Chromone: A molecule of Choice with Versatile Activities

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Chromones are a group of naturally occurring oxygen containing heterocyclic compounds and the chemistry of chromones has been explored and reviewed over the years\(^1\)\(^-\)\(^3\). The “chromones” trivial name was first used by Bloch and Kostanecki in 1900. Naturally occurring chromones known to contain the 4H-benzopyran moiety 1. Chromone 2 and its derivatives are very common motifs in natural products as well as drug.

Chromones are very common moiety found in plants and they show interesting biological activities\(^4\)\(^-\)\(^5\). Chemists showed their interest towards chromones because they are naturally abundant in the flavonoid family, with their interesting pharmaceutical activities\(^6\)\(^-\)\(^8\). Most of the naturally occurring chromones contain alkoxy or hydroxy groups at C-5 and C-7 position, and a methyl group at C-2 position. Peucenin and Eugenin were the first compounds containing chromone nucleus were isolated from the rhizome of the masterwort *Peucedanum ostruthium*\(^9\) and the wild clove *Eugenia caryophyllata Thunbg*\(^10\) respectively.

Another class of naturally occurring chromones are the styrlychromone derivative isolated from the marine cyanophyte *Hormothamnion enteromorphoides*\(^11\). These compounds were found to be potent cytotoxic agents to P-388 lymphocytic leukemia and HL-60 human promyelocytic leukemia cell lines. *Lachnum virgineum* is a rich source of biologically active metabolites, some of these show mild inhibition against the growth of Mycobacterium *tuberculosis*\(^12\) *Aposphaerins* A are potent antibiotics isolated from the endophytic fungus *Aposphaeriaspec species* which contain the 2-vinylchromone system in their structure\(^13\).
Biological activity in some chromone derivatives

Chromones occurred most widely in nature and exhibit important biological as well as pharmacological activities. Peucenin\textsuperscript{14, 15} Eugenio\textsuperscript{16} and isoeugenol\textsuperscript{17} are some commonly occurring chromones. Flavone derivatives show significant inhibitory and cytotoxic properties against numerous tumor cell lines have been identified as inhibitor for different protein kinases\textsuperscript{18}. Chromones from natural food sources such as berries, vegetables, tea and wine showed significant inhibitory activity against DNA topoisomerases\textsuperscript{19, 21}.

Chromone with anti-allergic activity

3-Hetarylchromones derivatives exhibit a wide range of biological activities which include anti-allergic, anti-cholesteremic, ant-microbial and anti-fungal activity. 3-(3-acetyl-5-aryl-2, 3-dihydro-1, 3, 4-oxadiazol-2-yl) chromones has been synthesized by using the available 3-formylchromone which function as anti-allergic agent\textsuperscript{22}.

Chromone with anti-cancer activity

The chromeno-pyridones synthesized involving reactions on the periphery of chromone ring structure which have been evaluated against various human cancer cell lines for the study of cytotoxic activities. Studies revealed the utilization of chromone ring structures bearing electron withdrawing groups on chromone moiety were more active against cancer cells as compared to electron donating groups. These synthesized compounds can be used in the study of anti-cancer activities and screening of mode of action studies\textsuperscript{23}. 
Chromone with anti-oxidant activity

Studies of molecular modelling on some chromone derivatives shows that they have inhibitory activity against Poly [ADP- ribose] polymerases. Analysis of these compounds shows that the inhibitory activity exhibited molecule is very remarkable. Diaminoflavone derivatives of chromone show significant antioxidant activity for quenching of free radical Generated24.

Chromone with anti-inflammatory activity

The 3-formylchromone and its derivative possess a varying degree of respiratory burst inhibitory assay. In addition Lutelin a naturally occurring compound show a significant anti-inflammatory activity as compare to indomethacin and aspirin25.

References: