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Influence of gluten free diet on rat liver cytochromes P450

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Celiac disease is being diagnosed in an increasing number of people. Celiatics need a gluten free diet, which may lack sufficient protein, fibre and minerals. The seeds of plants called pseudocereals (buckwheat and quinoa) help to mitigate this deficiency in a diet. This study evaluates the influence of buckwheat or quinoa on the metabolism of chosen drugs. Drugs are at first metabolized by cytochromes P450 (CYP) and therefore we determined CYP expression and activity of Wistar albino rats. Rats (51 days old) were fed a diet with 20% of buckwheat seeds (buckwheat) or 20% of quinoa seeds (quinoa). Rats were allowed to chow and tap water ad libitum. After 89 days, rats were anesthetized and exsanguinated. Livers were taken for further analyses. Microsomal fractions were prepared and used for the study of CYP activity and protein expression was evaluated by Western blotting technique. In this study specific substrates were used for individual human CYP that correspond to rat CYP enzymes (1A1, 2E1, 2C11, 2C11/3A, 2D1/2, 2A1/3A, 2B1, 2C6, 1A2) to determine the influence of buckwheat or quinoa on CYP enzymes. The results of protein expression were within ±25% expression of control group with the exception of 1A2 (buckwheat) by 47% and 2C11 (quinoa) by 65%. Activity of rat CYP 2B1 was increased by 37% (buckwheat) and combined activity of 2C11 and subfamily 3A was increased by 23% (quinoa). Activity was lowered in rat CYP 2D1/2, 2B1 (quinoa) and 2C6 (buckwheat) by 29%, 27% and 30% respectively. Based on the results of CYP protein expressions and activities it can be proposed that having the buckwheat and quinoa seeds daily will not significantly affect the metabolism of simultaneously administered drugs and their consumptions will probably not result in drug interactions.

Biography

Jiří Prokop has completed his Master's degree from Faculty of Science, Palacký University Olomouc, Czech Republic. He is currently pursuing his PhD (Medicinal Chemistry and Clinical Biochemistry Program) at the Faculty of Medicine and Dentistry of Palacký University Olomouc. He has actively attended four conferences (one international). His research interests are Enzymology, Pharmacology, Toxicology, Protein Expression and Oxidative stress.

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