

Promising novel treatment for human cancer -- *Chrysanthemum indicum* extract

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A series of studies have demonstrated that *Chrysanthemum indicum* possesses antimicrobial, antiinflammatory, immunomodulatory, and neuroprotective effects. Recently, much attention has been devoted to the anticancer activity of *Chrysanthemum indicum*, especially in hepatocellular carcinoma (HCC). However, its anticancer mechanism of action is still not clear and needs further investigation.

A research article to be published on September 28, 2009 in the *World Journal of Gastroenterology* addresses this question. The research team, led by Prof. Zong-fang Li from the Second Affiliated Hospital, School of Medicine, Xi'an Jiaotong University, investigated the effects of *Chrysanthemum indicum* extract (CIE) on inhibition of proliferation and on apoptosis, and the underlying mechanisms, in a human HCC MHCC97H cell line.

They examined viable rat hepatocytes and human endothelial ECV304 cells by trypan blue exclusion and MTT assay, respectively, as normal controls. The proliferation of MHCC97H cells was determined by MTT assay. The cellular morphology of MHCC97H cells was observed by phase contrast microscopy. Flow cytometry was performed to analyze cell apoptosis with annexin V/propidium iodide (PI), mitochondrial membrane potential with rhodamine 123 and cell cycle with PI in MHCC97H cells. Apoptotic proteins such as cytochrome C, caspase-9, caspase-3 and cell cycle proteins, including P21 and CDK4, were measured by Western blotting.

The results showed CIE inhibited proliferation of MHCC97H cells in a time- and dose-dependent manner without [cytotoxicity](#) in rat hepatocytes and human [endothelial cells](#). CIE induced apoptosis of MHCC97H cells in a concentration-dependent manner, as determined by flow cytometry. The apoptosis was accompanied by a decrease in mitochondrial membrane potential, release of cytochrome C and activation of caspase-9 and caspase-3. CIE arrested the cell cycle in the S phase by increasing P21 and decreasing CDK4 protein expression.

The researchers drew a conclusion that CIE exerted a significant apoptotic effect through a mitochondrial pathway and arrested the cell cycle by regulation of cell cycle-related proteins in MHCC97H cells without an effect on normal cells. The cancer-specific selectivity shown in their study suggests that the plant extract could be a promising novel treatment for human cancer.

More information: Li ZF, Wang ZD, Ji YY, Zhang S, Huang C, Li J, Xia XM. Induction of apoptosis and cell cycle arrest in human HCC MHCC97H [cells](#) with Chrysanthemum indicum extract. World J Gastroenterol 2009; 15(36): 4538-4546, www.wjgnet.com/1007-9327/15/4538.asp

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