In vitro and in vivo studies on the hepatic effect of acute administration of Chelidonium majus alone and in association with acetaminophen

Caterina L. Mammola1, Annabella Vitalone2, Antonella Di Sotto2, Paola Mariani3, Paolo Izzo1, Gabriela Mazzanti2

1 Department of Human Anatomy, Faculty of Medicine, Sapienza University of Rome, Italy
2 Department of Physiology and Pharmacology, Faculty of Pharmacy, Sapienza University of Rome, Italy
3 Department of General Surgery, Faculty of Medicine, Sapienza University of Rome, Italy

Background Several cases of hepatotoxicity after consumption of herbal preparations containing Chelidonium majus L. have been reported (Mazzanti G et al. J Ethnopharmacol 2009;124:328-32)

Present work was aimed to assess if the co-treatment of C. majus and sub-toxic doses of acetaminophen can induce liver damage.

Materials and methods Cytotoxicity of test substances was assessed in Buffalo normal Rat Liver cell line (BRL-3A) by the MTT reduction method, after 24 h of exposure. In vivo hepatotoxicity was evaluated male Wistar rats. Four experimental groups (n=8) were treated as follow: 1vehicle (polyethylene glycol and saline solution 1:1) + vehicle, 2vehicle+ acetaminophen (0.5 g/kg); 3 C. majus extract (1.5 g/kg) + vehicle; 4 C. majus extract (1.5 g/kg) + acetaminophen (0.5 g/kg), according to the treatment schedule of Janbaz and Gilani (Food Chem Toxicol 1999; 37: 603-7). Blood and liver samples were obtained from rats after anaesthetization with ethyllic ether and were analyzed.

Results C. majus, up to 5 mg/ml did not reduce significantly the cell proliferation. Acetaminophen, at the sub-toxic dose of 0.1 mg/ml, did not significantly increase the C. majus effect.

The treatment with C. majus did not alter liver function parameters. Rats treated with acetaminophen showed a significant increase in total bilirubin, AST, and ALT. The administration of both C. majus and acetaminophen did not increase the effect induced by the single substances.

C. majus did not affect hepatic histomorphology while acetaminophen induced focal hepatocellular necrosis and light inflammatory cells infiltration. The co-administration of C. majus extract did not increase the alterations induced by acetaminophen. Alpha-SMA expression in hepatic stellate cells was negative for all experimental groups.

Conclusions The co-administration of C. majus and acetaminophen does not have any synergistic effect in our experimental model, suggesting that the suspected hepatotoxicity in humans is not caused by association of C. majus with potential hepatotoxic drugs.

Key words Hepatotoxicity, Chelidonium majus, liver function, acetaminophen, interactions