Identifying genes required for *Saccharomyces cerevisiae* growth in mucin

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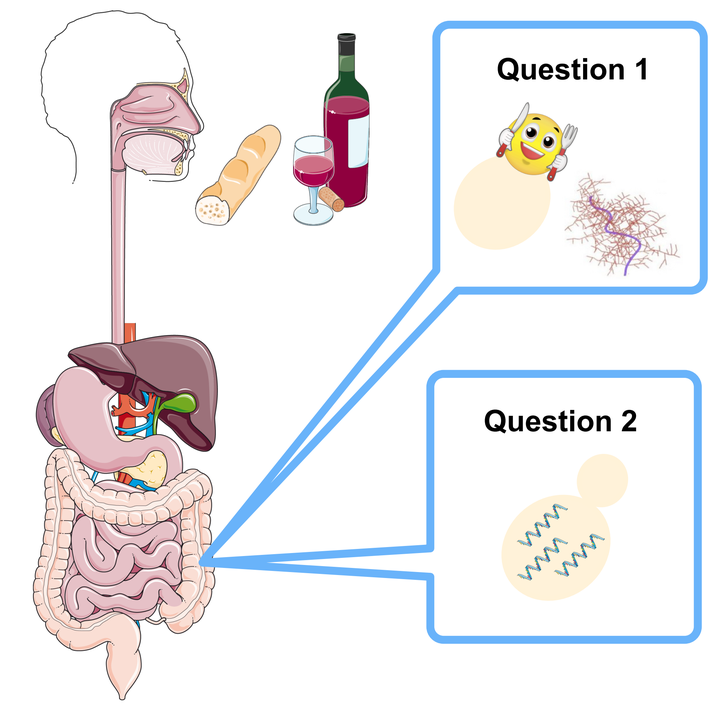
Introduction

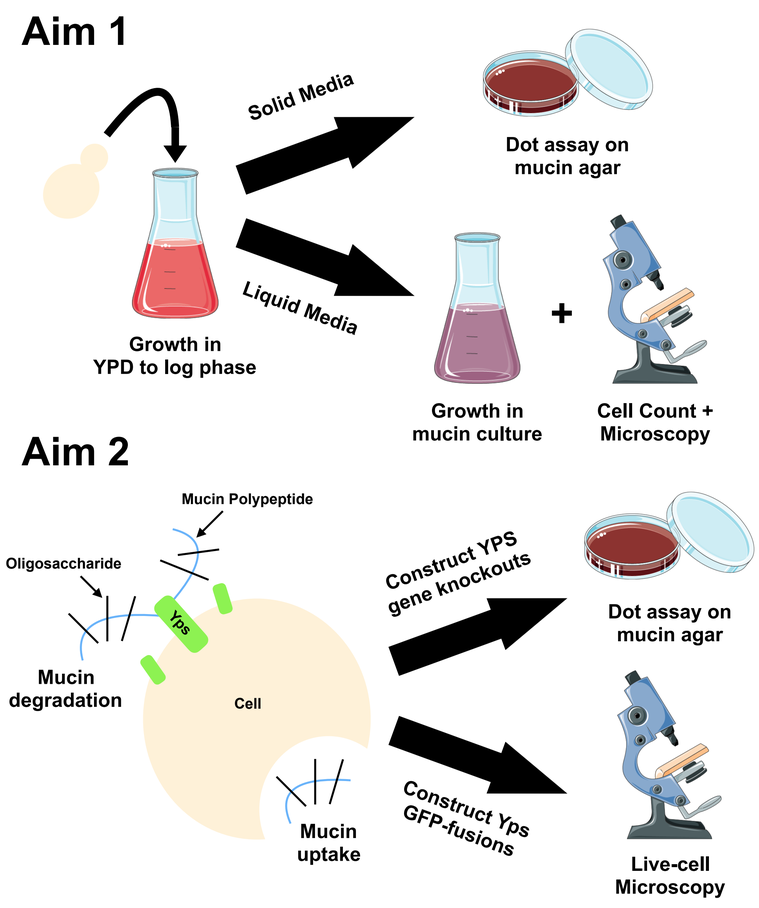


Saccharomyces cerevisiae is one of our most commonly ingested dietary fungi. Despite the detection of its DNA in gut microbiome studies, it is not known whether *S. cerevisiae* can survive and colonize the human gut. To do so, fungi must be able to metabolize mucin: large, highly glycosylated proteins that are the main carbohydrate source in the gut mucosa. Like its close relative and known gut colonizer *Candida albicans*, it is unknown whether **1)** *S. cerevisiae* can utilize mucin as a carbon source, and whether **2)** it possesses genes involved in breaking down this energy source for easier uptake from the environment.

Hypothesis

***S. cerevisiae* can grow in a mucin environment through the up regulation of mucin degrading proteases.**

Methodology



Results

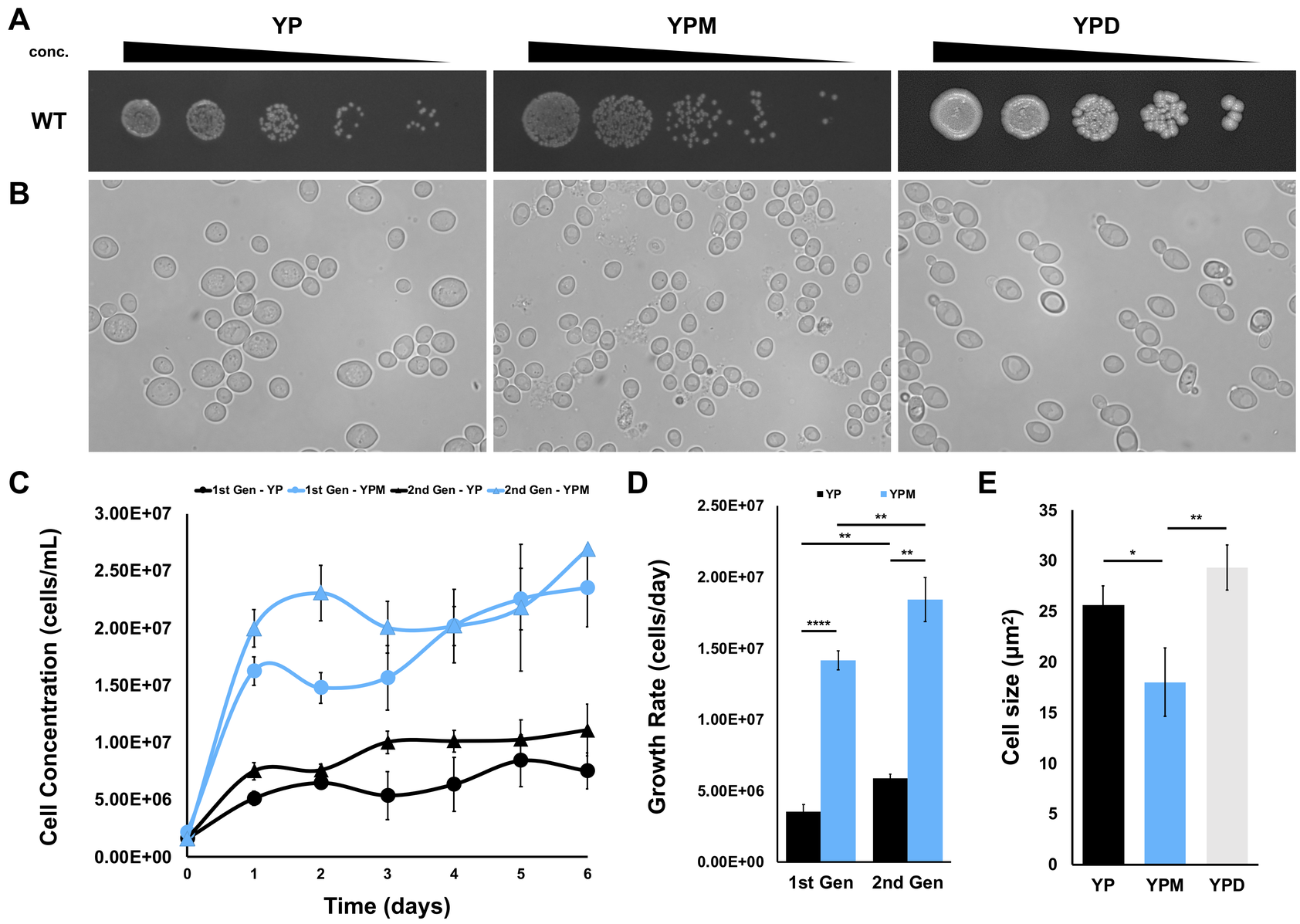


Figure 1 - *S. cerevisiae* grows and adapts in mucin media. A) Dot assay shows growth of WT BY4743 cells on yeast-peptone (YP) media, YP supplemented with 0.5% mucin (YPM) and 2% dextrose (YPD). **B)** Brightfield images of log phase WT cells grown in YP, YPM and YPD cultures. **C)** Growth curves demonstrate increased growth and adaptation of WT cells in YPM (blue) compared to YP (black) as 1st (●) and 2nd (▲) generation cultures. **D)** Growth rates increase for cells grown in YPM as a 2nd generation culture compared to the 1st generation. **E)** Cell size decreases for WT cells grown in YPM compared to YP and YPD.

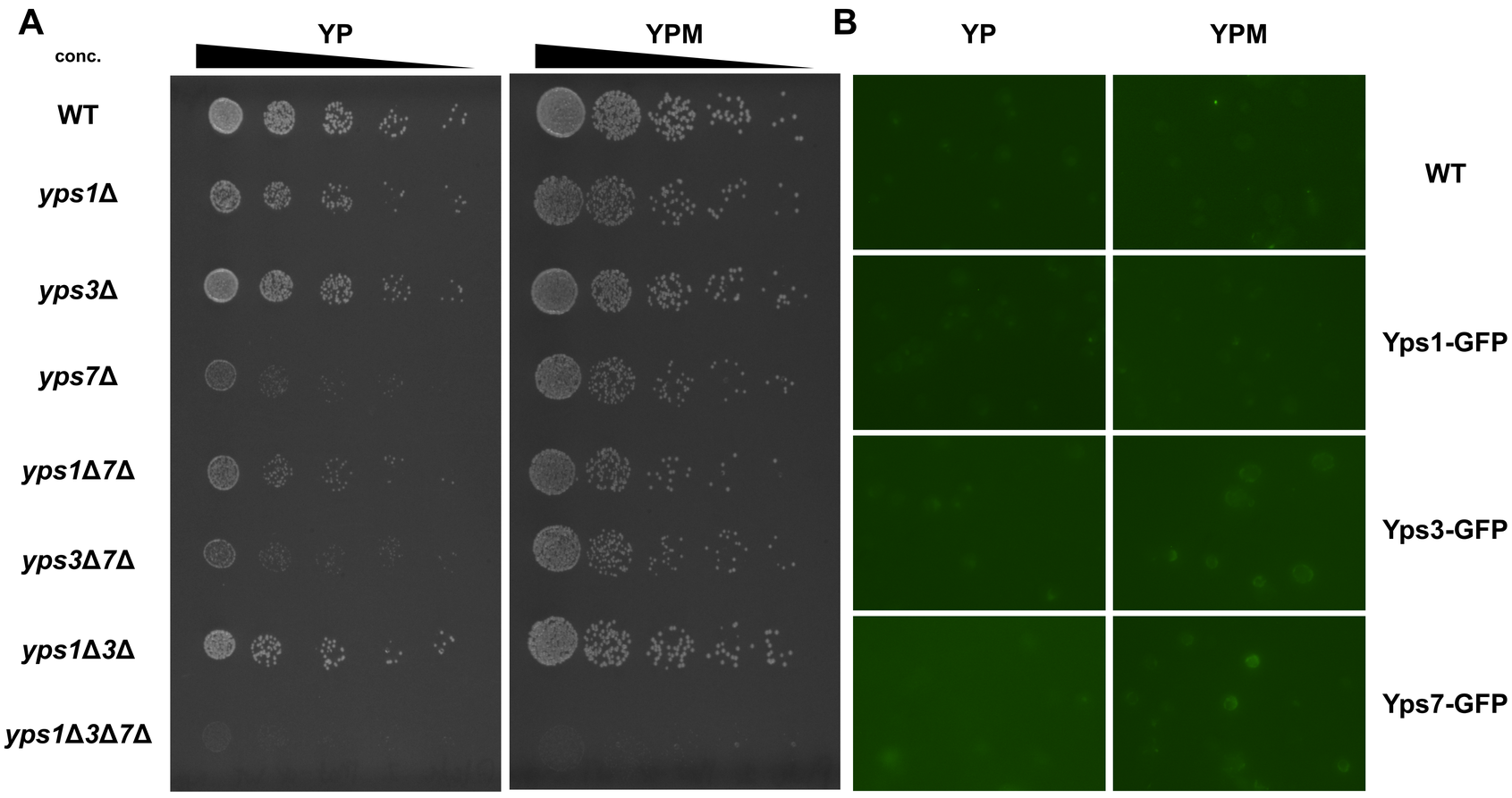


Figure 2 - Yapsin (Yps) proteins are important for growth in mucin media. A) Dot assay shows growth defects in constructed YPS7 deletion mutants on both YP and YPM media. **B)** Live-cell imaging demonstrates increased fluorescence and localization to the cell periphery of Yps3 and Yps7 GFP-fusions in YPM compared to YP.

Acknowledgements

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TECHNOMISE

Conclusions & Future Directions

- *S. cerevisiae* can **grow and adapt to mucin media**, with a significant **decrease in cell size**
- Deletion of the uncharacterized **YPS7** leads to an observable growth defect in limited carbon conditions
- Greater fluorescence of **Yps3** + **Yps7** GFP-fusions in mucin media, with localization to the cell periphery
- **Future Directions:** Western blot for Yps protein quantification and untargeted transcriptome analysis