The Response of *Myxococcus xanthus* to Low Oxygen Conditions

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Myxococcus xanthus is a soil bacterium with a complex life cycle. *M. xanthus* has many two-component systems (TCS) that sense and respond to varying conditions. These TCS regulate *M. xanthus* behaviors including motility, microbial predation, development, and sporulation. Recently, the Bretl lab characterized a multi-component two-component system 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 have used low-oxygen assays to assess growth, survival, and motility. Thus far, we have observed a significant decrease in growth and motility between wild-type *M. xanthus* and a Δ*nmpR* mutant in low oxygen conditions, indicating NmpR-dependent regulation is necessary for optimal growth and motility during low oxygen conditions. For survival, the only finding thus far is a difference in morphology between wild-type and Δ*nmpR* mutant. Future directions will investigate how limited oxygen, the NmpRSTU system, and downstream gene expression influence growth, survival, and social behaviors.