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Pharmaceutical Sciences **Review Article……!!!**

CARDIAC GLYCOSIDES WITH MEDICINAL USES

DR.S. SENTHILKUMAR

KARUR, TAMILNADU, INDIA.

KEYWORDS:

Pharmacological activity, medicinal plant, Cardiac glycosides, Heart disease, therapeutic application.

FOR CORRESPONDENCE:

DR.S. SENTHILKUMAR *

ADDRESS:

KARUR,

TAMILNADU, INDIA.

ABSTRACT

Cardiac glycosides are organic compounds containing two types names cardenolide and bifadienolide. Cardiac glycosides are found in a diverse group of plants including digiyalis purpurea and digifalis lanata, nerium oleander, thevetiaperuviana, convallarianjalis. Cardiac glycosides have been also found in asian herbal products and have been a source of human toxicity. The most important use of cardiac glycosides is its affects in treatment of cardiac failure and anticancer agents for several types of cancer. Digitalis compounds have historically been used in the treatment of chronic heart failure owing to their cardiotonic effect. Although newer and more efficacious treatments for heart failure are available, digitalis conpounds have a small direct diuretic effect on the kidney.

INTRODUCTION:

Çardenolides and bufadienolides are described as cardiac glycosides owing to the similarity in their biological activity, viz, the increase in the contractile force of the heart by inhibiting the enzyme Na^+, K^+, ATPASE. The enzyme is the only receptor for the cardiac glycosides and is responsible for the active extrusion of the intercellular Na^+ in exchange for extracellular K^+.

Cardiac glycosides occur in small amount in the seeds, leaves, stems, roots and bark of plants of wide geographical distribution. Many species grow in tropical regions and have been employed by natives of Africa and south America for preparation of arrow poisons for use in hunting and fighting.

MEDICINAL USES OF CARDIAC GLYCOSIDES:

The pharmacological effectivieness of the cardio-glycosides is dependent on both the aglycone and the sugar attachements. The inherent activity resides in the aglycone, but the sugars render the compounds more soluble and increase the power of fixation of the glycosides to the heart muscle. It appears that the key grouping for the attachment of the molecule through a hydrogen bond to the phosphorylated receptor enzyme (ATPASE) is the α, β – unsaturated carbony 1 function of the ring. All the active aglycones features hydroxyls ar C-3 and C14 and the presence of a third hydroxyl ar C_{12} or C_{16} will modify the activity and toxicity of the compound. The sterochemical requirements for activity include the cisconfiguration between rings C and D. The B-orentation of the unsaturated lactone ring at C-17 and the 3-B-orientation of the glucosidic linkage.

The most important use of the cardiac glycosides is its affects in treatment of cardiac failure. In cardiac failure or congestive heart failure, heart cannot pumb sufficient blood to maintain body needs. During must reestablish the concentration gradient, pumbing Na^+ into the cell against a concentration gradient. This process requires energy, which is obtained from hydrolysis of ATP to ADP by NA^+/ K^+ - ATPASE. Cardiac glycosides inhibit NA^+/ K^+ - ATPASE, and consequently increase the force of myocardial contraction.

Digitoxin used as a potential anticancer agent for several types of cancer. Anvirzel is an extract of nerium oleander used as a potential treatment for cancer. Two of the active components of anvirzel are the cardiac glycosides oleandrina and oleandrigenin. Cardiac glycosides such as digitoxin and ouabin have been show to be selectively cytotoxic to tumour as opposed to normal cells. Moreover, this class of agents has also been shown to act as potent radio sensitizers.

ANTICANCER PROPERTIES:

At present, cancer is one of the major causes of death worldwide. Extensive research has been conducted over the last decade in an attempt to identify promising, compounds that have anticancer effects. Cardiac glycosides are natural compounds that have been previously documented to be

antiarrhythmic agents, and their potential anticancer properties were identified thereafter, cardiac glycosides have been shown to have anticancer activities during various stages of carcinogenesis.

CONCLUSION:

Cardiac glycosides have a long history of therapeutic application. The early understanding of their positive inotropic effects facilitected their use as effective drugs for the treatment of heart-related pathologies. More recently, considerable in vitro, in vivo and epidemiological data support novel roles for such drugs for the treatment of several diseases.

Most notably, it is now established that cardiac glycosides can induce apoptosis and inhibit the growth of cancer cell lines at concentrations close to those found in the plasma of patients with cardiac compounds. Further more, on the basis of the increased susceptibility of cancer cells to cardioc glycosides, the potential use of cardiac glycosides as anticancer agents might be associated with fewer side effects than traditional cytotoxic therapical. These cytoprotective effects might from the basis for novel cardiac-glycoside based future therapies for the treatment of is chamic stroke and neurodegenerative diseases.

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