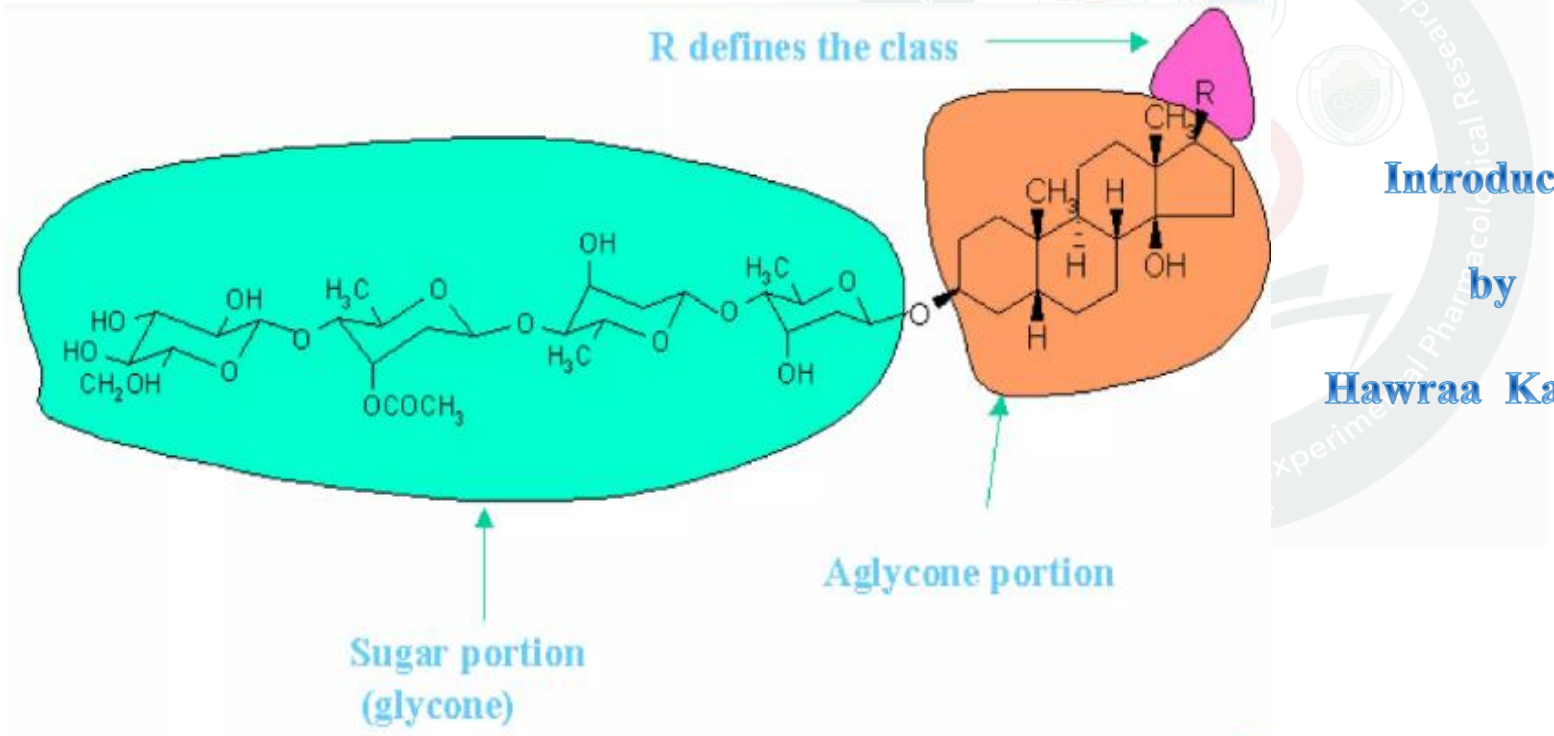
CARDIAC GLYCOSIDE EXTRACTION AND IDENTIFICATION



Introduced

by

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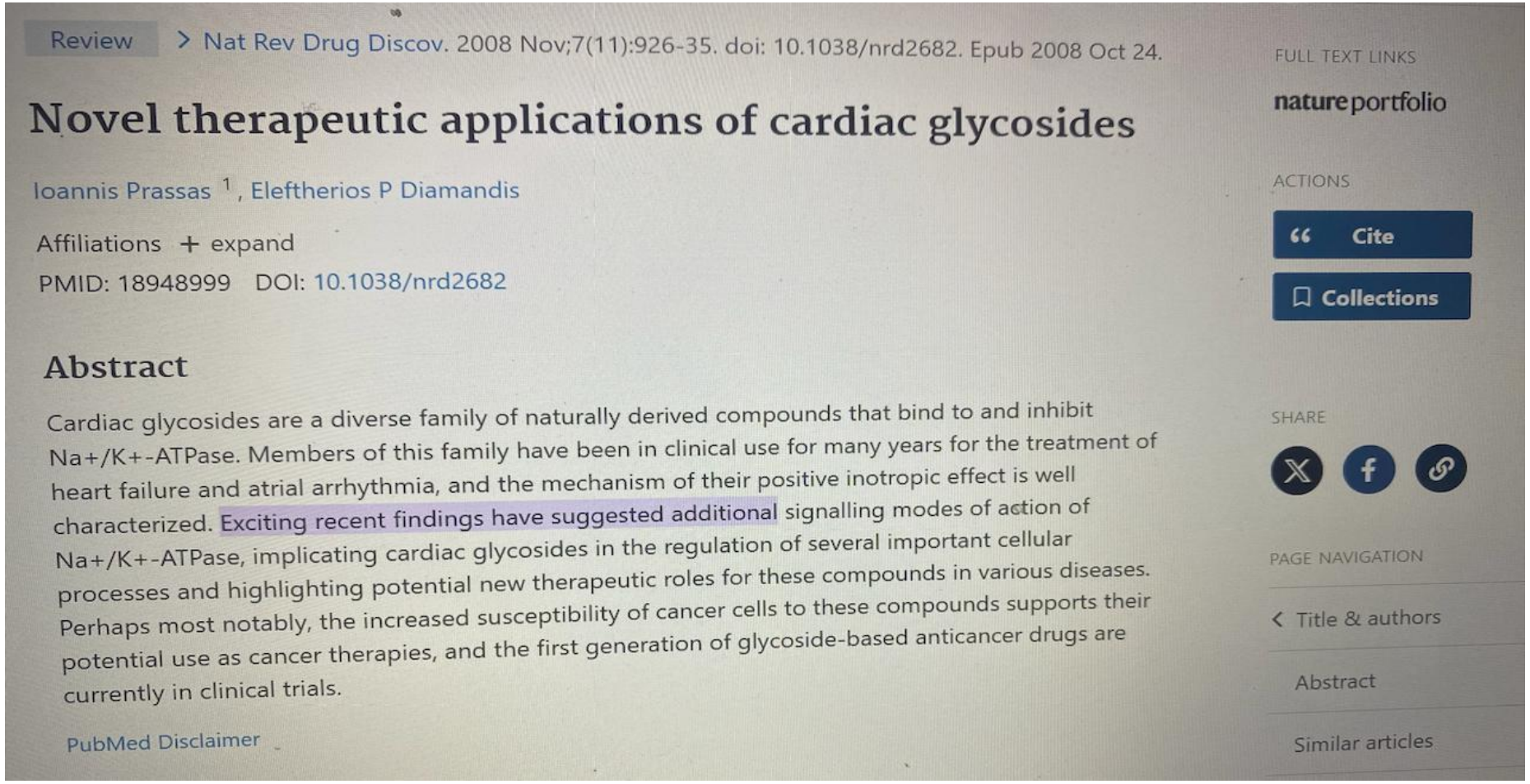
Introduction

- **Cardiac glycosides** are a class of organic compounds that increase the output force of the heart and increase its rate of contractions by acting on the cellular sodium-potassium ATPase pump.

- They are selective steroidal glycosides and are important drugs for the treatment of heart failure and cardiac rhythm disorders.

Other uses



Review > Nat Rev Drug Discov. 2008 Nov;7(11):926-35. doi: 10.1038/nrd2682. Epub 2008 Oct 24.

Novel therapeutic applications of cardiac glycosides

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Affiliations + expand

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Abstract

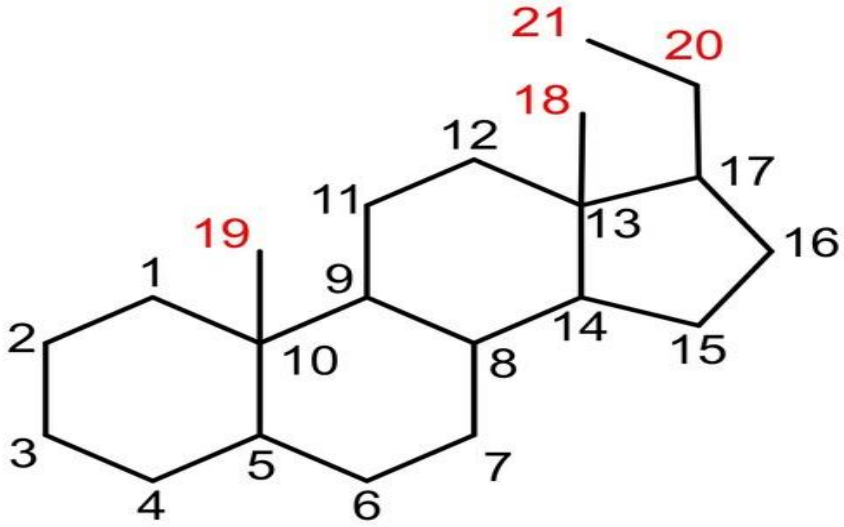
Cardiac glycosides are a diverse family of naturally derived compounds that bind to and inhibit Na+/K+-ATPase. Members of this family have been in clinical use for many years for the treatment of heart failure and atrial arrhythmia, and the mechanism of their positive inotropic effect is well characterized. Exciting recent findings have suggested additional signalling modes of action of Na+/K+-ATPase, implicating cardiac glycosides in the regulation of several important cellular processes and highlighting potential new therapeutic roles for these compounds in various diseases. Perhaps most notably, the increased susceptibility of cancer cells to these compounds supports their potential use as cancer therapies, and the first generation of glycoside-based anticancer drugs are currently in clinical trials.

Structure

- ***Cardiac glycoside*** all share the basic steroidal nucleus cyclopentaphenanthrene , a tetracyclic aromatic structure

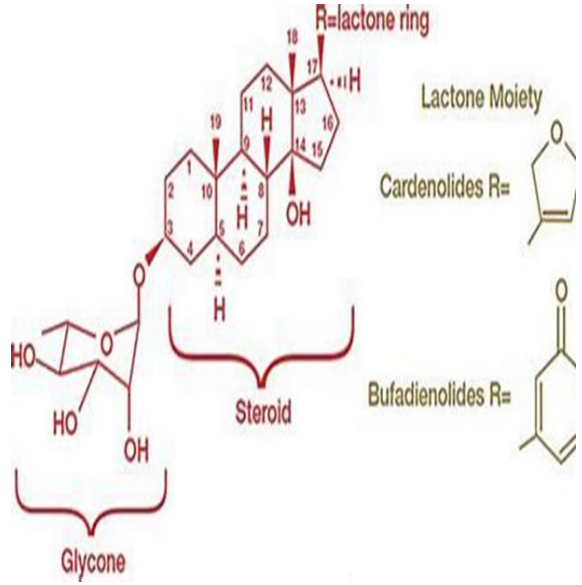
- Cyclopentaphenanthrene structure consist of two part :

  - Three fused benzene ring (phenanthrene)
  - Five membered cyclopentane ring



Classification

Cardiac glycosides divided to groups:

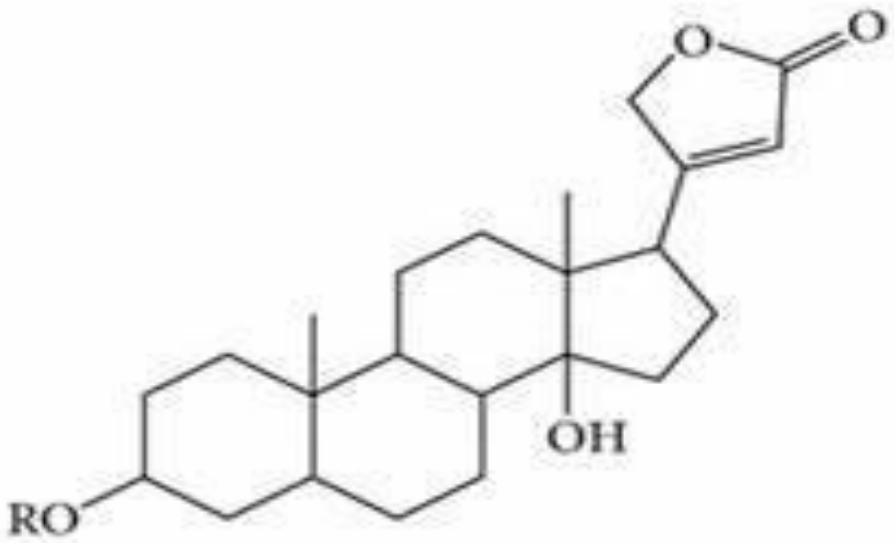


Cardenolides (23 C) :which is contain **5** membered un saturated lactone ring at C-17 position of steroid nucleus

e.g. Digoxine from foxglove and Oliandrin from oleander or rosebay

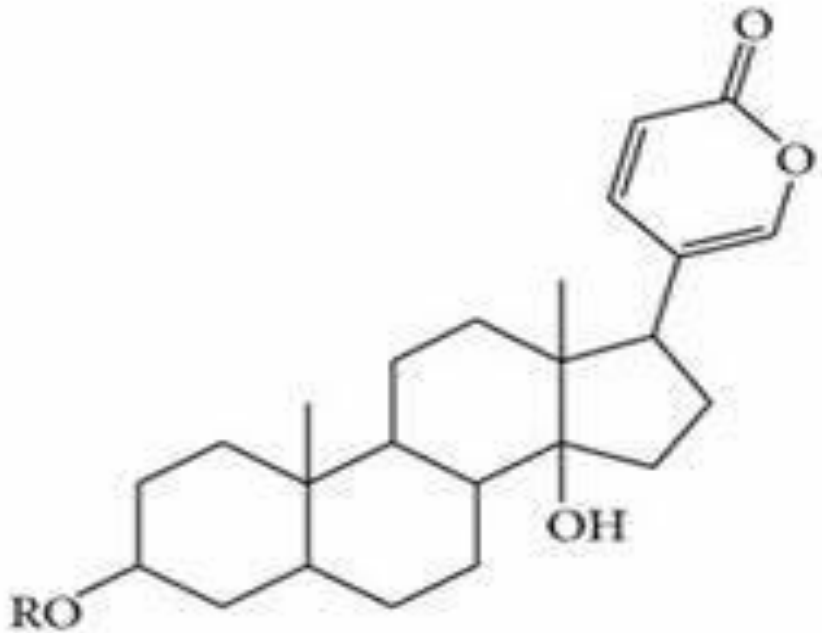
Bufadienolides (24 C) : which is contain 6 member lactone ring at C-17 position of steroid nucleus e.g. scillarenin ,obtain from Squill (rodenticide)

Classification



Cardenolide

Digitoxin: R = digitoxose-digitoxose-digitoxose



Bufadienolide

Bufalin: R = H

Plants

common name : foxglove

scientific name :Digitalis purpurea

Active ingredient :digoxin

fammily: Plantaginaceae

common name : oleander or rosebay

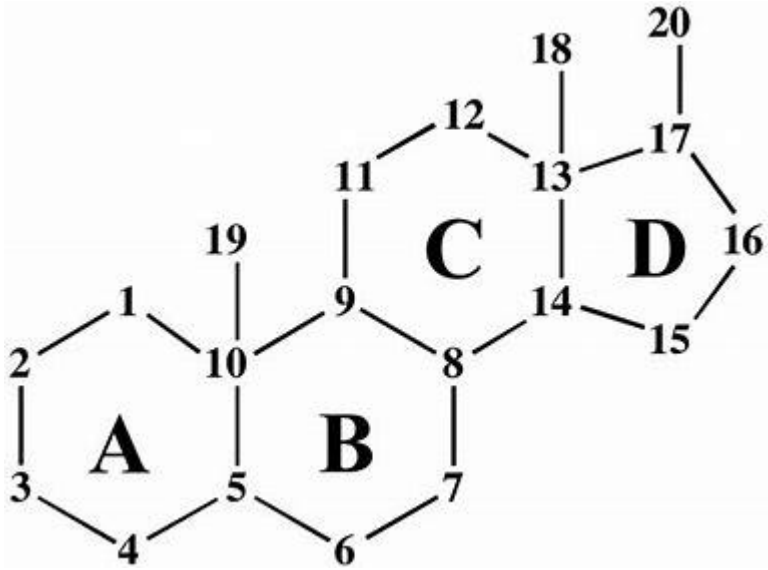
scientific name : Nerium oleander

Active ingredient :oleandrin

fammily: Apocynaceae

To convert steroid compound to cardio-active drug

- At C-17 position ⟶ alpha or beta unsaturated lactone ring



- At C-14 position ⟶ OH
- The ring junction as :

✓ AB ring is cis

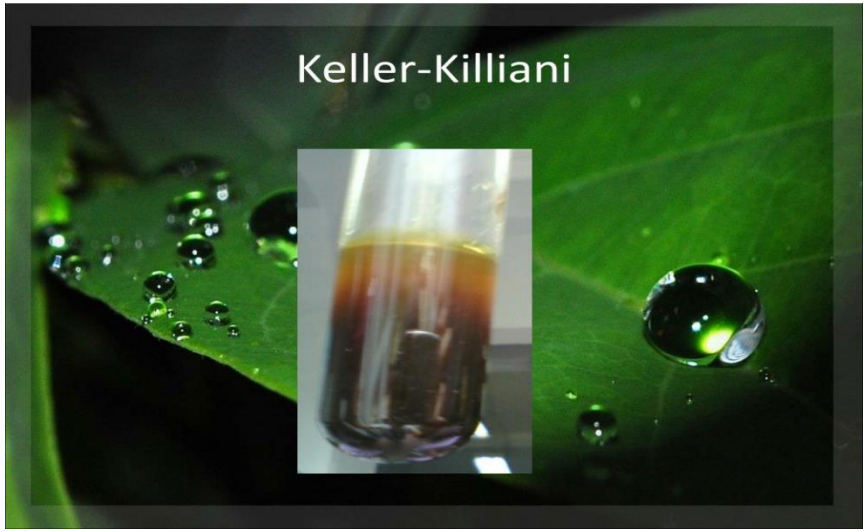
✓ BC ring trans

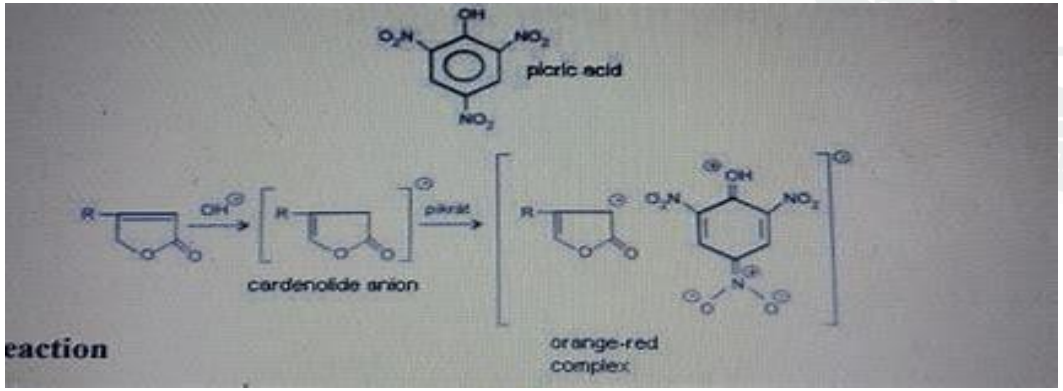
✓ CD ring cis

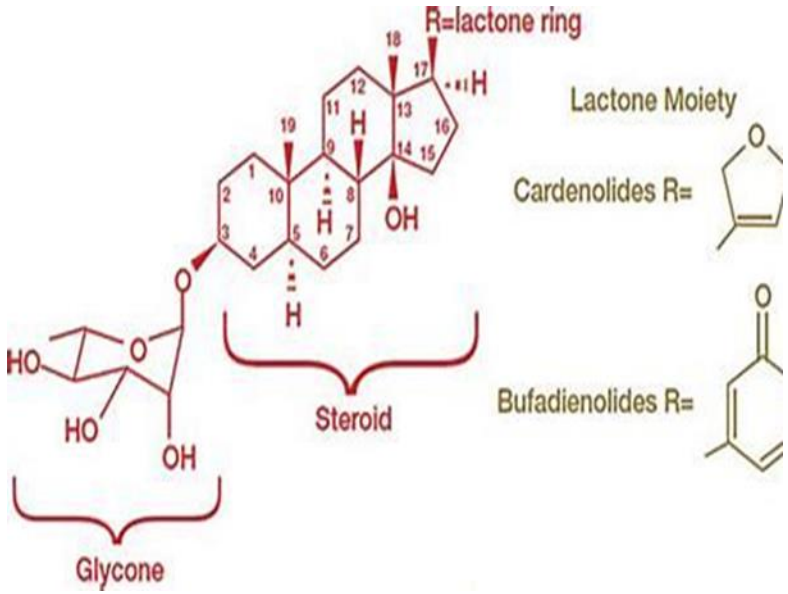
- At C-3 beta – sugar part (glucose –rhamnose –digitoxose)

EXPERIMENTAL WORK

- De-fatting step by n hexane
- Cold extraction method (maceration)
- Identification test for cardiac glycoside
- Keller-killians test
- Baljets test








thank you