

## ABSTRACT

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**Title:** Studies on the protective role of bioactive compound against hepatocellular carcinoma

**Submitted by:** Sayanta Sarkar

Hepatocellular carcinoma (HCC) refers to a major class of liver cancer. Bioactive compounds exhibit protective effects against DEN+CCl<sub>4</sub>-induced hepatocellular carcinoma model in mice. Owing to the many anti-cancer effects of isorhamnetin, we investigated its protective effects in the DEN+CCl<sub>4</sub>-induced HCC mice model. Isorhamnetin was found to have potential anti-tumor properties against HCC. Its administration inhibits TNF- $\alpha$  and some other pro-inflammatory cytokines to suppress cancer-inducing inflammation. Additionally, it regulates Akt and MAP kinase signaling molecules to suppress Nrf2 signaling. It also suppresses cell cycle progression and induces cancer death in DEN+CCl<sub>4</sub> administered mice. Isorhamnetin administration negatively regulates cancer cell metabolism and cell cycle progression. These findings in the DEN+CCl<sub>4</sub>-induced mice HCC model indicate anti-TNF- $\alpha$  properties of isorhamnetin and strongly suggest that it could be used in inhibiting TNF- $\alpha$  mediated sorafenib resistance in liver cancer patients. Isorhamnetin also functions as a PPAR- $\gamma$  activator and Nrf2-inhibitor to suppress cancer progression. Regulation of diverse cellular signaling pathways makes isorhamnetin a better anti-cancer chemotherapeutic candidate. It can be further studied specifically as an inhibitor of the above-mentioned cancer-promoting proteins or an agonist of anti-cancer proteins to develop a more promising treatment for hepatocellular carcinoma.

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The thesis has been divided into 5 chapters:

Chapter 1 gives a brief outline and general introduction the entire study.

Chapter 2 encloses a detailed review of the literature on hepatocellular carcinoma.

Chapter 3 details the introduction and literature review on isorhamnetin.


Chapter 4 gives information related to the materials and methods used in the study.

Chapter 5 describes *in vivo* the antineoplastic properties of isorhamnetin against HCC.

Chapter 6 describes the detailed molecular mechanism of anti-HCC properties of isorhamnetin.

Here, my research work showed the hepatocellular carcinoma ameliorative properties of isorhamnetin with a detailed mechanism.

  
Ratan Gachhui, Ph. D.  
Professor  
Life Sc. & Biotechnology Dept.  
Jadavpur University  
Kolkata - 700 032  
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Sayanta Sarkar  
24.07.23

  
Prof. Parames C. Sil  
Division of Molecular Medicine  
BOSE INSTITUTE  
P-1/12, CIT Scheme VII M  
Kolkata-700 054  
24.07.23