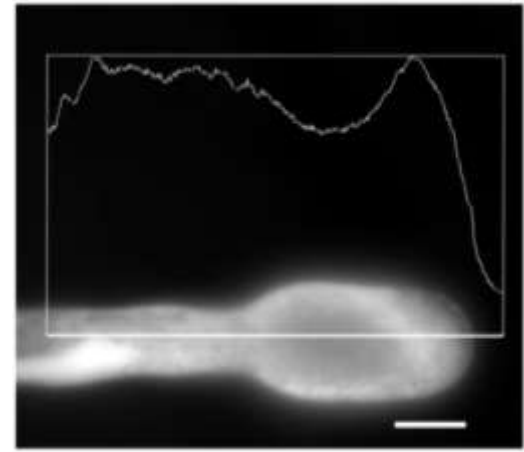
control



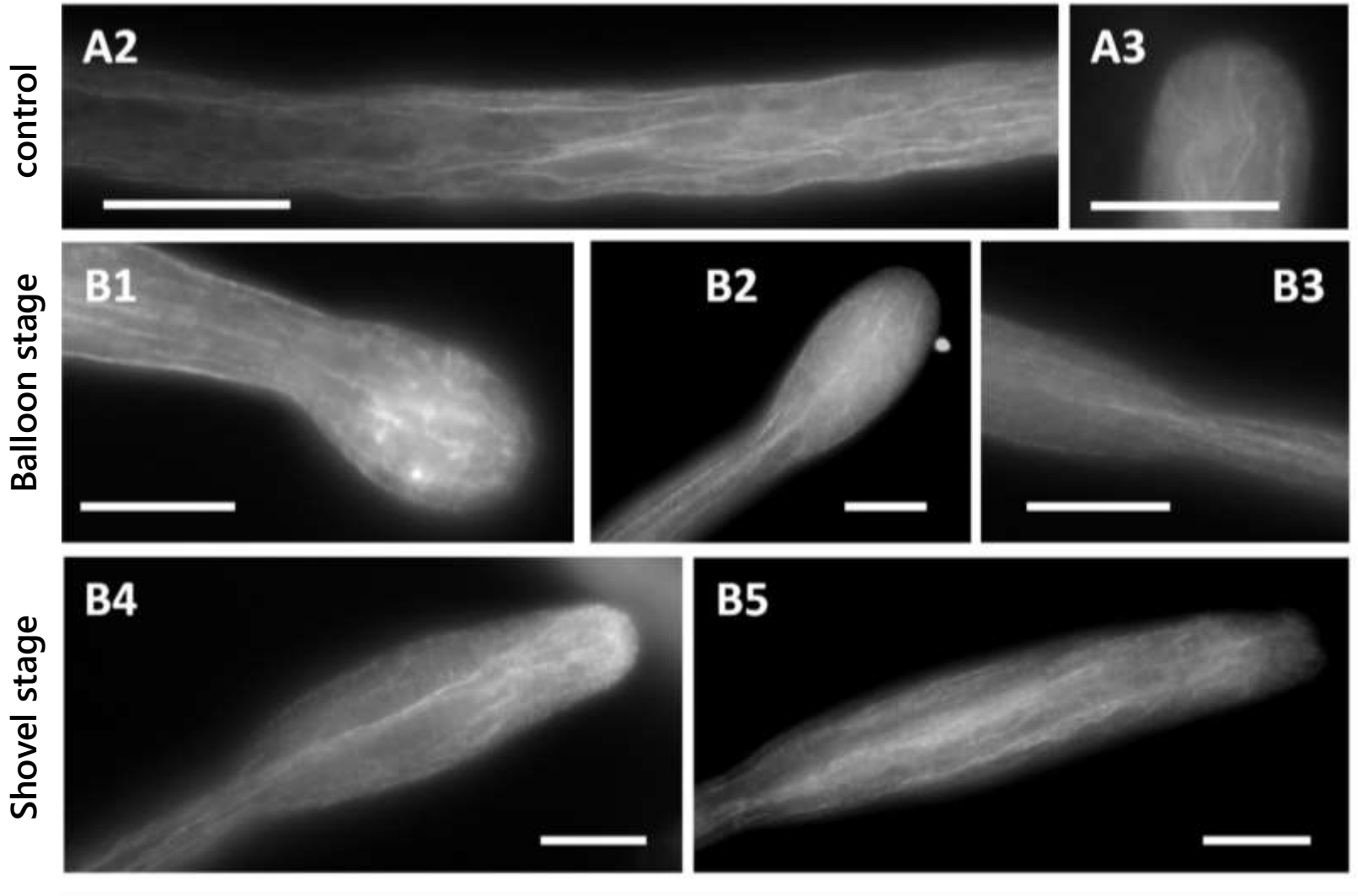
Balloon stage



Shovel stage

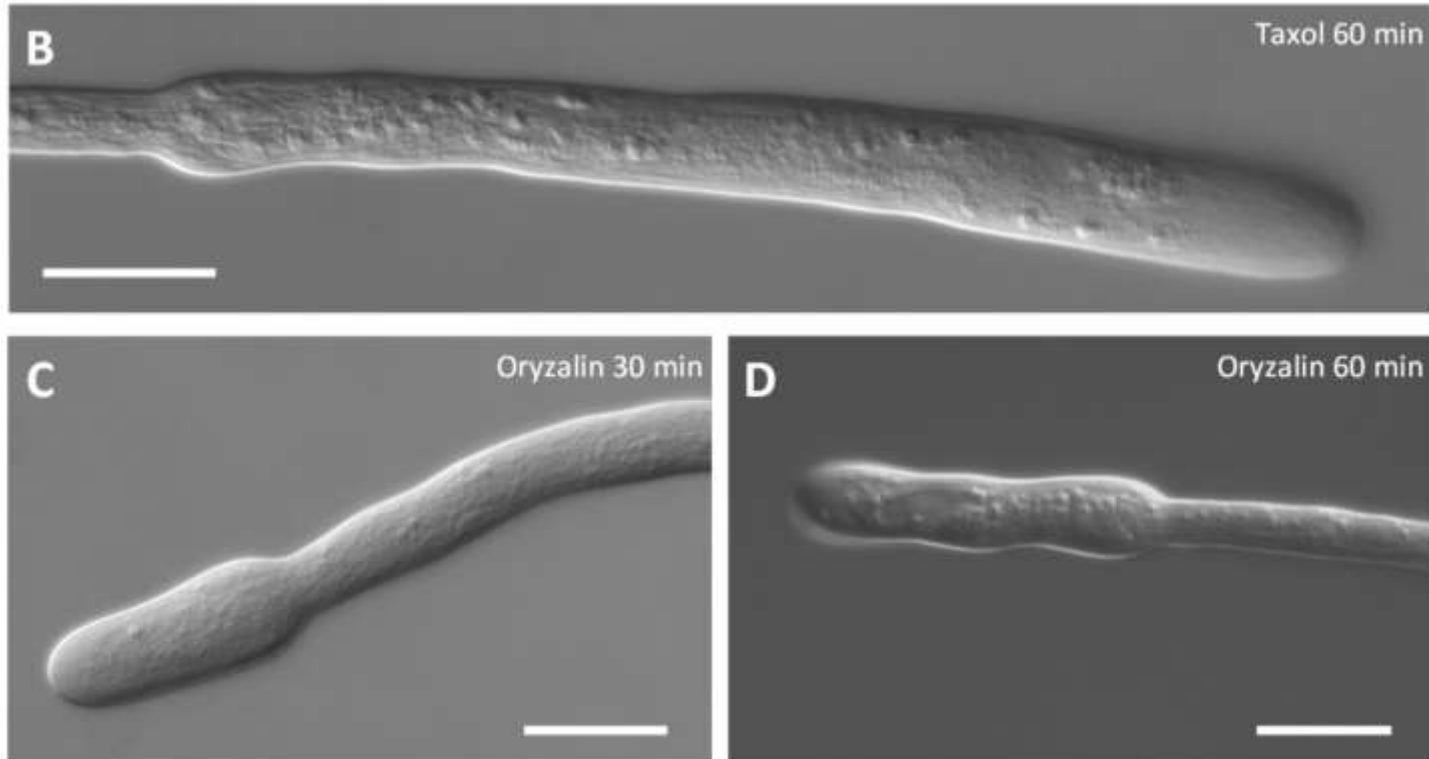


# Spermine induces changes in the actin cytoskeleton of growing pollen tubes

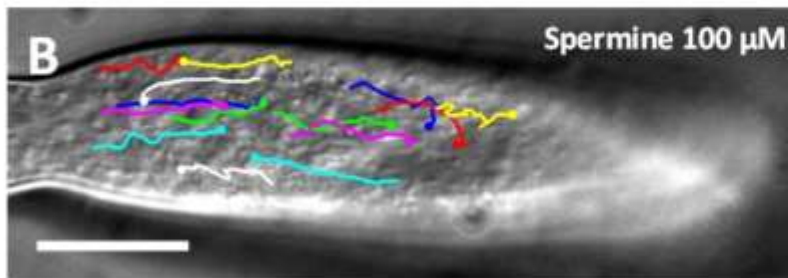
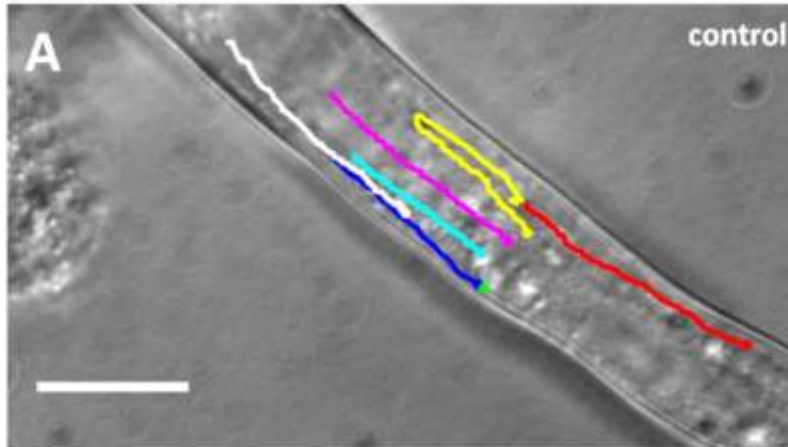


# Microtubules are not apparently involved in establishing the new growth pattern

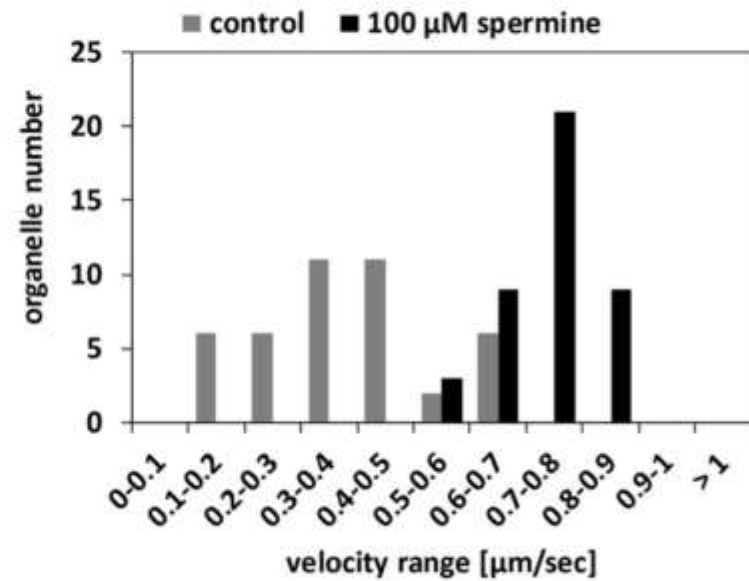
Shovel stage



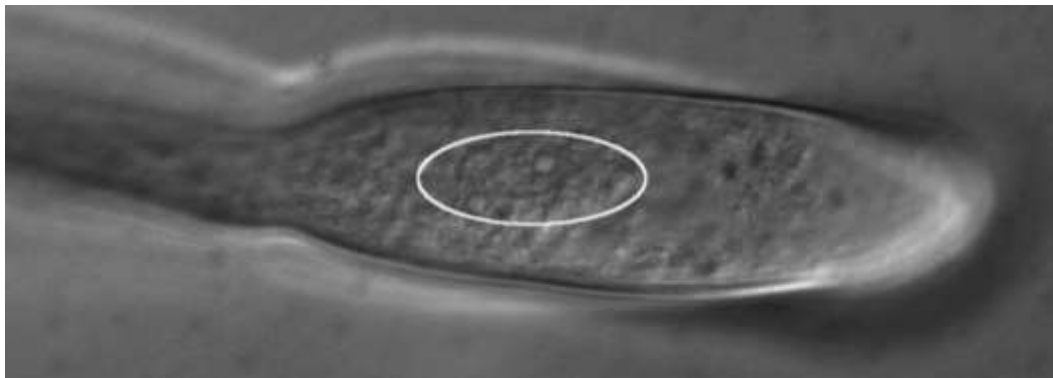
# Organelles in shovel-shaped pollen tubes move differently



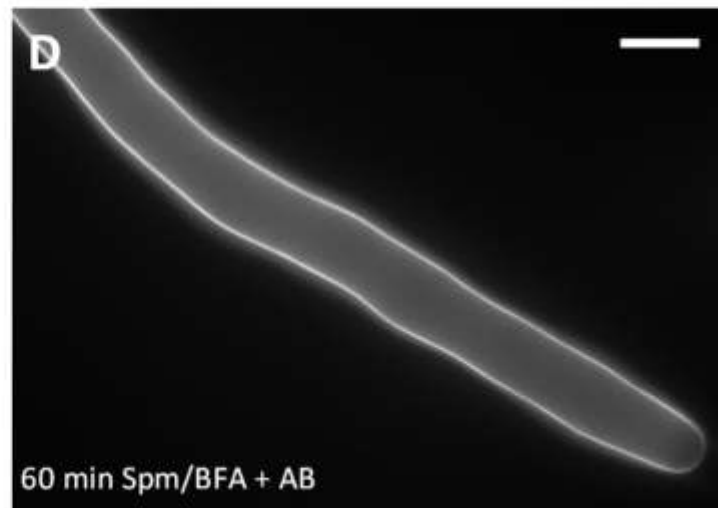
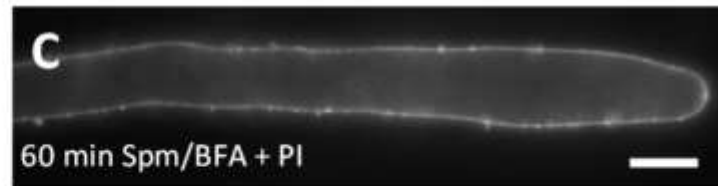
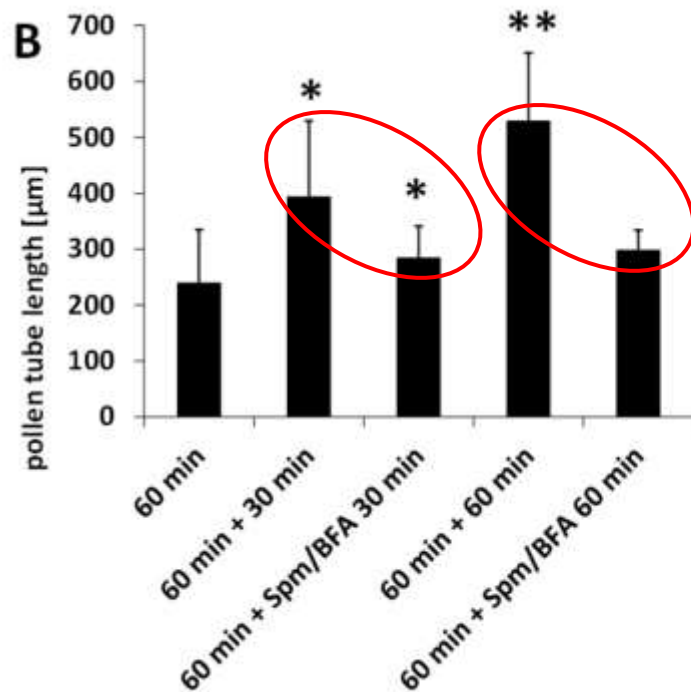
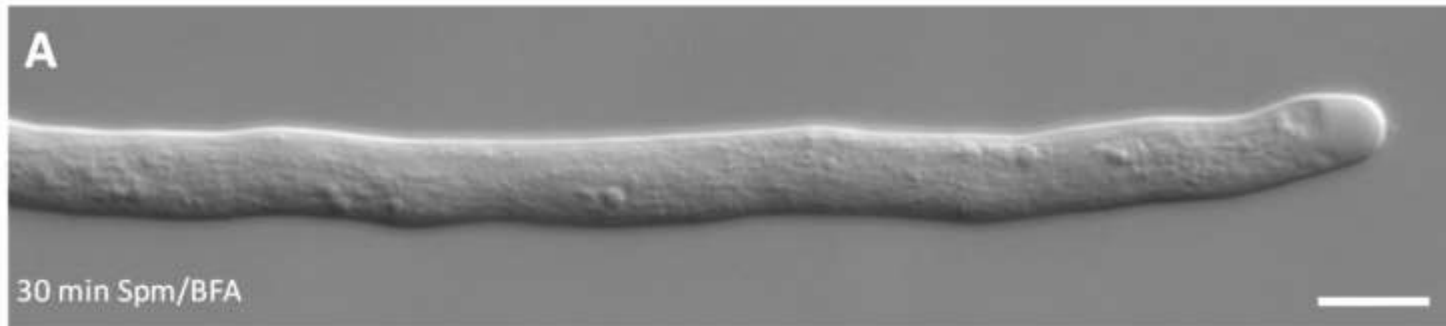
**C**



Shovel stage

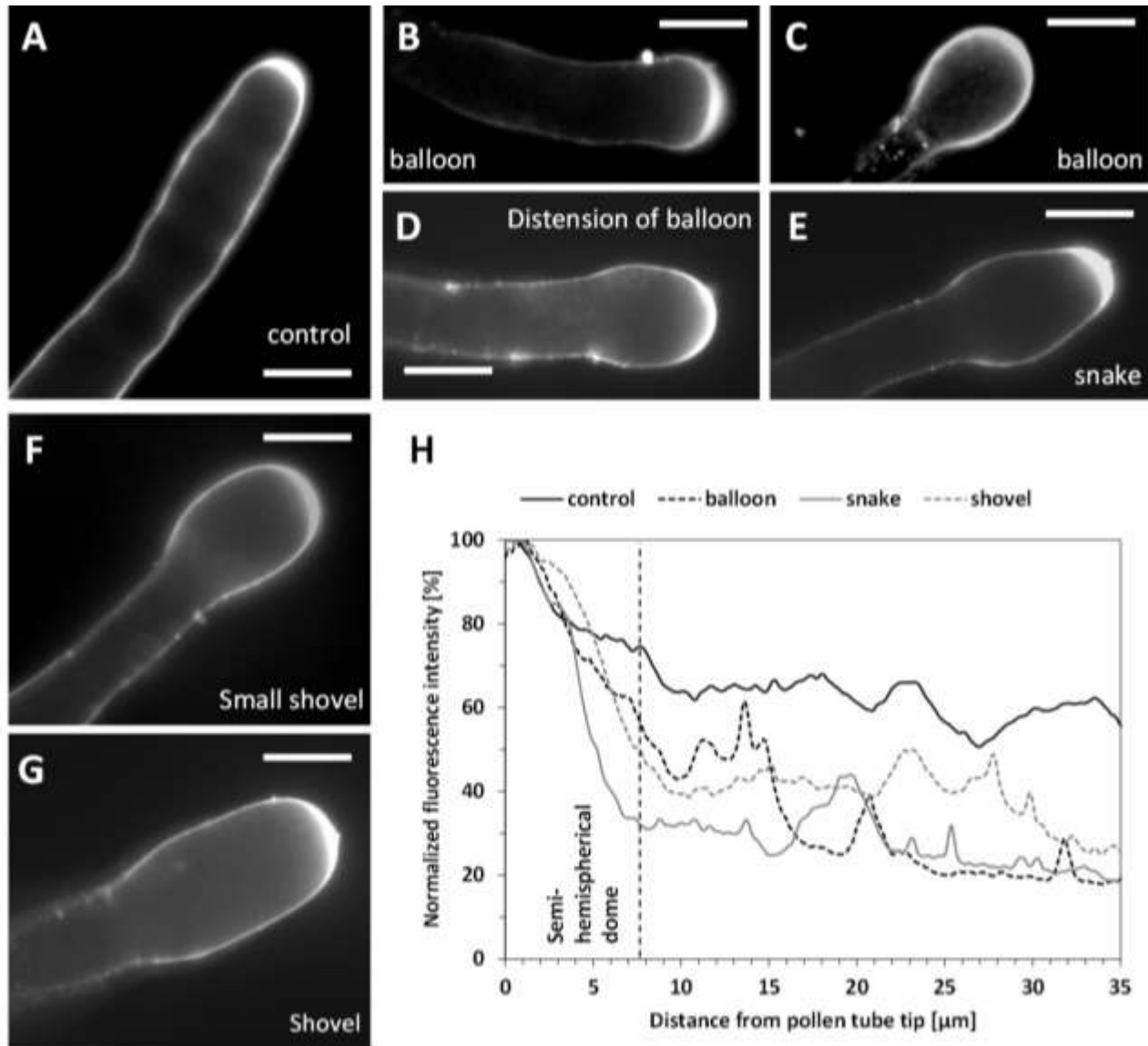


# Proper accumulation of vesicles is necessary for spermine in order to expand the apex of pollen tubes

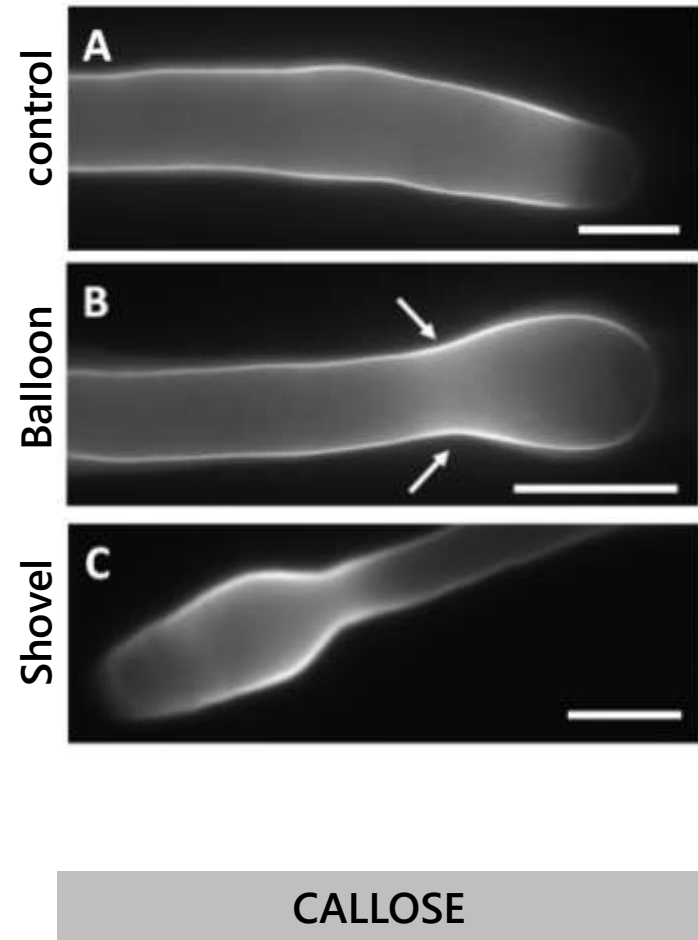
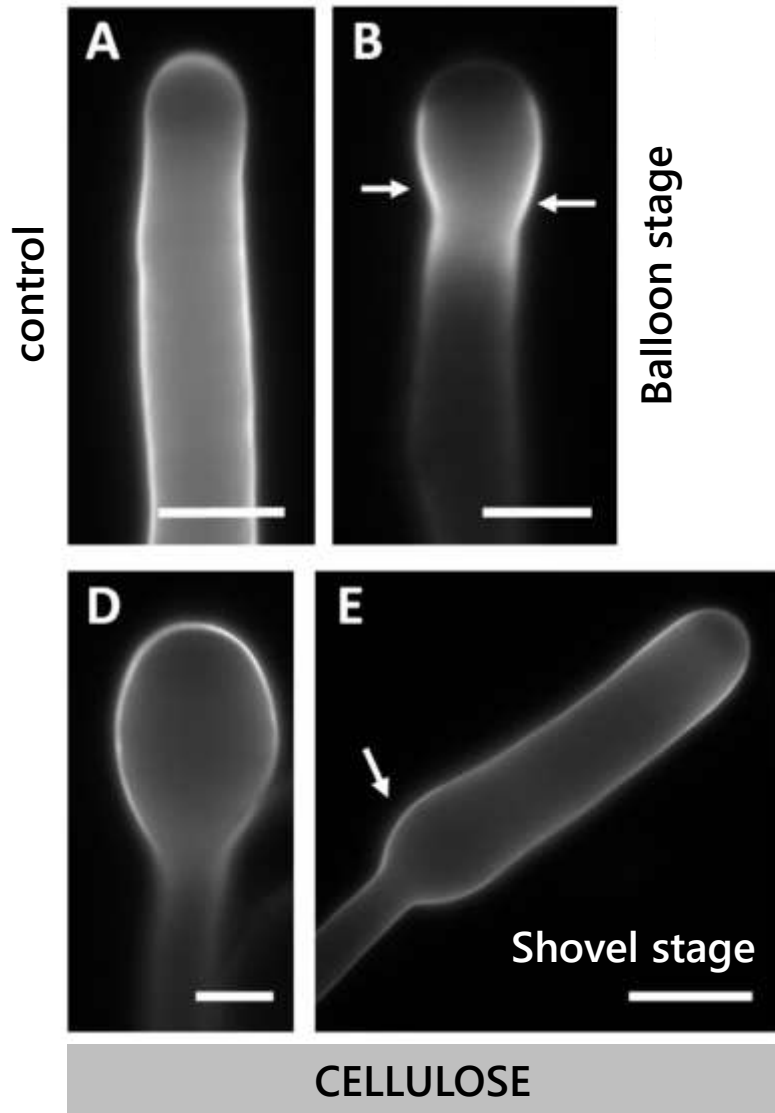




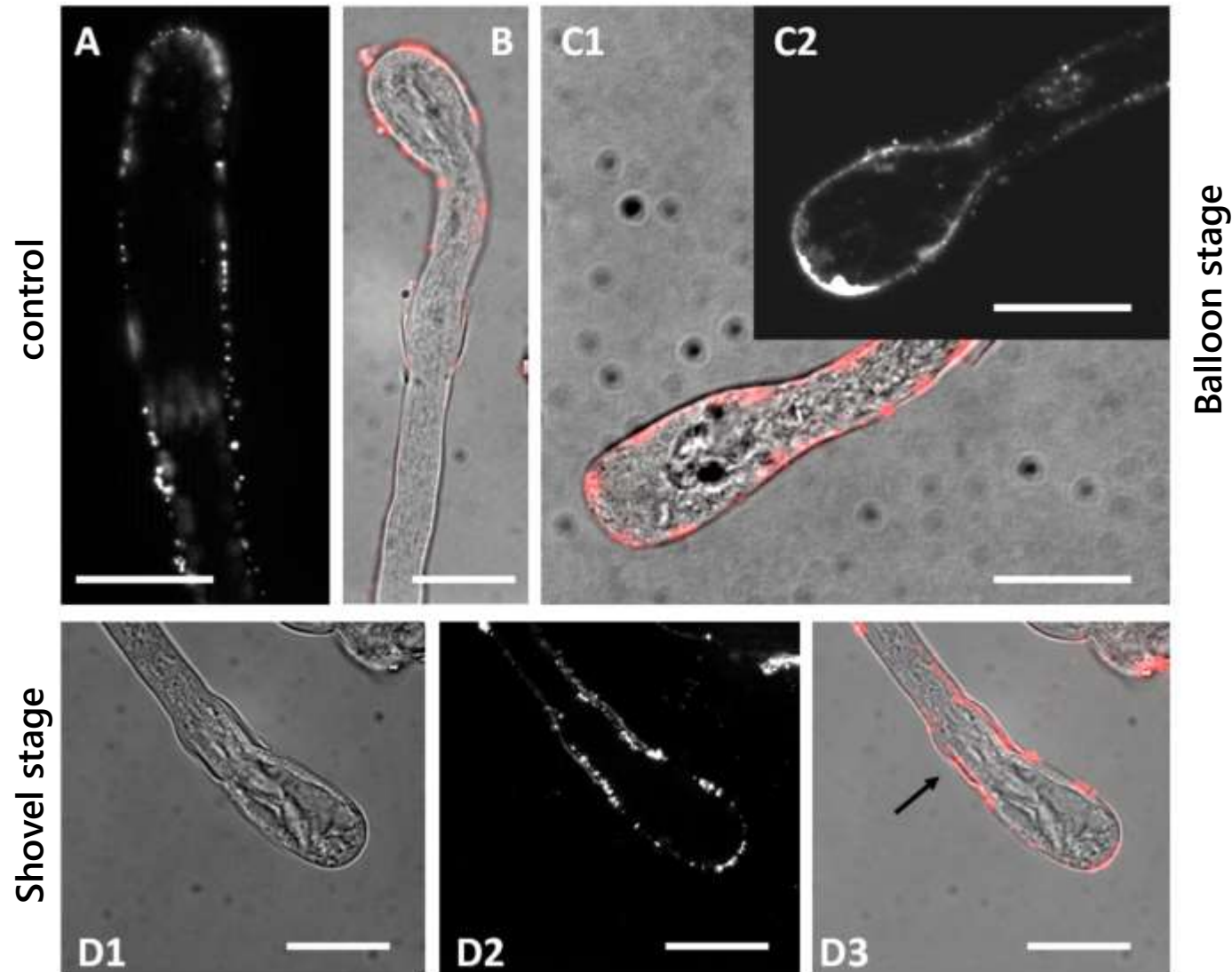
# Spermine alters the distribution of pectins



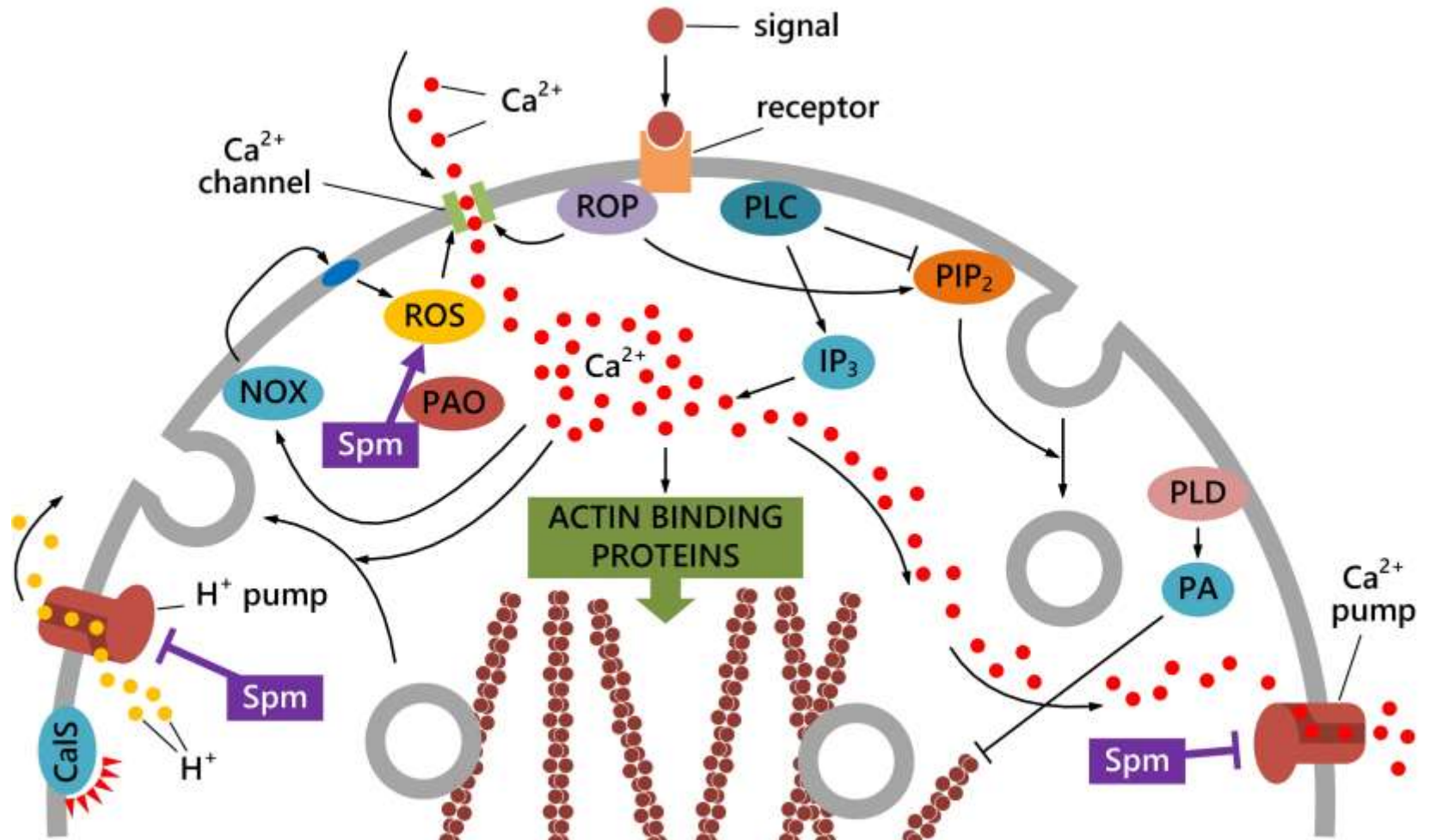
# Distribution of callose mirrored the pattern of cellulose



# Changes to callose pattern is accompanied by changes to the distribution of callose synthase



# In conclusion...



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