

Short Communication  
**Flavonoid and cancer prevention – Mini review**

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Flavonoid, symbolize an extraordinary assembly of plant secondary metabolites, in addition new investigations suggest as a traditional medicines, with therapeutic impact. Flavonoid molecules encompass characteristic structures diversity and wide-ranging pharmacological activities that may afford new drug discovery with inventive and prospective therapeutic indications to cancer chemoprevention and chemotherapy. Recent research background enhances predominantly functional activity of Flavonoids for cancer research. In this review we make sure about Flavonoid with all prospective of their anti-cancerous property.

**Key word:** Flavonoids, polyphenolic compounds, Cancer research

A human adult comprises about  $10^{15}$  cells; scores of them divide and differentiate in order to refurbish organs and tissues, which require cell turnover<sup>1</sup>. However, if the cells do not stop dividing, they may lead to cancer. Characteristically, cancer is an unrestrained proliferation of cells which become structurally abnormal and possess the ability to detach them from a tumor and establish a new tumor at a remote site within the host<sup>2</sup>. Globally, cancer represents a substantial burden of disease in the community and appears to be a prime cause of concern. Every year over 200,000 people are diagnosed with cancer in the United Kingdom only, and approximately 120,000 die as an aftermath of the disease<sup>3</sup>. According to the International Agency for Research on Cancer, in 2002, cancer killed > 6.7 million people around the world and another 10.9 million new cases were diagnosed<sup>4</sup>. If the results are extrapolated, at the same rate, an estimated 15 million people will have cancer, annually, by 2020. According to an estimate given by American Cancer Society<sup>5</sup>, about 1,500,000 new cases and over 500,000 deaths are expected in the US by 2009. The National Cancer Registry of South Africa has spotted the cancers of bladder, colon, breast, cervix, lungs and melanoma commonly among inhabitants<sup>6</sup>. Attempts are underway to work out the therapeutic and anti-neoplastic properties of medicinal plants<sup>7-12</sup>. Plant bioactive compound is a potential source for antitumor and cytotoxic activities<sup>13-14</sup>. Consequently, herbal medicines have received much attention as substitute anticancer drugs.

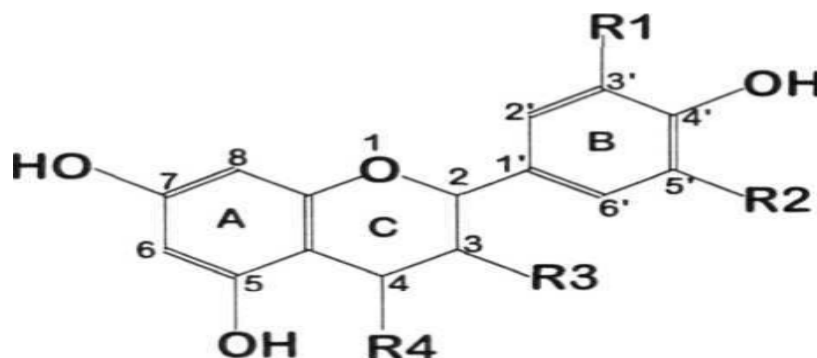
## FLAVONOIDS

Flavonoids are compounds form one of the key classes of derivative metabolites; they exhibit a variety of structures and are responsible for the major characteristics properties. Flavonoids are well conventional that plants have constantly been valuable sources of antitumor or cancer

obstacle compounds<sup>15-16</sup>. Huge groups of different phenolic compounds from plants are significant and vital anticancer agents<sup>17-18</sup>. In numerous cases, they are much more successful and In fact, they are much studied in order to discover their additional use in pharmacy and medicine in the prevention and therapeutic of cancer.

### STRUCTURE OF FLAVONOID MOLECULE

Flavonoids are a group of more than 4000 polyphenolic compounds that occur in nature in plant foundation. These compounds acquire a common phenyl-benzopyrone arrangement (C6-C3-C6), and they are categorized according to the saturation level and opening of the fundamental pyran ring, mainly into flavones, flavanols, isoflavones, flavonols, flavanones, and flavanonols.



**Fig.1 Basic structure of flavonoid molecule**

Modification of the 'C' and 'B' give rise to an array of flavonoids:

Flavanone, R3-H, R4=O, R1-H, R2-H

Dihydroflavonol, R3-OH, R4=O, R1-H, R2-H

Leucoanthocyanidin, R3-OH, R4-OH, R1-H, R2-H

Anthocyanidin, R3-OH, R4-H, O1 =C2, C3=C4, R1-H, R2-H

Anthocyanin, R3-OGlc, R4-H, O1=C2, C3=C4 R1-H, R2-H

Flavone, R3-H, R4=O, C2=C3, R1-H, R2-H

Isoflavanone, shift of aryl group (B ring) from C2 to C3 position

Flavonol, R3-OH, R4=O, C2=C3, R1-H, R2-H

Monohydroxyl flavonoid (e.g., pelargonin), R1-H, R2-H

Dihydroxyl flavonoid (e.g., cyanin), R1-OH, R2-H

Trihydroxyl flavonoid (e.g., delphinin), R1-OH, R2-OH

### FLAVONOIDS: BIOLOGICALLY ACTIVE COMPOUNDS

In recent years, researches about flavonoids are becoming the area under discussion of therapeutic research and flavonoids represent one of the most interesting groups of biologically active compounds. flavonoids compounds have an amazing variety of biological activity lying on cancer prevention. These comprise, for instance, antimutagenic, and anti-carcinogenic, activities<sup>19-21</sup>. In addition majority of flavonoids have been definite to inhibit many kinds of cultured human cancer cell lines, at the same time as less or no toxic to human typical cells<sup>22-26</sup>. Flavonoids are concerned in the regulation of cell proliferation and anticancer properties<sup>23, 24, 27-31</sup>. Flavonoids have been shown as angiogenesis inhibitors derived from natural sources<sup>32</sup>. Therefore, flavonoids compounds may have potential in support of the cure of solid tumors<sup>33-34</sup>.

## FLAVONOIDS AND CANCER PREVENTION

Dietary flavonoids, combined with other components such as various vitamins, play an important role in cancer prevention. Flavonoids act on reactive oxygen species, cell signal transduction pathways related to cellular proliferation, apoptosis, and angiogenesis. It has been stated that flavonoids, as antioxidants, can inhibit carcinogenesis<sup>35</sup>. Some flavonoids- such as fisetin, apigenin, and luteolin are stated to be potent inhibitors of cell proliferation<sup>36</sup>. However there have been a number of reports that directly contradict the potential role of flavonoids as antioxidants/anticancer agents. Up to that time published relevant literature for protection against some forms of cancer has shown many common flavonoids such as the synthetic flavone, flavopiridol, soy isoflavonoid- Genistein, and many researchers have tried to elucidate possible structural activity relationships that might lead to new drug discovery and focuses on the biological effects of the main flavonoids, Overall, exciting data show that dietary flavonoids could be considered as a useful cancer preventive approach.

## DRUG DISCOVERY

Current research reveals the different potential application of flavonoids for control disease. Drug development is essential part of research on dietary flavonoids compounds that showed improved drug-like properties. We highlight the role of Ethno-medicine and its assessment in favor of drug discovery. In the present time herbal products are considered to be symbols of protection in comparison to the synthetic product that are regarded as unsafe to human life and environment.

## CONCLUSION

Although a large number of synthetic drugs are being added to the world of modern pharmacopoeia, but still no system of medicine in the world which can solve all the health problems. Therefore the search for new therapeutic constituents from plants is genuine and urgent. There are large numbers of indigenous plants left which have not been investigated thoroughly from modern scientific view or their curative values have not been recognized. Thus there is an urgent need for systematic phytochemical investigation of those plants which have not been investigated systematically or worked at a time when modern facilities were not available for their potential therapeutic components. More research can be done to investigate the unknown and unexplored potential of plants flavonoids. Further analysis of flavonoids can be carried out by way of making use of different analytical methods such as HPTLC, HPLC, FTIR, NMR and UV spectrophotometer analysis.

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