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Inhibition of morusin from edible medicinal mulberry to two tumor cells by inducing cell apoptosis and disturbing the cell cycle

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Morusin is a prenylated flavonoid that is extracted from the root bark of *Morus alba*, which has been found to play a role in anti-cancer promotion. Here, we first screened the effects of morusin on 20 kinds of cancer cells. We found that the tumour inhibitory ratio of the high concentration treatment group (20 µg/ml) could reach 84% with a dose effect manner. The average half maximal inhibitory concentration (IC50) of 20 kinds of cancer cells was 14.79 µM, of which 80% was less than or equal to 15.36 µM. Second, we investigated the effects of morusin on the proliferation, invasion and apoptosis of MDA-MB-453 breast cancer cells and HCT116 colon cancer cells, and explored its mechanism. Morusin remarkably inhibits the growth of these cells in a time- and dose-dependent manner. The apoptotic results showed that the apoptotic rate of MDA-MB-453 cells treated with a high concentration of morusin was 77.73% (P<0.01). Western blotting displayed that morusin could upregulate the expression of E-cadherin and downregulate the N-cadherin and vimentin in a dose-dependent manner, and thus reverse epithelial-mesenchymal transition. It could also upregulate the expression of Bax and cleaved Caspase-3 and downregulate the expression of Bcl-2 and Caspase-3, indicating that morusin could induce cell apoptosis. The results showed that MDA-MB-453 cells were arrested in the G2 phase, and HCT116 cells were blocked in the S phase when treated with morusin, which could disturb the cell cycle. In summary, morusin could inhibit tumour growth and migration and promote cell apoptosis.

Recent Publications

- 1. Yin X L, Liu H Y and Zhang Y Q (2017) Mulberry branch bark powder significantly improves hyperglycemia and regulates insulin secretion in type II diabetic mice. Food & Nutrition Research. 61(1):1368847.
- 2. H Y Liu et al. (2016) Interference effect of oral administration of mulberry branch bark powder on the incidence of type II diabetes in mice induced by streptozotocin. Food & Nutrition Research. 60:31606.
- 3. Ding B, Lv Y and Zhang Y Q (2016) Anti-tumor effect of morusin from the branch bark of cultivated mulberry in Bel-7402 cells via the MAPK pathway. RSC Advances. 6(21):17396-17404.
- 4. Wang S et al. (2014) An efficient preparation of mulberroside a from the branch bark of mulberry and its effect on the inhibition of tyrosinase activity. PLOS One. 9(10):e109396.
- 5. Wan L Z, Ma B and Zhang Y Q (2014) Preparation of morusin from Ramulus mori and its effects on mice with transplanted H22 hepatocarcinoma. Biofactors. 40(6):636-645.

Biography

Yu Qing Zhang obtained his PhD in Technology of Bioscience from Shinshu University, Matsumoto, Japan in 2005. He is a Professor of Applied Biology Department as well as the Silk Biotechnology Lab at Soochow University, P R China since November 2007. His research interest focuses on characterizing mechanical and biological properties and developing new use of silk biomaterial, in particular, applications of silk protein in biomedical materials, biomedicines, daily fine chemicals or cosmetics. Currently, he is appointed as a Scientist of the China Agriculture Research System (CARS) by the Agriculture Ministry of China.

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