Flavonoids: As Anticancer Drug

Chate Nitin G[1], Dr. Shaymlila B Bawage[2], Prof.Nandkishor B. Bawage[3]
[1]*B Pharmacy Final Year Student, Latur College of Pharmacy, Hasegaon,Tq.Ausa. Ausa Dist.Latur413512 Maharashtra, India*
[2,3] *Dept. Of Pharmacognosy & Phytochemistry, Latur College of Pharmacy, Hasegaon,Tq.Ausa. Ausa Dist.Latur413512 Maharashtra, India*
[4] *Dept. Of Pharmaceutical Chemistry, Latur College of Pharmacy, Hasegaon,Tq.Ausa. Ausa Dist.Latur413512 Maharashtra, India*

Abstract **- Cancer is a major public health problem in both developed and developing countries. Many plant cancers found in plants including taxon, vinblastine, vincristine, campothecin derivatives, topotecan, irinotecan and etoposide are used in clinics around the world. Other promising anti-cancer agents include flavoridin, roscovitine, combretastatin A-4, botulinic acid, and Silvestro. An increasing number of studies investigating how different components of food interact at the cellular and cellular level to determine the end of a cell has been proven.**

INTRODUCTION

Flavonoids are polyphenolic plant secondary metabolites containing generic phenyl benzopyrone (C6-C3-C6). In contrast to their heterocyclic ring, flavonoids can be divided mainly into flavones, flavanols, flavanones, flavanol's, anthocyanidins, isoflavones, and chalcones. Flavonoids are part of this family and contain more than 4000 species. They have been classified according to its molecular structure consisting of two benzene rings attached to a straight carbon-linear series and forming an oxygen heterocycle (C6-C3-C6) and most of them come from various hydroxyl compounds, methoxy, and O-glycoside group substituents in basic benzo-pyrone (C6-C3-C6) [2] moiety.

CHEMICAL PROPERTIES OF FLAVONOIDS

All flavonoids have a basic stock of flavone - the 15-carbon phenylpropanoid chain (C6-C3-C6 system), which forms two fragrant rings (A and B) connected by a heterocyclic pyran ring Depending on the chemical structure, the oxidation rate, as well as linking chain unsaturation flavonoids. Flavonoids appear as aglycones, glycosides and methylated derivatives. The basic structure of flavonoid is the aglycone six-member ring combined with a benzene ring either α-pyrone (flavanols and flavanones) or its dihydroderivative (flavanols and flavanones). Polyphenolic terpenoids are the most widely studied flavonoids with a structure of C6-C3-C6. The chemical composition of flavonoids is based on C15 bones with a CHROMANE ring holding a second ring of aromatics B in the 2nd, 3rd or 4th position.

METABOLISM & BIOAVAILABILITY OF FLAVONOIDS

According to the U.S. Food and Drug Administration (FDA), definition of bioavailability is "a measure and the degree to which an active ingredient or active ingredient works in a drug product and is available where it is made". The same principle can be applied to flavonoid chemicals in food.

Aside from the health claims of flavonoids, it is a well-known fact that the availability of flavonoids is generally low and can vary greatly between different flavonoid classes and compounds in a particular class. The urine-related excretion of anthocyanin and daidzein diet was 0.3% and 43% respectively describing differences in flavonoids availability. When it comes to flavonoids with complex structures and large molecular weights, the availability of bioavailability can be very low. The metabolism of flavonoids is generally indicated. Flavonoids are low in enzymes for binding and hydrolysing in the small intestine, liver and colon and are all composed of O-glucuronides, sulphate esters and O-methyl esters and no aglycones present in plasma.

Different groups of flavonoids

Benefits of flavonoids: -

There are several important groups of flavonoids, including anthocyanin's, flavanols, flavones, flavanols, flavanones and isoflavones. Within the small group of flavanol there are still more collections. Each of these subgroups and each type of flavonoid carries its own unique action, benefits and diet from it.

Flavones:

These include luteolin and apigenin. A good source of flavone is an edible vegetable with succulent branches, parsley, various herbs, and hot peppers. Flavones are associated with full antioxidant benefits and delayed drug activity. Flavones are one of the smallest groups of flavonoids. Flavones are as abundant in leaves, flowers and fruits as glucosides. The edible vegetable with succulent branches, parsley, red pepper, chamomile, mint and ginkgo biloba are some of the major sources of flavone. Luteolin, apigenin and tangerine fall under this category of flavonoids.

Anthocyanin's:

These include Maldivian, pelargonidin, peonidin and cyanidin. Good sources of anthocyanidins include red, purple and blue berries; pomegranates; plums; Red wine; and purple red grapes Anthocyanidins are associated with heart health, antioxidant effects and help with obesity and prevent diabetes. Anthocyanins are color-coded plants for plants, flowers, and fruits. Cyanidin, delphinidin, malvidin, pelargonidin and peonidin are the most widely studied anthocyanins (Fig. 2). They occur mainly on the outer layers of various fruit cells such as cranberries, black currants, red grapes, merlot grapes,etc.

Flavanones:

These include hesperidin, eriodyctiol and naringenin. Flavanones are found mainly in citrus fruits. They are associated with heart health, relaxation and general antioxidant and anti-inflammatory activity. Flavanones are another important component commonly found in all citrus fruits such as oranges, lemons and grapes. Hesperidin, naringenin and eriodyctiol are examples of this type of flavonoids. Flavonones are associated with many health benefits due to their powerful free properties. These compounds are responsible for the bitter taste of the juice and the peel of citrus fruits.

Isoflavones:

This small group includes genistein, glycitein and daidzein. Isoflavones are mainly concentrated in beans and soy products, as well as beans. They are phytoestrogens, which means they are chemicals that act like the hormone oestrogen. Scientists suspect that they may be helpful in reducing the risk of hormonal cancers, such as breast, endometrial, and prostate cancers, although the results of the study are currently mixed. In various studies, isoflavones sometimes act as antioxidants and sometimes as oxidants, so their effect on cancer is unclear.

Flavanols:

This small and widely distributed group of flavonoids includes quercetin and kaempferol. They are found in onions, leeks, sprouts in Brussels, kale, broccoli, tea, berries, beans and apples. Quercetin is an antihistamine associated with helping to get rid of hay fever and hives. It is also known for its anti-inflammatory properties. Kaempferol and other flavanols are associated with potent anti-inflammatory and antioxidant-inducing anti-inflammatory properties. Flavanonols, also called dihydroflavonols or catechins, are the main sources of 3-hydroxy of flavanones. They are a very diverse and multisubstituted group.

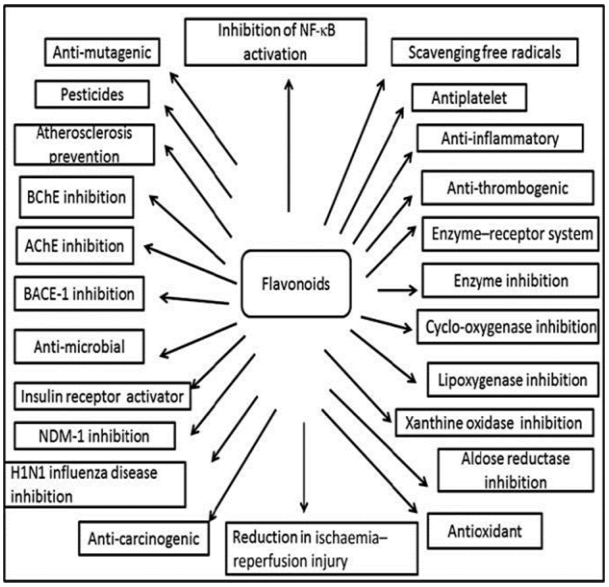
Flavonols:

There are three main types of flavanols: monomers (more commonly known as catechins), dimers and polymers. Flavones are found in zinc, cocoa, grapes, apples, berries, fava beans and red wine. Catechins are most common in green and white tiles, while dimers, which are associated with lowering cholesterol, is found in black tea. Scientists suspect that catechins may be helpful in relieving chronic symptoms of fatigue. Catechins are also associated with cardiovascular health Flavanols are flavonoids with a ketone group. They form blocks of proanthocyanins. Flavanols are derived mainly from a variety of fruits and vegetables. The most widely studied flavanol’s are kaempferol, quercetin, myricetin and fisetin.

ACTIVITIES AND USES OF FLAVONOIDS

Flavonoids are divided into different categories such as alkaloids, terpenoids and phenolics. Flavonoids perform many protective functions in the human body

(Figure 3). Many flavonoids have been developed as bioactive chemicals that disrupt nucleic acids or proteins and exhibit antimicrobials or insecticides and medicinal properties. Flavonoids are therefore of interest in medicine as a means of treatment and at the same time in agriculture as pesticides.



WEIGHT MANAGEMENT

Premkumar noted that flavonoids are also associated with inflammation and weight loss. "Flavonoid content can reduce inflammation and lower levels of the hormone that suppresses appetite, leptin," he said. "We know for sure that leptin plays an important role in food use because mice with a genetic mutation in leptin or their receptor are overweight, and these animals are used as role models for diabetes and obesity."

FUTURE RESEARCH AND DEVELOPMENT PLANS

Flavonoids have received a lot of attention in literature over the past 10 years and many potential beneficial effects have been identified. However, more research is being done on in vitro and silico studies. Therefore, further studies are needed so that the benefits of flavonoids in food can be enhanced for better human health. The study of flavonoids is complex due to differences in different cellular structures and a lack of detail on the availability of the findings.

CONCLUSIONS

Flavonoids are natural molecules, present in human food and beverages since ancient times; Therefore, it does not have the same harmful side effects as synthetic anti-cancer drugs Many studies have shown their beneficial effects in reducing inflammation, to regulate the immune response.

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