Sample Individual Abstract

Determination of Heart Cell Type and Subcellular Location of Arginase 2

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Poster Presentation

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Heart disease is a profound human health problem worldwide and has been the leading cause of death in the United States since 1990. Fifty-four percent of the heart disease problems are due to coronary heart disease. In 2003, about 3.5 % of the United States population, or 4.2 million men and 3 million women, suffered an acute myocardial infarction (American Heart Association, 2006). In an effort to understand the early responses in the heart to an acute myocardial infarction (AMI), a microarray study was performed and the arginine-nitric oxide- polyamine pathway was highly up-regulated (Harpster et al, 2006).

The goal of this project was to determine the cell type and subcellular location of arginase 2 (ARG2) an enzyme involved in the metabolism of L-arginine and up-regulated during a heart attack. Western blotting was used to confirm ARG2 showed an induction following AMI. In addition, immunohistochemistry was used to determine the cell type and intercellular location of ARG2. ARG2 is predicted by sequence analysis to localize to the mitochondria. Multiple experiments were done to label ARG2 via immunohistochemistry. The images showed moderate background and no clean signal. Although suitable for western blot analysis, this particular ARG2 antibody was not suitable for immunohistochemistry.

Sample Group Abstract

Lignin to Adipic Acid

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Oral Presentation

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Lignin is a heterogeneous mixture of aromatic polymers found in plant cell walls. Cellulosic ethanol plants, whose feedstocks are made up of plant materials such as corn stover, produce lignin as a coproduct along with ethanol. Currently, that lignin is burned as a low energy fuel, but since the production of ethanol from cellulosic feedstocks is expected to increase significantly in the next few years, alternative uses for lignin are being researched. The National Renewable Energy Lab (NREL) has demonstrated that lignin can be converted to adipic acid, a precursor to nylon-6,6, which has many uses. Using a genetically engineered strain of *P. putida* to funnel lignin to muconic acid and then hydrogenation to produce adipic acid, NREL's production of adipic acid is more environmentally friendly than the current petrochemical method.

The goal of this project was to analyze NREL's lab scale procedure of making adipic acid and determine if it could be viably industrialized. This was accomplished by designing and building an industrial process model based on NREL's methods and data and the current availability of lignin. Economic and sensitivities analyses were completed and safety and environmental concerns were researched and addressed. All of this was taken into consideration in order to determine if industrializing the production of adipic acid from lignin is feasible, and if the process could compete with the current petrochemical method.