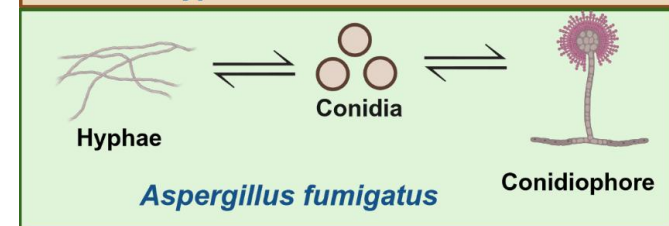
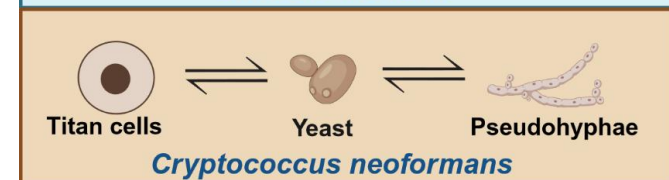
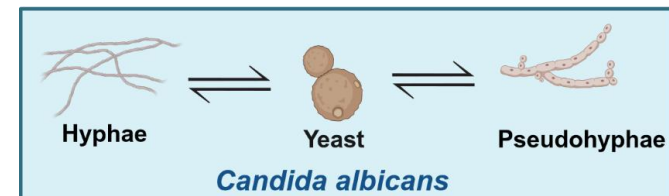
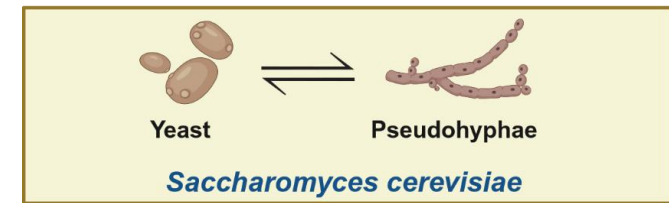
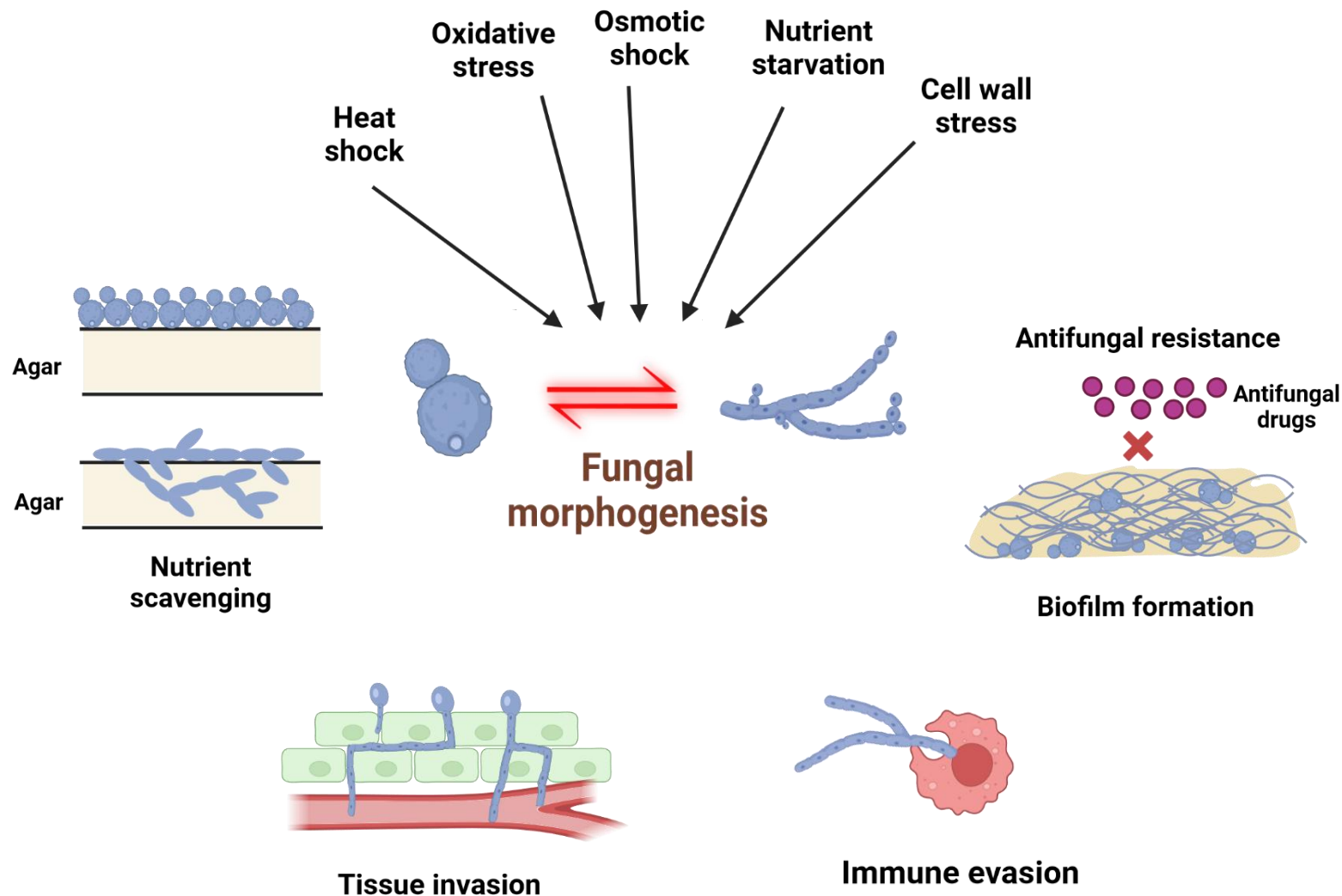
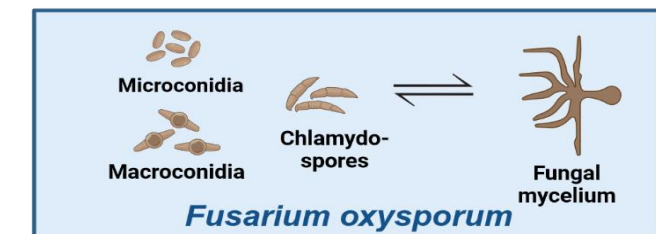




# Fungal Morphogenesis

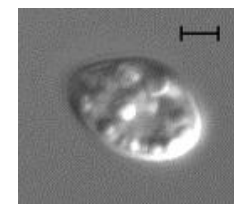
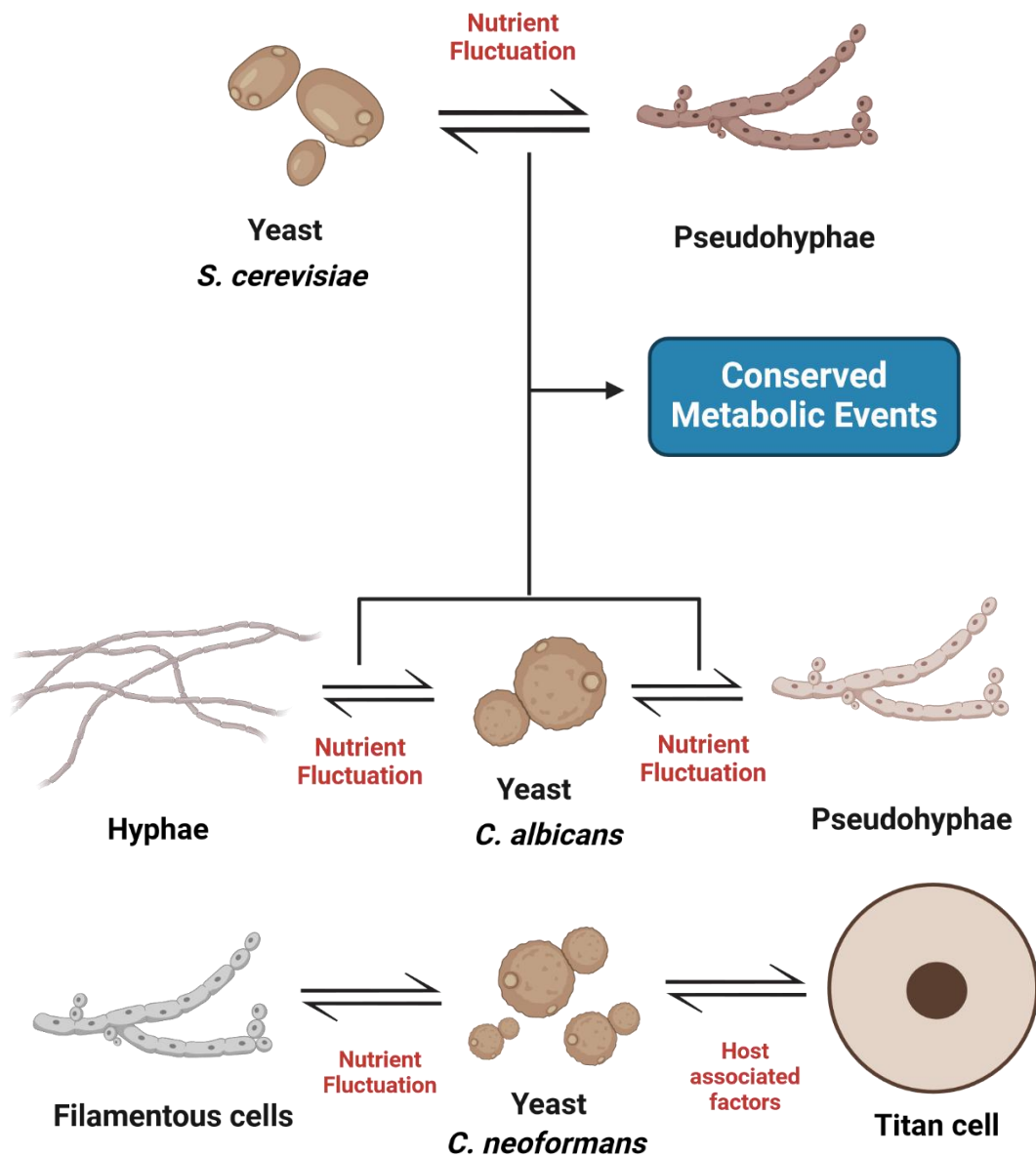


## Animal fungal pathogens



## Plant fungal pathogens

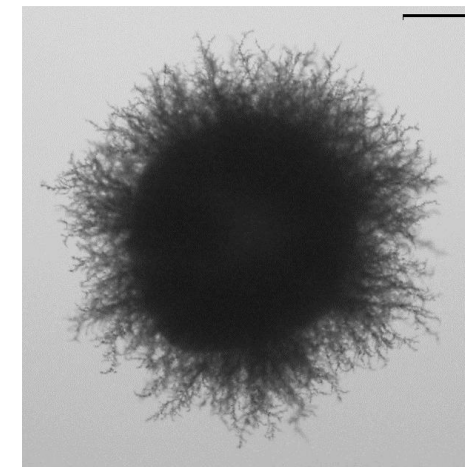
# Fungal Morphogenesis



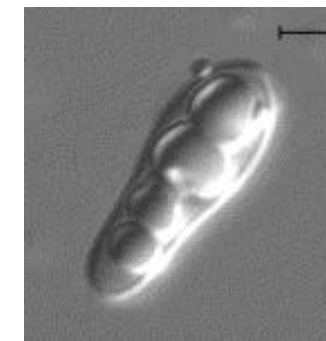
Scale bar=2μm

*S. cerevisiae*

**Nitrogen limitation condition**



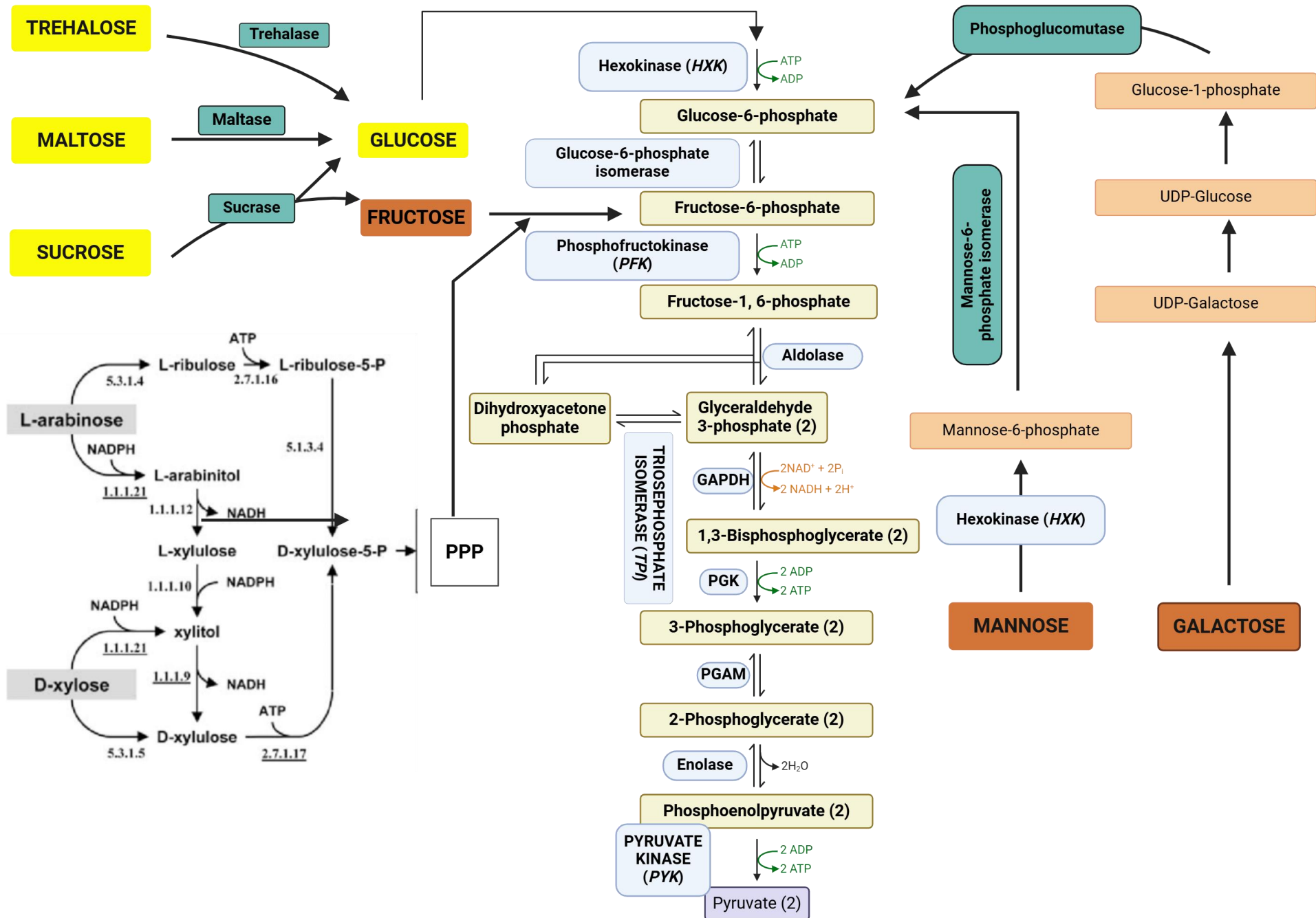
Scale bar=1mm



Scale bar=2μm

***Nitrogen limitation is necessary for pseudohyphal differentiation, but is it sufficient?***

*Fermentable carbon sources that ultimately feed into glycolysis trigger pseudohyphal differentiation.*





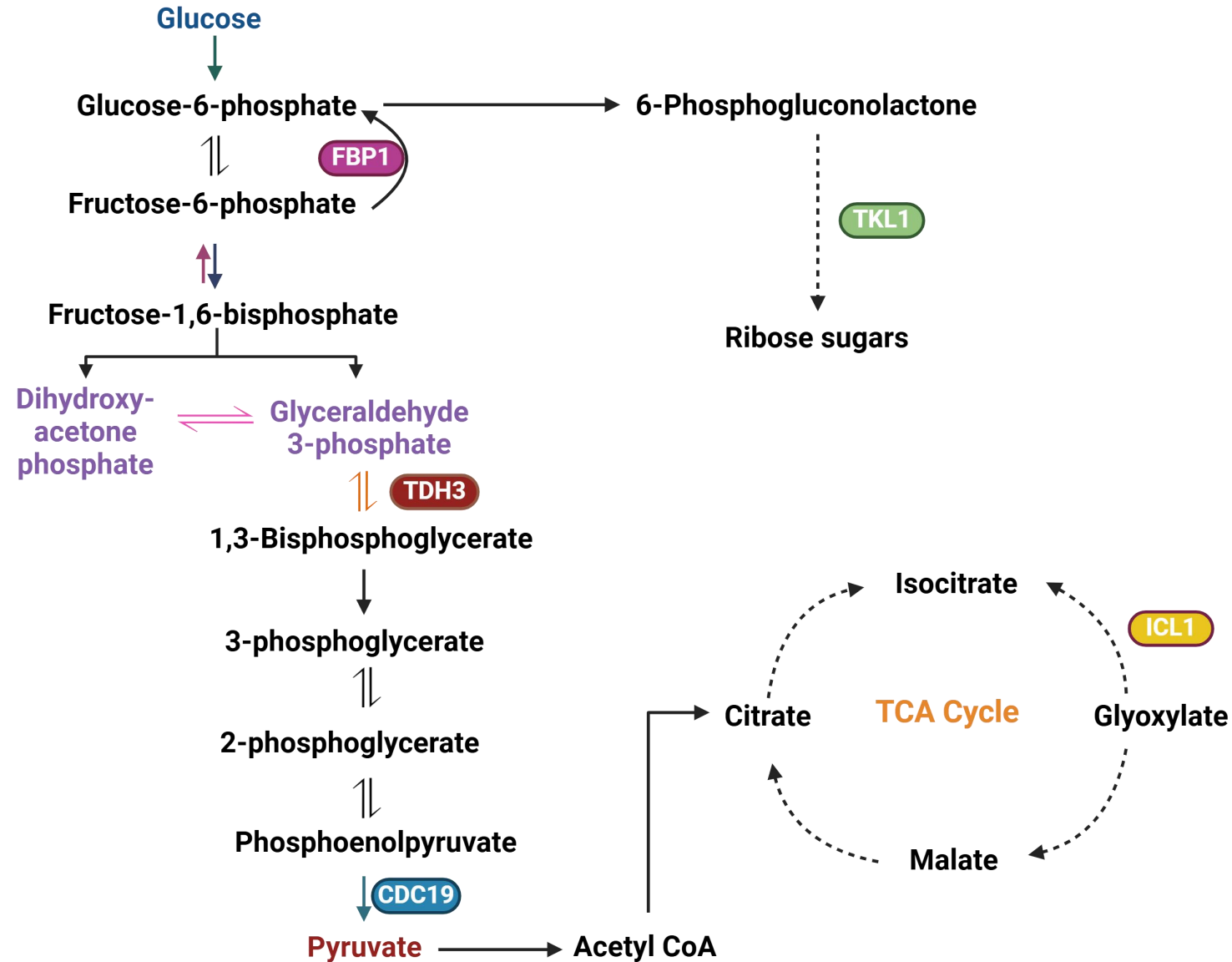
# Recapitulation

*Glucose influences pseudohyphal differentiation in a concentration-dependent manner*

*Ability of cells to breakdown glucose is critical for pseudohyphal differentiation*

*Ability of cells to metabolize glucose via **glycolysis** is critical for pseudohyphal differentiation*

# Probing into metabolic state of pseudohyphal cells



# Probing into metabolic state of pseudohyphal cells

## Glucose de-repressed genes

Phosphoenolpyruvate + ADP



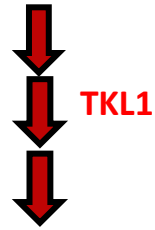
Pyruvate+ATP

Glyceraldehyde-3-p



3-phospho glyceroyl phosphate

6-Phosphogluconolactone



Ribose sugars (carbon backbone)

## Glucose repressed genes

D-threo-isocitrate

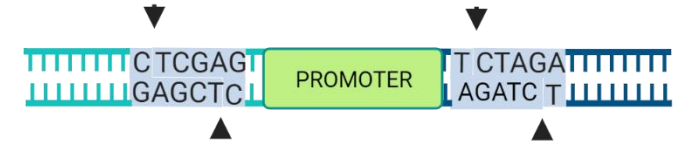
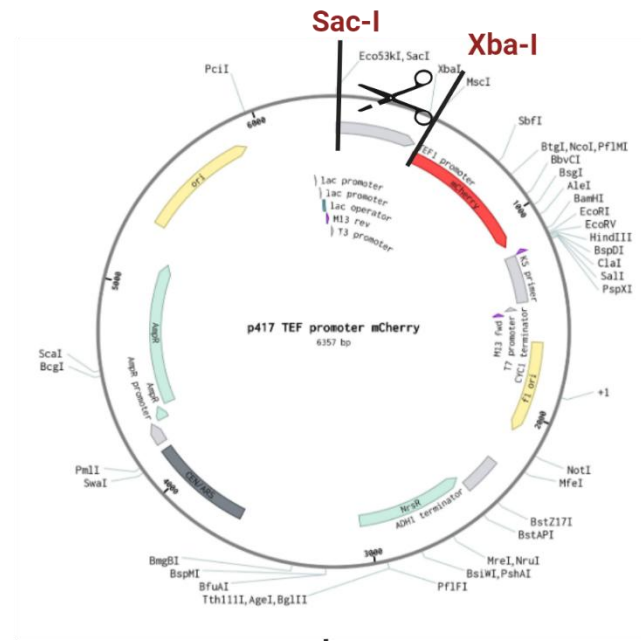


Glyoxylate + Succinate

D-fructose-1,6 bis-phosphate



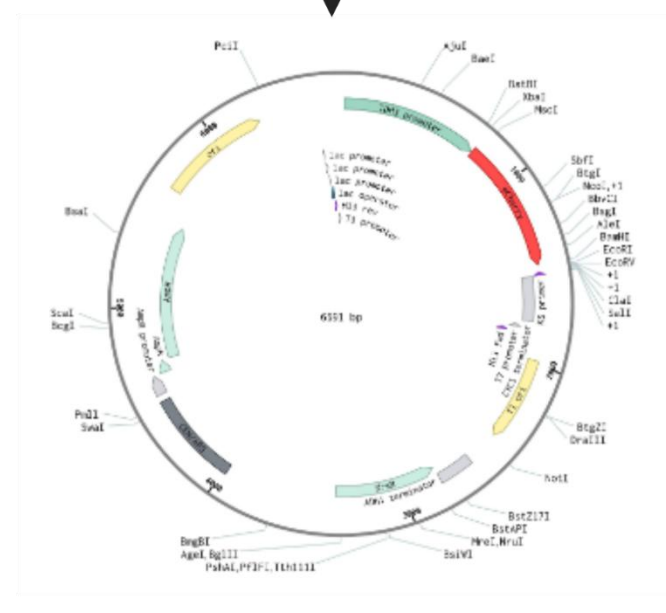
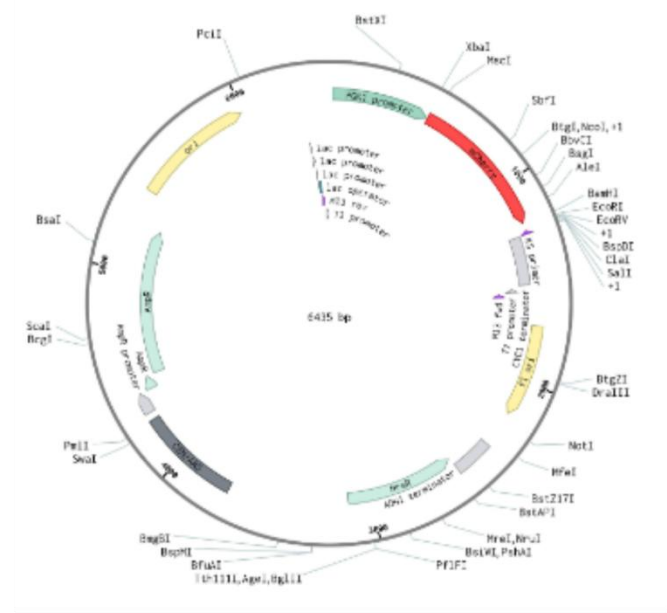
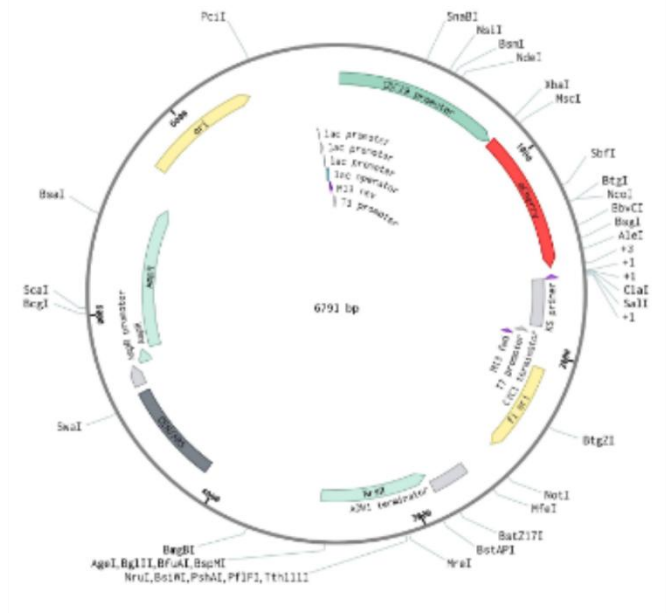
D-fructose-phosphate + phosphate



**pCDC19**

**pPGK1**

**pTDH3**

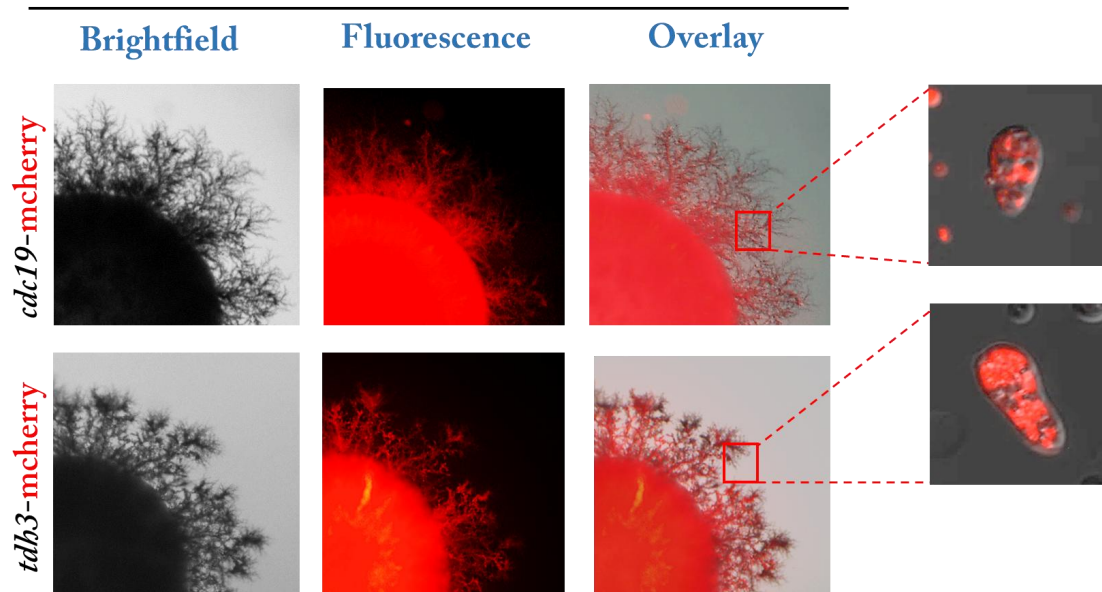




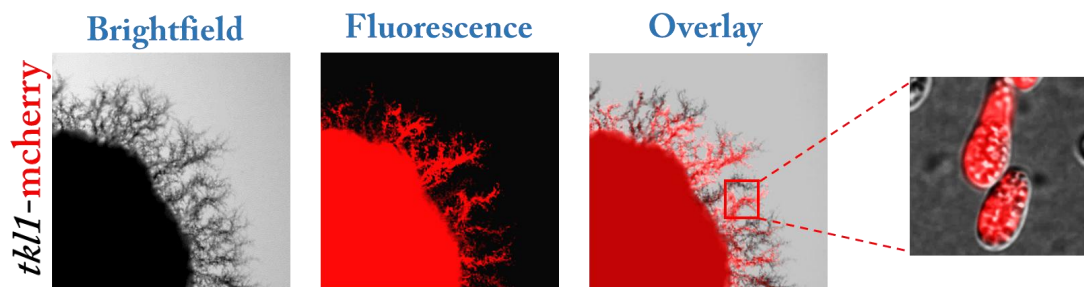
# Probing into metabolic state of pseudohyphal cells

## Glucose de-repressed pathways

### Glycolysis Pathway Reporter

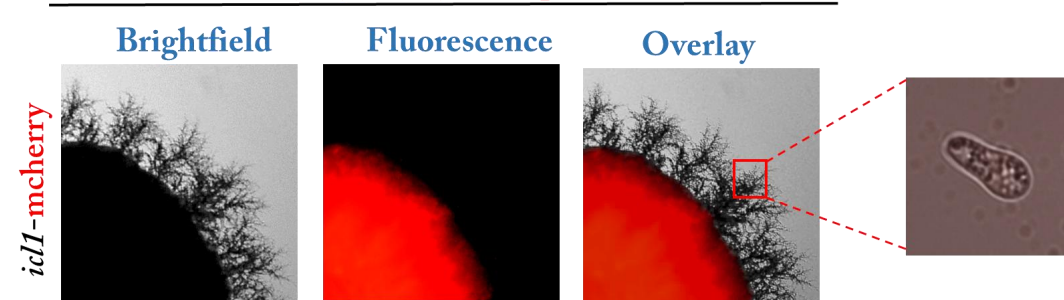


### Pentose Phosphate Pathway Reporter

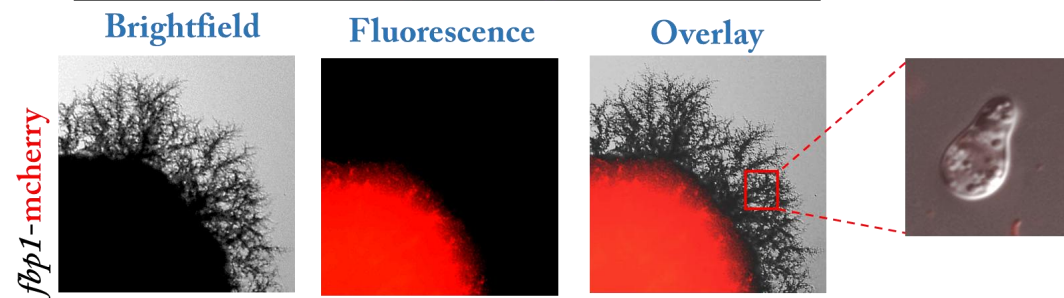


## Glucose repressed pathways

### Glyoxylate Cycle Reporter



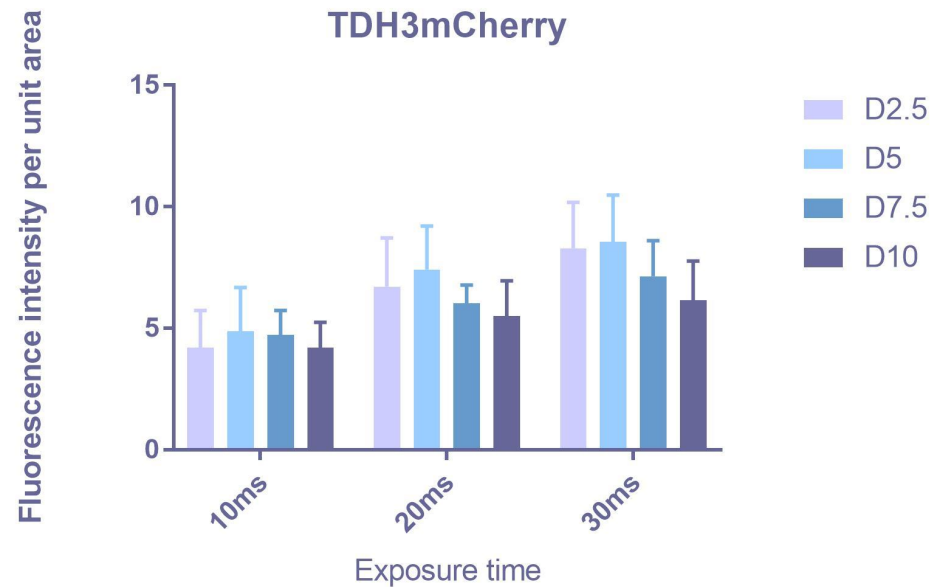
### Gluconeogenesis Reporter



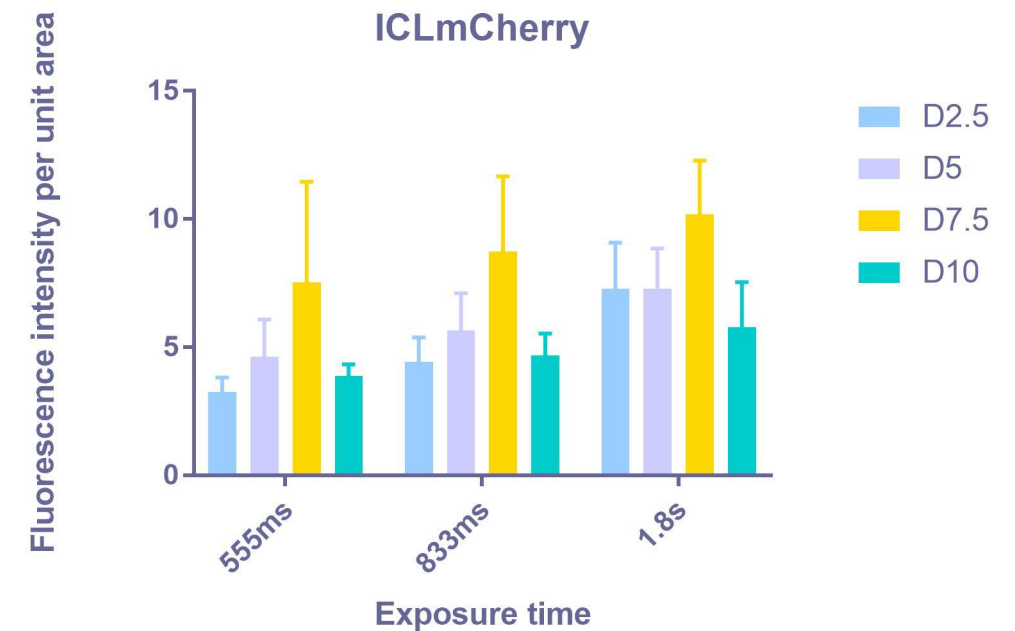
***Pseudohyphal cells are highly glycolytic even under stress condition.***

# Spatio-temporal expression of central carbon metabolism

## Glucose de-repressed pathways

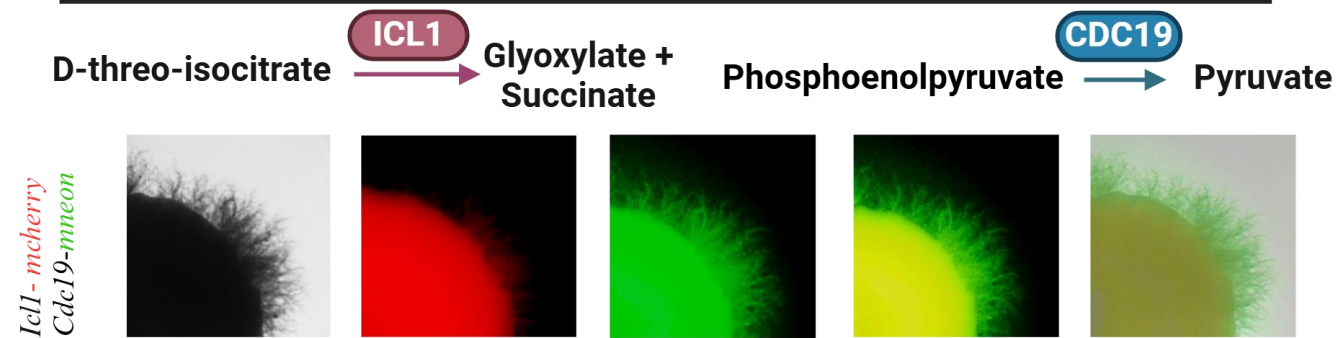


## Glucose repressed pathways

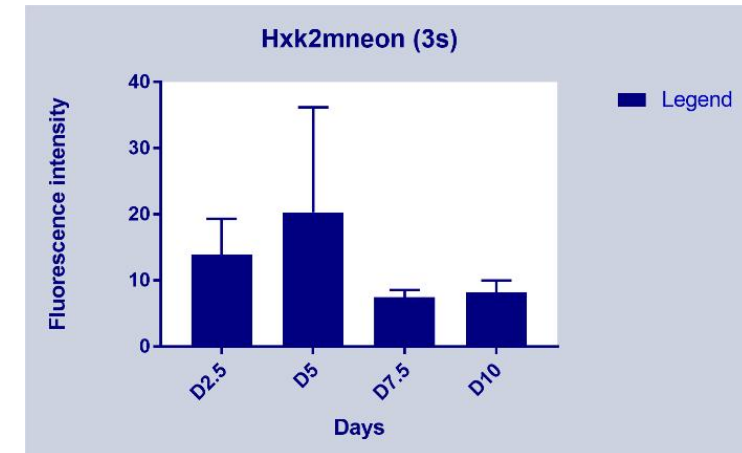
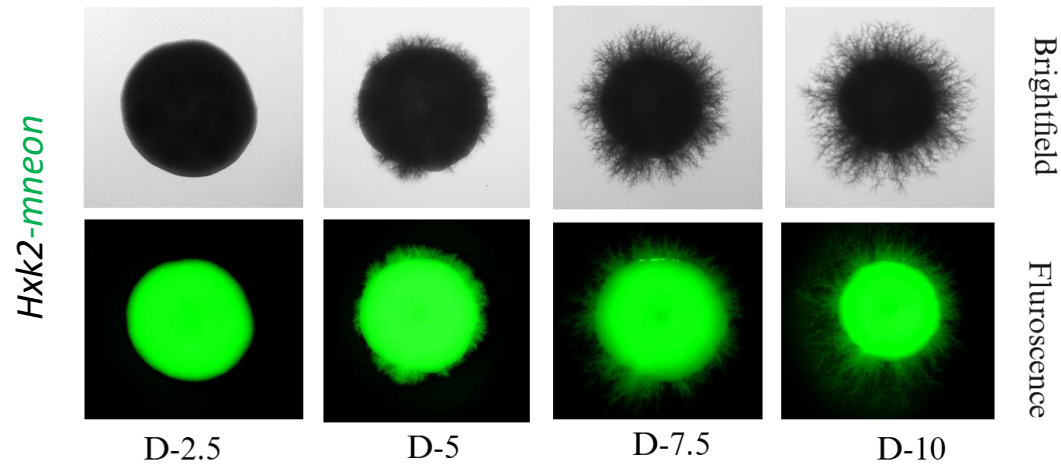
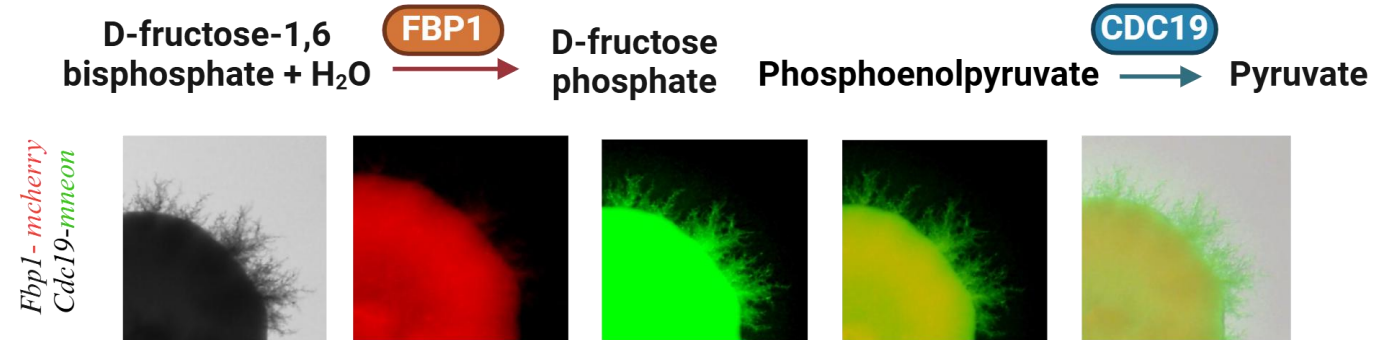


***A notable increase in glycolysis is observed on Day-5.***

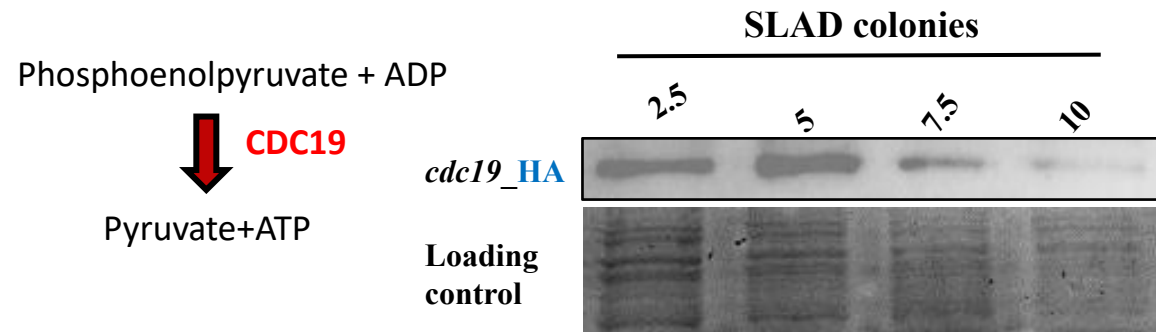
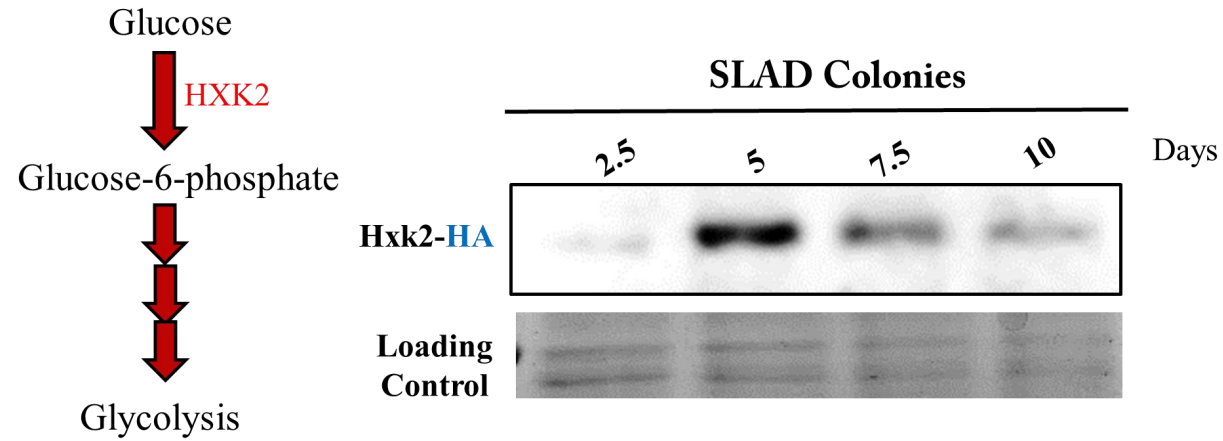
## Glyoxylate + Glycolysis reporter



## Gluconeogenesis reporter+Glycolysis Reporter

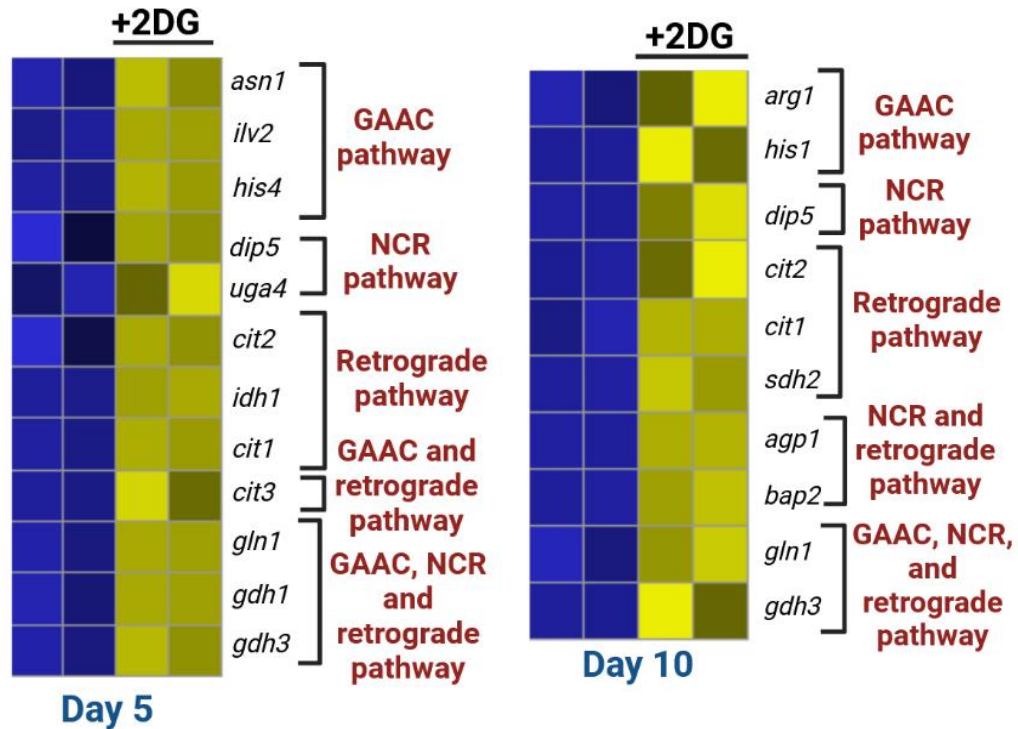


# Spatio-temporal expression of central carbon metabolism



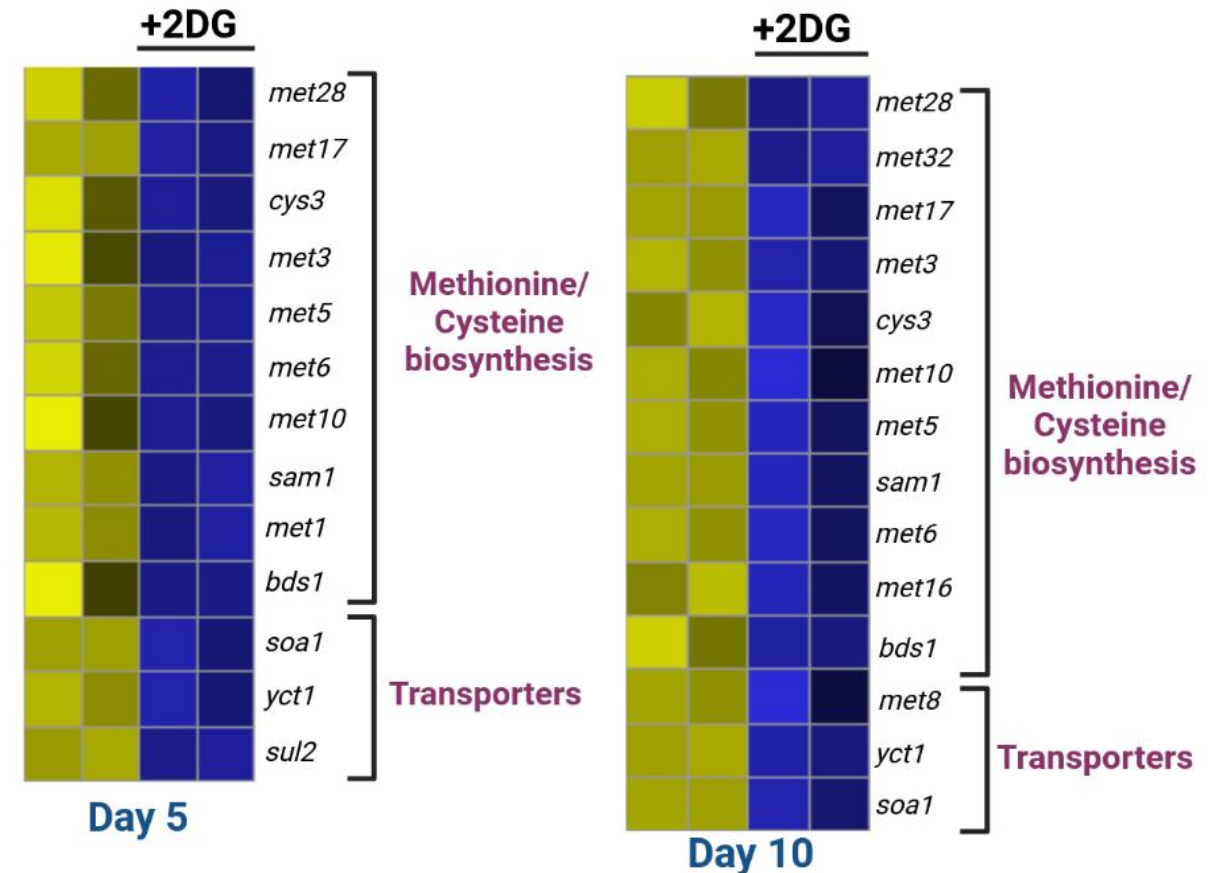
# Understanding the Mechanisms Underlying Glucose-mediated Regulation of Fungal Morphogenesis

## Amino acids biosynthesis



*Attenuation of glycolysis causes upregulation of genes involved in amino acids biosynthesis and transporters*

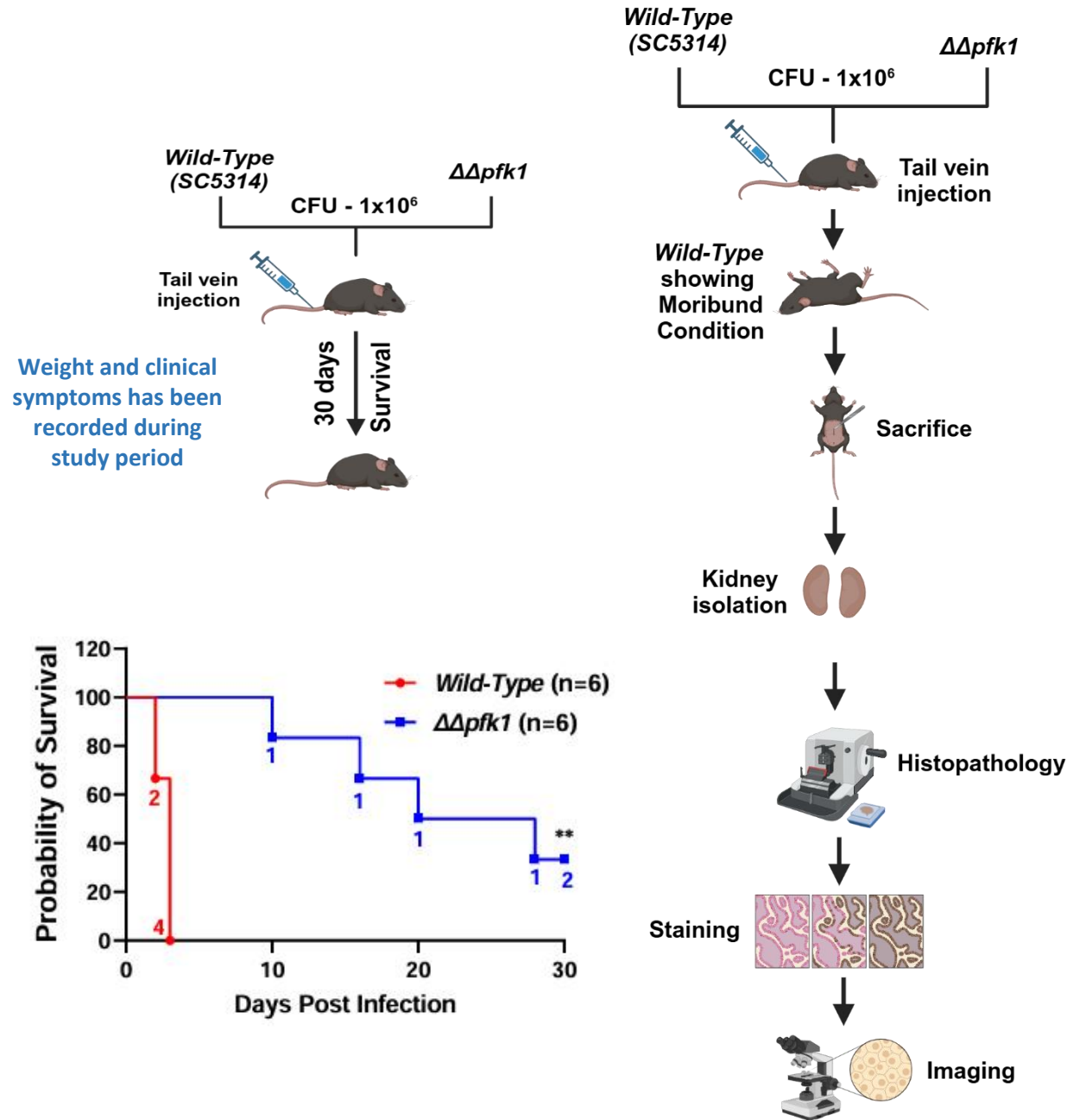
## Cysteine and methionine biosynthesis pathways



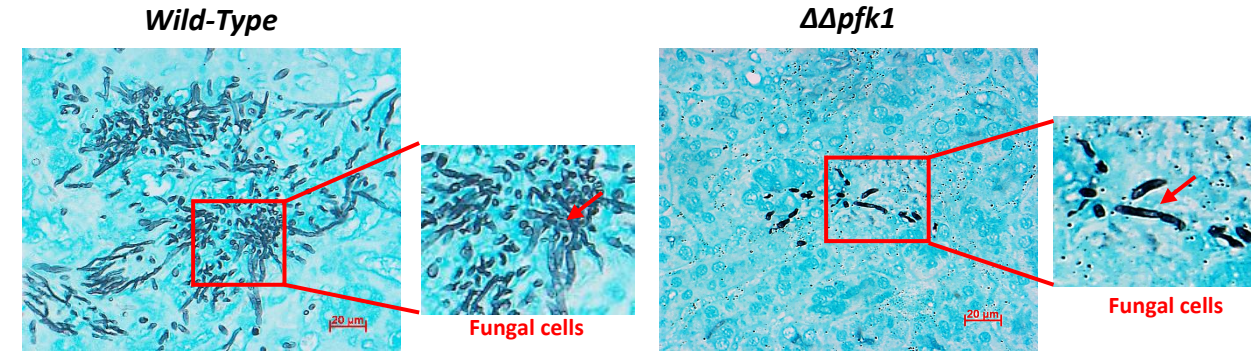
*Interestingly, genes involved in sulfur assimilation pathway and transport are highly downregulated when glycolysis is inhibited*



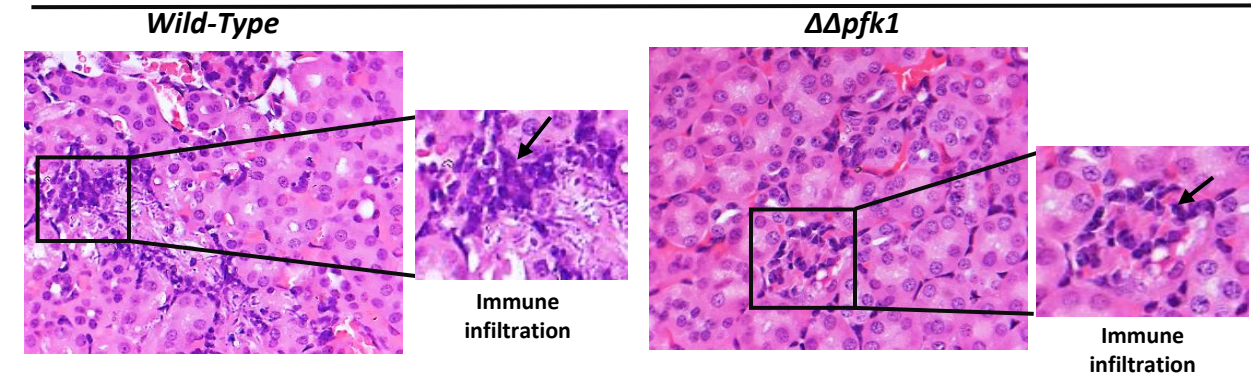
# Perturbation of Glycolysis in *C. albicans* Compromises Pathogenicity in Murine Models



## GMS Staining

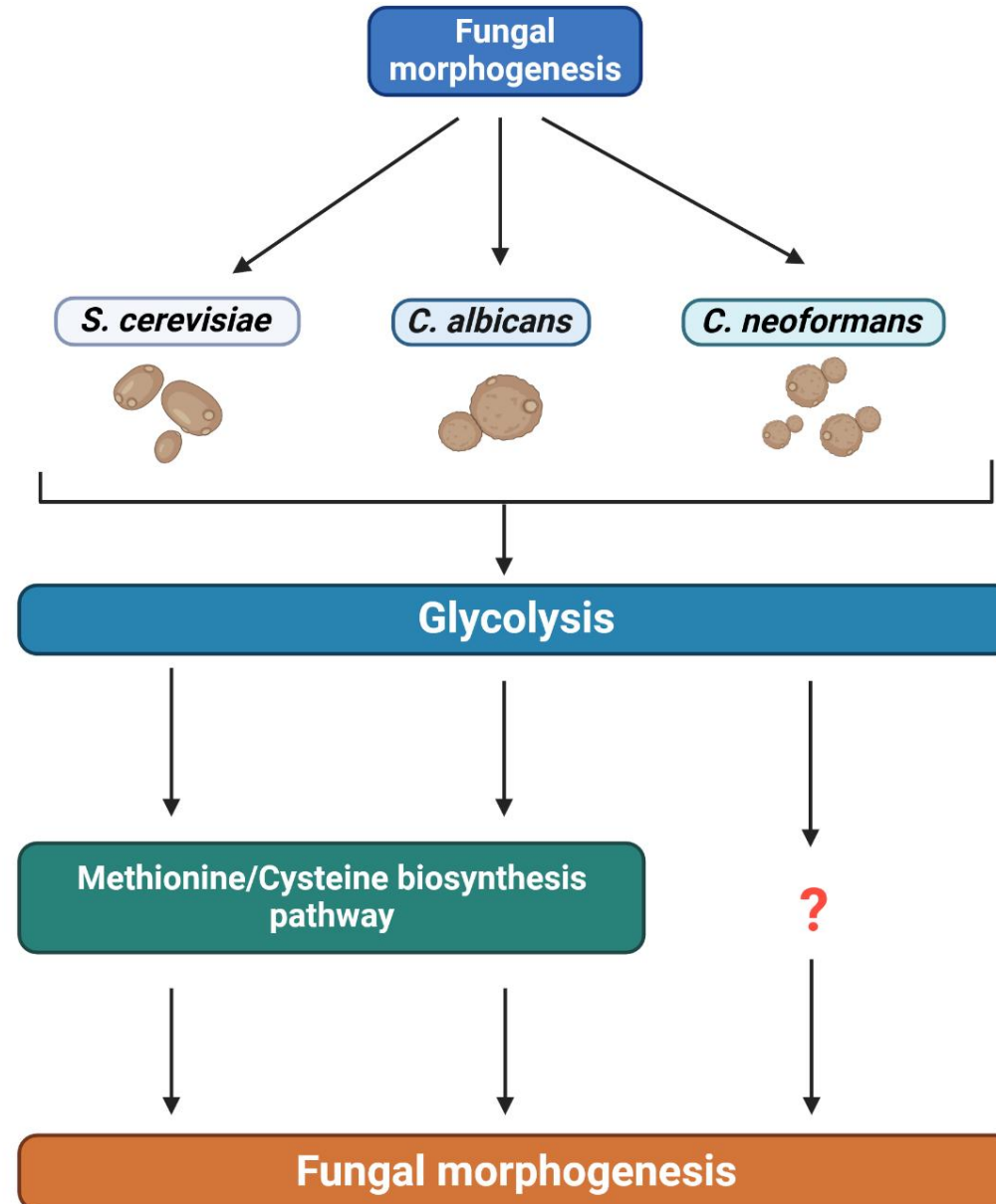


## H & E Staining





# Proposed Model of study



# Acknowledgements



**Project Supervisor**  
**Dr. Sriram Vrahan**

**Lab Members**  
**Dhrumi Shah**  
**Dr. Sudharsan M.**  
**Nikita Rewatkar**  
**Dr. Uma Mahto**  
**Pallavi Phatak**  
**Siddhi Gupta**

**LTS Staff**  
**Narasimhulu**

**RNA-Seq Analysis**  
**Sree Lakshmi (Dr. Tej Lab)**  
**Manoj (Dr. Ishwariya Lab)**  
**NGS Facility Staff**

**Funding:**

**IndiaAlliance**  
**DBT wellcome**

