Rewiring of Cellular Carbon Metabolism in Response to Nutrient Limitation

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Due to the requirement of carbon for biomass growth and metal cofactors in metabolic enzymes, cellular metabolism is controlled by both carbon and metal nutrient availability. Of special interest is how iron (Fe) limitation, which is ubiquitous in aerobic environments, influences organic carbon utilization by biogeochemically-important bacterial species. In this talk, I will present research of my group focused on elucidating what controls the order of preferential metabolism (i.e. metabolic hierarchy) of common organic substrates in Fe-limited *Pseudomonas putida* KT2440. *Pseudomonas* species, which include plant growth-promoting bacteria, can thrive in diverse nutritional environments due to their extensive metabolic capabilities. We investigate how these beneficial soil bacteria tune their intracellular carbon metabolism in response to Fe limitation to facilitate the production of Fe-scavenging molecules (or siderophores), promote dissolution of Fe-minerals, and selectively utilize carbon source from organic mixtures. Our findings shed light into how reprogramming of cellular metabolism controls the coupling between Fe availability and carbon cycling.