

Abstract

Dilantin (DPH) is the most commonly prescribed anticonvulsant drug used today, but it is also known to be a human teratogen. Previous studies on the effects of DPH using NSA mice have revealed detailed information on the specific mechanisms of embryo development that are directly affected by DPH potentially causing the collection of fetal abnormalities termed fetal hydantoin syndrome (FHS). It has been shown that the cell cycle is deregulated in preimplantation mouse embryos treated with DPH by altering the expression of cyclin A. Even more, the DNA polymerase δ (Pol δ) protein catalytic subunit has been shown to have a decreased expression contributing to delayed DNA synthesis in 2-cell mouse embryos. This study continues the analysis of the DNA Pol δ subunit by beginning to examine the effect DPH has on the expression of Pol δ mRNA. This would explain whether Pol δ protein levels are being affected at the level of mRNA expression or later on at protein synthesis or a period beyond that. RT-PCR, gel electrophoresis, and ethidium bromide UV-fluorescence imaging were used as tools to examine the relative levels of expression of Pol δ mRNA of DPH and NaOH treated 2-cell mouse embryos at G1 and S phase of the second cell cycle. The results of this study were inconclusive in terms of determining the effect of Dilantin on Pol δ mRNA expression. However, the proper primers for Pol δ were designed, and the concentrations of MgSO₄ and the primers were both optimized at 2mM and 0.125mM respectively. The next step would be to isolate more embryos and run reactions at these optimal levels to determine the effect of DPH on Pol δ mRNA expression.

Honors College
Ball State University
Muncie, IN 47306