

# The impact of low oxygen concentrations on *Myxococcus xanthus* social behaviors

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*Myxococcus xanthus* is a soil bacterium and model organism for bacterial gene regulation and social behaviors. To adapt to its complex environment, *M. xanthus* has many two-component systems (TCS) that sense and respond to varying conditions. These TCSs regulate *M. xanthus* behaviors including motility, microbial predation, development, and sporulation. Recently, the Bretl lab characterized a multi-component TCS named NmpRSTU which senses oxygen concentrations and regulates genes to facilitate growth and survival. Despite requiring oxygen to produce energy, *M. xanthus* must encounter soil environments with reduced oxygen levels. However, almost all research on this bacterium has been done under ambient oxygen conditions. Therefore, little is understood about *M. xanthus* behaviors in low-oxygen, and there is no understanding of the impact of NmpRSTU in these environments. I will design low-oxygen assays to assess growth, survival, motility, and development. Thus far, we have observed a significant decrease in growth between wild-type *M. xanthus* and a  $\Delta nmpR$  mutant in low oxygen conditions, indicating NmpR-dependent regulation is necessary for optimal growth during low oxygen conditions. Future directions will investigate how limited oxygen, the NmpRSTU system, and downstream gene expression influence *M. xanthus* behaviors.