ASIAN GINSENG (PANAX GINSENG) AGGRAVATES ETHANOL TOXICITY IN JAPANESE RICEFISH (ORYZIAS LATIPES) EMBRYOGENESIS

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Abstract: Alcohol is recognized as one of the oldest known teratogen that has serious central nervous system (CNS), cardiovascular, and craniofacial defects affecting the entire lifetime of an individual. Prevention of FASD, other than women abstaining from drinking alcohol during pregnancy, is not known. The synthetic drugs recommended for the treatment of alcoholism cannot be used by women during pregnancy. The limitations of synthetic drugs have led us to investigate on herbal products. In particular, many Chinese herbs including Asian ginseng (Panax ginseng) have therapeutic properties. More recently, black ginseng (produced from red ginseng by nine cycles of steam treatment) has been shown to inhibit ethanol-induced teratogenesis in mouse embryos in vitro. Due to ethical constraints, human studies of FASD are very limited. Fish embryos like zebra fish (Danio rerio) and Japanese ricefish or medaka (Oryzias latipes) have been proven efficacy and are now commonly used for toxicity studies. We have developed medaka as an animal model to study FASD and use them for searching herbal medicines that can attenuate toxic effects of ethanol. Fertilized medaka (Oryzias latipes) eggs in standard laboratory conditions (16L: 8D, 25 °C) were exposed to ginseng (PG) root extract (0- 2 mg/ml) for 0-2 day post fertilization (dpf). The calculated IC₅₀ of PG as determined on 10 dpf is 355.3 +/- 1.115 μg/ml (n=3, r²= 0.9001). In separate experiments embryos were exposed to sub lethal concentrations of PG (50 and 200 μg/ml) with or without ethanol (100 and 300 mM) either for 0-2 dpf or 1-3 dpf and examined the mortality 10 dpf. It was observed that PG is able to enhance embryo mortality by disrupting the circulation status of the embryos. It is therefore concluded that PG aggravates some of the ethanol-dependent toxic pathways in medaka leading to decrease in embryo survivability.

Key words: Fetal alcohol spectrum disorder, Japanese ricefish, Panax ginseng.

Acknowledgements: This research supported by the National Center for Natural Product Research and the Department of Pharmacology, School of Pharmacy, University of Mississippi, University, MS.