Induction of cytochrome P450-dependent monooxygenases in hamster tissues by fasting.

陳大樑

Ueng TH;Ueng YF;Chen TL;Park SS;Iwassaki M;Guengeich FP

摘要

Abstract

The effects of fasting on liver, kidney, and lung monooxygenases were studied using hamsters starved for 4 days. Fasting treatment increased microsomal cytochrome P450 content and NADPH-cytochrome P450 reductase activity in kidney and lung. The treatment caused significant increases of aniline hydroxylation, N-nitrosodimethylamine demethylation, and 7-ethoxycoumarin O-deethylation activities in the liver, kidney, and lung. Fasting caused a threefold increase of benzphetamine N-demethylation activity in lung and a 25% increase in liver and had no effect in kidney. Benzo[a]pyrene hydroxylation activities in the fasted hamster liver, kidney, and lung were higher, lower, and similar to the controls, respectively. Gel electrophoresis of tissue microsomes from control and fasted hamsters revealed that fasting enhanced the intensity of protein band(s) in the P450 molecular weight region. Immunoblotting of the microsomal proteins showed that fasting induced a protein crossreactive with rabbit antibody raised against human P450 2E1 in hamster liver, kidney, and lung. Immunoblotting analysis using mouse monoclonal antibody 2-66-3 raised against rat P450 2B1 revealed that fasting induced an immunorelated protein preferentially in hamster lung, with minimal effects on liver and kidney. Protein blots probed with mouse monoclonal antibody 1-12-3 indicated that fasting induced a protein related to P450 1A1 in hamster liver, kidney, and lung. These results demonstrate that fasting causes a variety of inductive effects on the enzyme components and catalytic activities of monooxygenase systems as well as on the P450s 2E, 2B, and 1A in the hamster tissues.