

The Effect of Galactose Metabolic Disorders on Rat Brain Acetylcholinesterase Activity

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To evaluate whether in classical galactosemia galactose (Gal), galactose-1-phosphate (Gal-1-P) and galactitol (Galtol) affect brain acetylcholinesterase (AChE) activity, various concentrations (1–16 mM) of these compounds were preincubated with brain homogenates of suckling rats as well as with pure eel *Electroforus electricus* AChE at 37 °C for 1 h. Initially, Galtol (up to 2.0 mM) increased (25%) AChE activity which decreased, thereafter, reaching the control value in high Galtol concentrations. Gal-1-P decreased gradually the enzyme activity reaching a plateau (38%), when incubated with 8–16 mM. However, when the usually found 2 mM of Galtol and 2 mM of Gal-1-P, concentrations in galactosemia were added in the incubation mixture simultaneously, brain AChE was stimulated (16%). Galtol or Gal-1-P modulated brain AChE as well as enzyme activity of *E. electricus* in the same way. Gal, Glucose (Glu) and glucose-1-phosphate (Glu-1-P) had no effect on AChE activity. It is suggested that Galtol as well as Gal-1-P can affect acetylcholine degradation acting directly on AChE molecule. Consequently the direct action of these substances on the enzyme might explain the brain cholinergic dysfunction in untreated galactosemia patients.