The Validated Embryionic Stem Cell Test to Predict Embryotoxicityinvitro

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Backgrounds:
A straight-forward way to identify whether a drug or environmental chemical can be harmful to unborn baby is to evaluate its effect on laboratory animals. All invivo methods need large number of animal and are therefore time consuming and expensive. However, the thousands of chemicals in need of testing, to reduce the spending of live animals, an assortment of in vitro assays has been proposed. In recent years, embryonic stem cell test (ESC) has been used to investigate the mutagenic, cytotoxic and embryotoxic effects of compounds in vitro.

Methods:
The EST uses two cell lines and three endpoints to predict embryotoxic chemicals: mouse embryonic stem cells (D3 cells) and murine fibroblasts (3T3 cells). The validated prediction model was developed based on the inhibition of differentiation of D3 cells into cardiomyocytes, and the inhibition of D3 cells and 3T3 cell viability. In addition, differences in sensitivity between differentiated (adult) and embryonic cells are also taken into consideration.

Results:
The three experimental endpoints: ID50 (50% inhibition of differentiation of ES cells into cardiac myoblasts and IC50 D3 and IC50 3T3 (50% inhibition of cell growth in ES and 3T3 cells in the MTT assay, respectively). According to these results chemicals are classified into three classes of the in vivo (notembryotoxic, weak and strong embryotoxic).

Conclusion:
The in vitro EST described is rapid, simple, and sensitive and can be usefully applied as a component of the risk/hazard assessment process.

Keywords: Cytotoxic, Embryionic stem cell, Mutagenic.

Oral Presentation

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