Teratogenic properties of L-2,4-diaminobutyric acid and its effect on ornithine decarboxilase in the murine neural tube defect model.

Daphney Matladi and Hendrik Potgieter

Department of Biochemistry, School of Chemistry and Biochemistry, North-West University, Potchefstroom Campus, Potchefstroom

L-2,4-Diaminobutyric acid (DABA), a neurotoxic ornithine analogue, occurring in plants (i.e. flat pea: *Lathyrus sylvestris* L), is a known cause of toxicosis in livestock and may harbour potential dangers to man. The main aim of this study was to investigate the potential of DABA to induce neural tube defects (NTD) in mouse embryos and to ascertain the effects of this amino acid on ornithine decarboxylase (ODC), a key enzyme in the synthesis of polyamines. Pregant Hanover NMRI females were dosed (per os) with DABA (150 - 450 mg/kg body mass) on days 7,8, and 9 *post coitus* (p.c.). Controls received a physiological saline solution. Following decapitation of pregnant females, embryos were harvested (12 or 18 days p.c.) and either stereomicroscopically examined to assess the incidence and nature of congenital defects (18 d p.c.), or frozen away at -75 °C (12 and 18 days p.c.) until the catalytic acivity of ODC could be assayed. DABA proved to be significantly embryotoxic and teratogenic (5-17% NTD) towards mouse embryos. The catalytic activity of ODC was significantly inhibited in the livers of pregnant females and their embryos. DABA proved to be a potent teratogen, causing NTD in embryos exposed to it, or its metabolites and may induce NTD by affecting the biosynthesis of polyamines, involved in embryogenesis.