

ABSTRACT

Teratogenes are external environmental factors that can cause a developmental or a congenital defect in exposed individuals. The methods used for detecting the embryotoxic effect of substances are the classic when laboratory mammals are used and the alternative which use *in vitro* and *in ovo* systems. The main difference between these two is that the alternative methods lack metabolism of maternal organism. The metabolism of maternal organism brings a high variability of results to systems of the classic methods.

We used two alternative methods in this thesis, both using chicken embryo. The first of them was *in ovo* method called CHEST (Jelínek, 1977). CHEST method can be used for administration of tested substances from ED2 to ED6. The disadvantage of this method is due to the dilution of the tested substance after subgerminal application at ED2. Therefore we developed *in vitro* method called SANDWICH. No dilution occurs while using the SANDWICH method.

The aim of this study was to develop *in vitro* method SANDWICH while using proven teratogene (*all-trans* retinoic acid) and its solvent (dimethyl sulfoxide), to estimate beginning of the embryotoxicity dose range for both substances using CHEST and SANDWICH, and finally to compare obtained results.

We confirmed the embryotoxic effect of *all-trans* retinoic acid with method CHEST and SANDWICH. The embryotoxic effect of dimethyl sulfoxide was proven only for the highest concentration tested with CHEST. The teratogenic effect of low concentrations of dimethyl sulfoxide obtained by SANDWICH was surprising. When the results were compared, we found estimated beginning of the embryotoxicity dose range for both substances using CHEST and SANDWICH method differing by two to three dose ranges.

SANDWICH method is a relatively quick and cheap method for primary detection of the beginning of the embryotoxicity dose range of tested substance at early developmental stages of an embryo. The embryo is exposed to the tested substance for longer period of time. This makes the SANDWICH great completion to the CHEST method at ED2.