

Uttroside B: A Novel Drug for Liver Cancer discovered at RGCB, Thiruvananthapuram



Solanum nigrum Linn

In a collaborative research at the Rajiv Gandhi Centre for Biotechnology (RGCB) at Thiruvananthapuram, researchers have isolated and characterized a compound Uttroside B from *Solanum nigrum* L., commonly known as Black nightshade, which has immense therapeutic potential against HCC. The work has been done at the laboratory of Dr. Ruby John Anto, RGCB in collaboration with Dr. Ravishankar Lankalapilli from National Institute for Interdisciplinary Science and Technology (NIIST), Thiruvananthapuram.

Solanum nigrum L. is a plant commonly used in traditional medicine preparations. Several reputed Ayurveda references describe the use of this plant for numerous diseases, especially liver-associated ailments. Moreover, the plant is a store-house of nutrients and it is used as common green leafy vegetable in southern India.

Hepatocellular carcinoma (HCC) is the most common type of primary liver cancer in adults, and is the most common cause of death in people with cirrhosis. Unlike other cancers, HCC is inherently resistant to conventional chemotherapeutics and hence prognosis of the patients is extremely challenging. Sorafenib, an orally administered multi-kinase inhibitor remains as the first-line therapeutic option for advanced liver cancer. No other treatment strategy has worked for liver cancer so far. However, sorafenib has several limitations such as high cost, low

bioavailability, severe toxic side-effects etc. which results in its dose reduction and has raised demands for alternative treatment strategies.

The preclinical efficacy of Uttroside B was evaluated using *in vitro* studies carried out in human liver cancer cells and in animals bearing hepatic tumors. The results show that Uttroside B exhibits exceptional therapeutic efficacy towards liver cancer. The compound is more potent than sorafenib, the only FDA approved drug for liver cancer. The Uttroside B has shown cytotoxicity to all liver cancer cells irrespective of their HBV status, while being relatively non-toxic to immortalized liver hepatocytes.

Acute and chronic toxicity studies carried out in mice reveal that uttroside B does not induce significant hepatotoxicity, nephrotoxicity and hematotoxicity, as indicated by serum biochemical analysis and histopathological analysis.

Two patents have been filed on the research finding under Application no. 201641018401 dated 28 May 2016 (National); and PCT/ IN20 17/050204 dated 27th May 2017 (International). The technology has been transferred to the multinational company, Q Biomed (<https://adisinsight.springer.com/drugs/800048876>); <https://qbiomed.com/index.php/pipeline/uttroside>. Besides, a MoU has been signed between RGCB and Oklahoma Medical Research Foundation (OMRF), USA, for a multi-disciplinary, multi-institutional, and international collaboration for the clinical evaluation of the compound.

This work has been presented in the EACR-AACR-ISCR conference held at Jerusalem, Israel on October 9-11, 2018 and received the Keystone symposia global health travel award by Bill and Melinda Gates foundation, for attending the Keystone Symposium, ‘Why So Many Ways to Die? Apoptosis, Necroptosis, Pyroptosis and Beyond’ held on 19-23 November, 2019 at São Paulo, Brazil.

Dr. Bilqeesa Bhat
Project Scientist,
bhat.bilqeesa3000@gmail.com

Contact Person:
Dr. Anish N. P., RGCB