in vitro Metabolic Engineering

Summary of Discussion

Fred G. Heineken

- *Can Extracellular or Cell-Free Pathway Analysis give insight into what is happening in a Living Cell*

- *Does Extracellular or Cell-Free Synthesis using Isolated Metabolic Pathways provide an adequate understanding of similar Synthesis in a Living Cell*

There was general agreement that cell-free pathway analysis can give valuable insights into an *in vivo* pathway, but one would need to verify such insights using whole organisms. There was a concern that the *in vitro* analysis would not provide information on the regulation of a pathway, and this is also important in understanding a how a pathway functions in a living cell.

- *Does Metabolic Engineering include the manipulation of Extracellular or Cell-Free Synthesis Pathways, or is this simply Biocatalysis*

It depends on what one calls "Biocatalysis". If this means the study of a particular enzyme structure/function relationship, and the relationship to the gene used to express this enzyme, then the manipulation of extracellular or cell-free synthesis pathways goes beyond biocatalysis since this involves the understanding of a number of enzymes is a particular pathway. Here again, to fully understand this type of manipulation, one needs to verify how such a manipulation behaves in a living cell.

- *Is it possible to do Extracellular or Cell-Free Analysis of Signal-Transduction Pathways for the Regulation of Metabolic Pathways*

There was general agreement that this is possible to do, but is more challenging than cell-free pathway analysis.