153a Effect of Oxygen on the *E. Coli* Global Redox Sensing/Regulation Networks and Metabolic Flux Distribution Based on C-13 Labeling Experiments

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E. coli has several elaborate sensing mechanisms for response to the availability of oxygen and the presence of other electron acceptors. The adaptive responses are coordinated by a group of global regulators, which include the one component Fnr protein, and the two-component Arc system. With the initial onset of anaerobiosis ArcA is activated, and if these conditions persist, Fnr is activated leading in turn to the up-regulation of *arc*A and amplification of its effect. To quantitate the contribution of Arc and FNR dependent regulation in catabolism, the metabolic flux distribution in a wild-type *E. coli*, an *arc*A mutant, a *fnr* mutant, and a double *arc*A, *fnr* mutant, under semi-aerobic conditions, was studied using C-13 labeling experiments. The metabolic network was recognized according to the detected isotopomer distribution. The metabolic activity is important as deletion of one regulatory gene may affect the metabolite pattern, which in turn can affect the activity of various other enzymes. In particular it can result in the activation of another regulatory system. In the current presentation the effect of ArcA, FNR, and their combination on the fluxes through the TCA cycle and the fermentative pathways under semi-aerobic condition will be discussed.