Annals of Pharmacology and Pharmaceutics

Short Communication
Published: 22 Aug, 2017

Taxifolin: A Wonder Molecule in Making Multiple Drug Targets

*Utkarsh Raj, Imlimaong Aier and Pritish Kumar Varadwaj**

Department of Bioinformatics and Applied Sciences, Indian Institute of Information Technology, Allahabad, India

Keywords

Taxifolin; Anti-cancerous; Anti-ebola; Anti-oxidant; Anti-inflammatory

Short Communication

Taxifolin (often referred to as dihydroquercetin) is a flavanonol which is a part of the phytonutrient family (a set of chemical materials that occur evidently in flora and have more than one fitness benefits however aren't taken into consideration vital to human fitness).

Taxifolin has been observed in a variety of cone bearing gymnosperms, like, *Pinus roxburghii* [1], *Cedrus deodara* [1], *Larix sibirica* (the Russian or Siberian larch) and inside the Chinese yew, *Taxus chinensis* var. mairei [2]. Its presence has also been reported in silymarin extract from the milk thistle seeds and cherry wood aged vinegar [3]. The 2D structure of Taxifolin has been depicted in Figure1.

Over the past 50 years, almost six hundred studies (mostly conducted in Russia) have investigated the efficacy and protection of taxifolin. The important roles of the compound Taxifolin has been elucidated in Figure 2. The main highlights of this compound are its antioxidant efficiency and vascular-defensive movement. Taxifolin has also been shown to provide benefits to cardiovascular health, the pores and skin, cognitive feature, contamination, allergic reactions and immunodeficiency, in addition to the fitness of diabetics. Amongst others, research has examined that taxifolin is a brilliant antioxidant, far more effective than dietary carotenoids and it lowers blood viscosity and improves capillary microcirculation. In people with diabetes type II, taxifolin inhibits pro-inflammatory hobby of neutrophils, as a result assisting to protect the vascular device from the damage brought about by diabetes. It also strengthens blood flow in the retinal part of the eye, shielding towards loss of vision via macular degeneration, prevents formation of cataracts with the aid of inhibiting enzyme in the lens, lowers extended blood pressure and regulates an electrical size associated with activation of the coronary heart ventricles. It's role in blood pressure-decreasing and anti-arrhythmia recover people suffering with excessive arterial blood pressure by the inhibition of lipid peroxidation, a system which results in atherosclerosis and inhibition of formation of apolipoprotein B, one of the crucial substances of LDL.

In rats, taxifolin lowers serum and hepatic stages of lipids and cholesterol, offers safety to the brain and nerve cells by inhibiting the expression of enzymes which causes infection and prevents inflammatory white blood cells from attacking and adhering to willing regions of the brain. For this reason, it presents critical neuroprotection toward oxidative damage because of inadequate blood and oxygen supply to the brain. Taxifolin further displays a strong antioxidant property in rats which inhibits the activity of nitric oxide (NO) produced as an inflammatory response. In degenerative thoughts disorder related to stroke-related impaired posterior cerebral flow, taxifolin drastically reduces insomnia, emotional and vegetative symptoms and signs, optimizes intellectual activation at the same time as improving mood and lowers expression of unpleasant bodily sensations. It also inhibits the activity of COX-2, which is known to cause inflammation in animals and humans alike. Improvement of memory in 70% of individuals suffering from cerebral flow problems was observed with over 60% elevation in cognizance.

Taxifolin does not contain mutagenic properties and is much less noxious as compared to its associated polyphenol quercetin [4]. Taxifolin is a promising chemo preventive agent as it can modulate the genes through an ARE-set up process/machinery [5]. Taxifolin reportedly enhances the effectiveness of traditional antibiotics such as ceftazidime and levofloxacine *in vitro*, which has the capability of providing combinatorial therapy to patients suffering from methicillin-resistant *Staphylococcus aureus* (MRSA) related infections [6]. Just like an array of other flavonoids, Taxifolin

OPEN ACCESS

Correspondence:
British Kumar Varadwaj, Department of Bioinformatics and Applied Sciences, Indian Institute of Information Technology, Allahabad, India, Tel: +91-532-2922219;
E-mail: pritish@iiita.ac.in

Received Date: *29 May 2017*
Accepted Date: *21 Jul 2017*
Published Date: *22 Aug 2017*

Citation:
Raj U, Aier I, Varadwaj PK. Taxifolin: A Wonder Molecule in Making Multiple Drug Targets. Ann Pharmacol Pharm. 2017; 2(8): 1083.

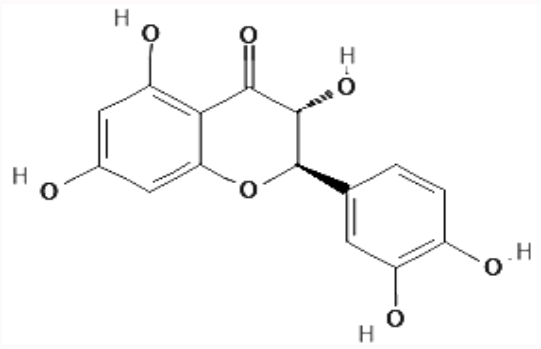

Figure 1: Structure of Taxifolin.

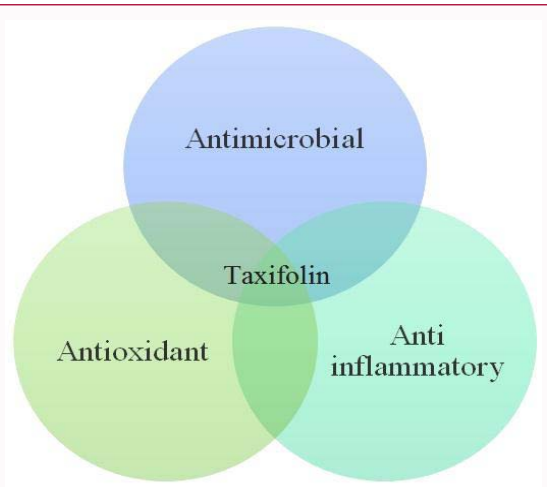

Figure 2: Important roles of the compound Taxifolin.

also shows antagonistic response towards the opioid receptor in non-selective manner [7]. It has further been placed to assume the role of activator of the adiponectin receptor 2 (adipor2).

Recent studies have elucidated the active involvement of Taxifolin as an inhibitor of viral protein of the dreadful ebola virus [8]. *In silico* studies to search for an efficient inhibitor of protein produced by the ebola virus has rated taxifolin above the present lead bcx4430, an adenosine analogue. In depth study of the biochemistry of taxifolin, its role in the inhibition of microorganisms and mechanism on oxidative stress and inflammation related components may be of great importance in increasing the bioaccessibility and bioavailability of taxifolin as an effective drug.

References

1. Willför S, Ali M, Karonen M, Reunanen M, Arfan M, Harlamow R. Extractives in bark of different conifer species growing in Pakistan. Holzforschung. (2009);63(5):551-8.
2. Cunfang Li, Changhong Huo , Manli Zhang, Qingwen Shi. Chemistry of Chinese yew, Taxus chinensis var. mairei. Biochemical Systematics and Ecology. 2008;36(4):266-282.
3. Cerezoa AB, Tesfayea W, Soria-Díazb ME, Torijac MJ, Mateoc E, Parrillaa MCG, et al. Effect of wood on the phenolic profile and sensory properties of wine vinegars during ageing. J Food Comp Anal. 2010;23(2):175-184.
4. Makena PS, Pierce SC, Chung KT, Sinclair SE. Comparative mutagenic effects of structurally similar flavonoids quercetin and taxifolin on tester strains Salmonella typhimurium TA102 and Escherichia coli WP-2 uvrA. Environmental and Molecular Mutagenesis. 2009;50(6):451-9.
5. Byoul LS, Hyun CK, Dangaa S, Amgalan S, Won NC. The Chemopreventive Effect of Taxifolin Is Exerted through ARE-Dependent Gene Regulation. Biolo Pharm Bul. 2007;30(6):1074-9.
6. An J, Zuo GY, Hao XY, Wang GC, Li ZS. Antibacterial and synergy of a flavanonol rhamnoside with antibiotics against clinical isolates of methicillin-resistant Staphylococcus aureus (MRSA). Phytomedicine. 2011;18(11):990-3.
7. Katavic PL, Lamb K, Navarro H, Prisinzano TE. Flavonoids as opioid receptor ligands: identification and preliminary structure-activity relationships. J Nat Prod. 2007;70(8):1278-82.
8. Raj U, Varadwaj PK. Flavonoids as multi-target inhibitors for proteins associated with Ebola virus: in silico discovery using virtual screening and molecular docking studies. Interdisciplinary Sciences: Interdiscip Sci. 2015.