

Nitrogen limitation and lipid production in *Yarrowia lipolytica*

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Project Goal: Our goal is to enable rapid engineering of the oleaginous yeast, *Yarrowia lipolytica*, for increased rates of biofuel production.

Yarrowia lipolytica is an oleaginous yeast with strong potential as a production host for biofuels and bioproducts. *Yarrowia* produces significant amounts of lipids, including triacylglycerols when nitrogen is a limiting nutrient. We have characterized system level metabolic and regulatory changes that occur upon nitrogen limitation using systems and cell biological approaches. These studies include the development of a green fluorescent protein (GFP) based “cell organelle atlas” to characterize the cellular changes that occur upon nitrogen limitation in *Y. lipolytica*. Genome-wide promoter analysis predicts that the ortholog of the carbon catabolite repression regulator, mig1/cre1/creA, as well as nitrogen responsive GATA transcription factors are key controllers of the cellular response to carbon and nitrogen levels. The research we will present includes a genetic and transcriptome analysis of the GATA transcription factors and their regulatory targets.

Publications

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6. Pomraning, K.R., Wei, S., Karagiosis, S.A., Kim, Y.M., Dohnalkova, A.C., Arey, B.W., Bredeweg, E.L., Orr, G., Metz, T.O., Baker, S.E. 2015. Comprehensive metabolomic, lipidomic and microscopic profiling of *Yarrowia lipolytica* during lipid accumulation identifies targets for increased lipogenesis. *PLoS One*. 10(4):e0123188.

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