Formate metabolism in micropigs

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Abstract

The toxicity of methanol is directly related to the accumulation of formate which, in turn, is related to the adequacy of the folate-dependent metabolism of formate to carbon dioxide. Thus, humans who possess low hepatic folates and low 10-CHO H_4folate dehydrogenase activity metabolize formate poorly and are sensitive to methanol. Conversely, most laboratory species do not exhibit methanol toxicity because they metabolize formate at high rates. Studies reported here show that the Yucatan micropig has the lowest hepatic folates of any animal species studied. Formate oxidation rates in micropigs were 23% of rates reported for rats. The half-life of formate disappearances from the blood was 74 min, a value twice that reported for rats. In addition, 10-CHO H_4folate dehydrogenase activity and amount in micropig liver is markedly reduced. Micropigs may prove useful in studies of methanol poisoning due to their low capacity for formate oxidation and their reasonable size and ease in handling. © 1992.