As early as 1971, Estabrook hypothesized P450 “clusters” were reduced at different rates by CPR. Since many of these early experiments were difficult to interpret as a result of the complexity of the microsomal systems, purified proteins became the system of choice for studying these interactions. The complete structural and catalytic analyses of C3H, C4H, F3H and CPR will not only provide valuable scientific knowledge for basic research on the control of metabolic flux, but also the foundation for a novel strategy for crop improvement.

Flavonoids are important secondary metabolites in humans and plants. For plants they are necessary for nodulation, coloration, UV-B protection, and pathogen defense. Flavonoids in humans have shown anticancer, antiaging, and a myriad of other beneficial effects. Bioengineering of flavonoids for upregulation could allow for reduced lignin and increased adaptability to stress.

Flavonoids and simple monolignols are synthesized by the phenylpropanoid pathway. Lignin’s crosslinking of cellulose hampers cellulosic biofuel production.

Lignin and biofuel production from sorghum

Lignin, a plant cell wall component, is a phenylalanine-based monolignol polymer synthesized by the phenylpropanoid pathway. Lignin’s crosslinking of cellulose hampers cellulosic biofuel production.