Switches, thresholds and flux signals in the control of central metabolism's architecture in *Escherichia coli*

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The ability of microorganisms to reconfigure the topology of central metabolism from acetogenic to gluconeogenic architecture is central to successful adaptation and in turn, survival, as the environment changes from "feast" to "famine". Based on flux analysis, measurements of enzymic activity of isocitrate lyase and its m-RNA transcripts, the author proposes that the central metabolic pathways of *Escherichia coli* are bicyclic in nature and that the organism's ability to switch from one cycle to another is controlled by the "diauxic switch", which is turned "on" or "off" in response to a drop-in flux to ATP to a critical thresh hold as growth rate-diminishes from µmax to ≤0.43h-1. The shortfall in ATP supply is redressed by increasing flux through succinyl CoA synthetase, which under these circumstances, necessitates the operation of the glyoxylate bypass for the provision of succinyl CoA. Uniquely, however, yet in complete harmony with the hypothesis presented, the glycerol phenotype does not appear to employ the "diauxic-switch", as glycerol affords direct entry into the two glycolytic SLP-ATP generating reactions, thus maintain the level of ATP above the critical threshold required for the activation of the diauxic-switch.

Speaker Biography

Mansi El- Mansi is a PhD graduate in microbial biochemistry and molecular enzymology, University College of Wales, Aberystwyth, UK (1982). Immediately after graduating, he joined Dr Harry Holms research group at the University of Glasgow, department of biochemistry; under the leadership of professor Martin Smellie. Such a happy association continued for the best part of a decade in which many discoveries were made on the control of isocitrate dehydrogenase activities and the expression of the glyoxylate bypass operon. During the course of his career at Glasgow University (9 years) and in Edinburgh (17 years) as well as at Sharda University, India (3 years) and more recently at Elizade University and University of Africa, Nigeria. He has had many notable achievements in academic and applied research. In addition to elucidating the signal, which triggers the expression of the ace operon in vivo in preparation for the switch of central metabolism's topology from acetogenic to gluconeogenic architecture.

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