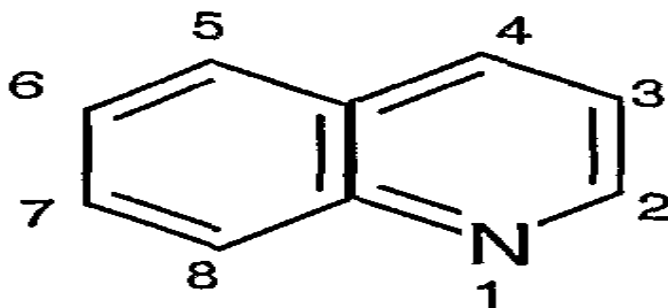
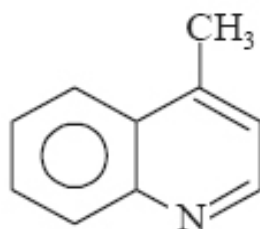


Quinoline Alkaloids

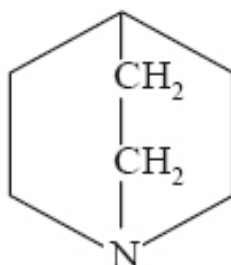


- In general, the alkaloids containing essentially the 'quinoline' nucleus include a series of alkaloids obtained exclusively from cinchona bark, the major members of this particular group are, namely:
 - quinine
 - quinidine
 - cinchonine
 - cinchonidine.
- more than twenty five alkaloids have been isolated and characterized either from the *Yellow Cinchona* i.e.
 - *Cinchona calisaya* and *Cinchona ledgeriana*,
 - OR from the *Red Cinchona* i.e.
 - *Cinchona succirubra*
 - (Family: *Rubiaceae*).
- **Basic Structures of Cinchona Alkaloids:**
 - Cinchona alkaloids usually possess two ring : quinolone (which consist from benzene ring + pyridine) and bicyclic quinuclidine.
 - Cinchona possess the basic skeleton of 9'-rubanol that is derived from the parent compound known as ruban.
 - Thus, ruban is obtained from the combination of two distinct heterocyclic nuclei, namely:

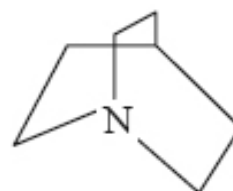
- (a) 4-methyl quinoline nucleus, and
- (b) quinuclidine nucleus.



4-Methyl Quinoline
Nucleus

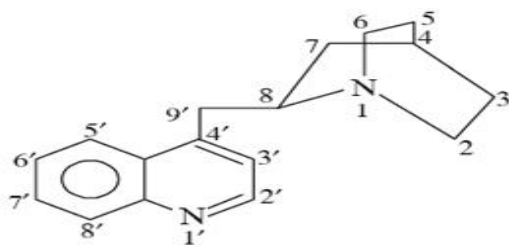


Quinuclidine
Nucleus

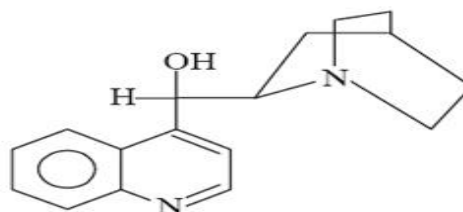


Quinuclidine
Nucleus

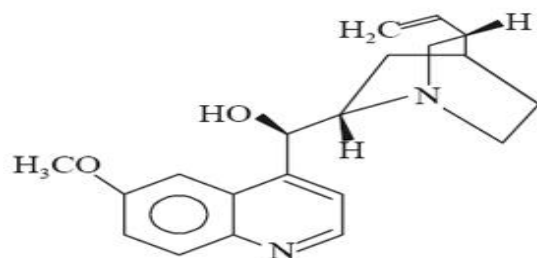
- However, this particular nomenclature was suggested by Rabe so as to simplify the naming of such compounds and also to signify its origin from the natural order *Rubiaceae*.



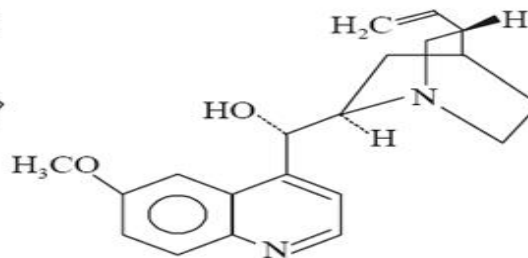
Ruban



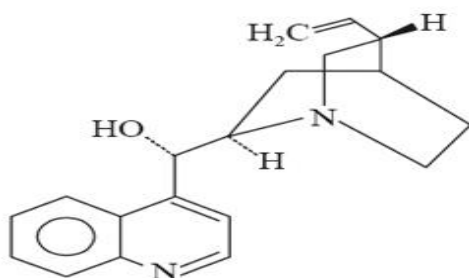
9'-Rubanol



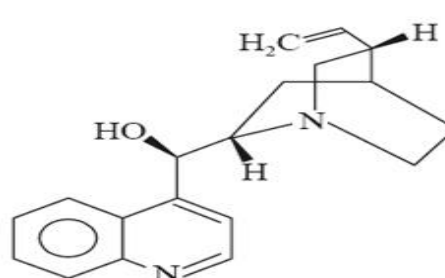
Quinine



Quinidine

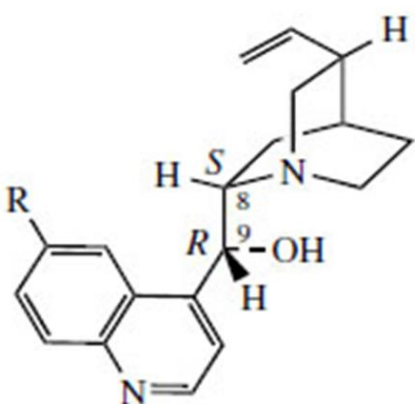


Cinchonine

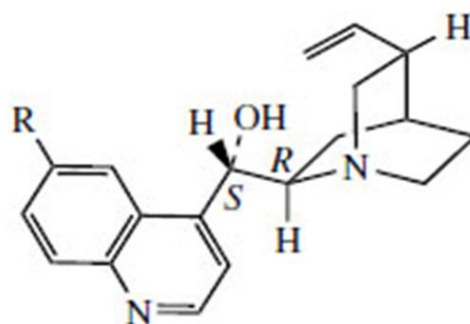


Cinchonidine

- Quinine & quinidine are stereoisomers
- Cinchonine & cinchonidine are stereoisomers
- For cinchonine & quinidine $C_8 = R$, $C_9 = S$
- For cinchonidine & quinine $C_8 = S$, $C_9 = R$
- Stereoisomers are [isomeric molecules](#) that have the same molecular formula and sequence of bonded atoms (constitution), but that differ *only* in the three-dimensional orientations of their atoms in space.



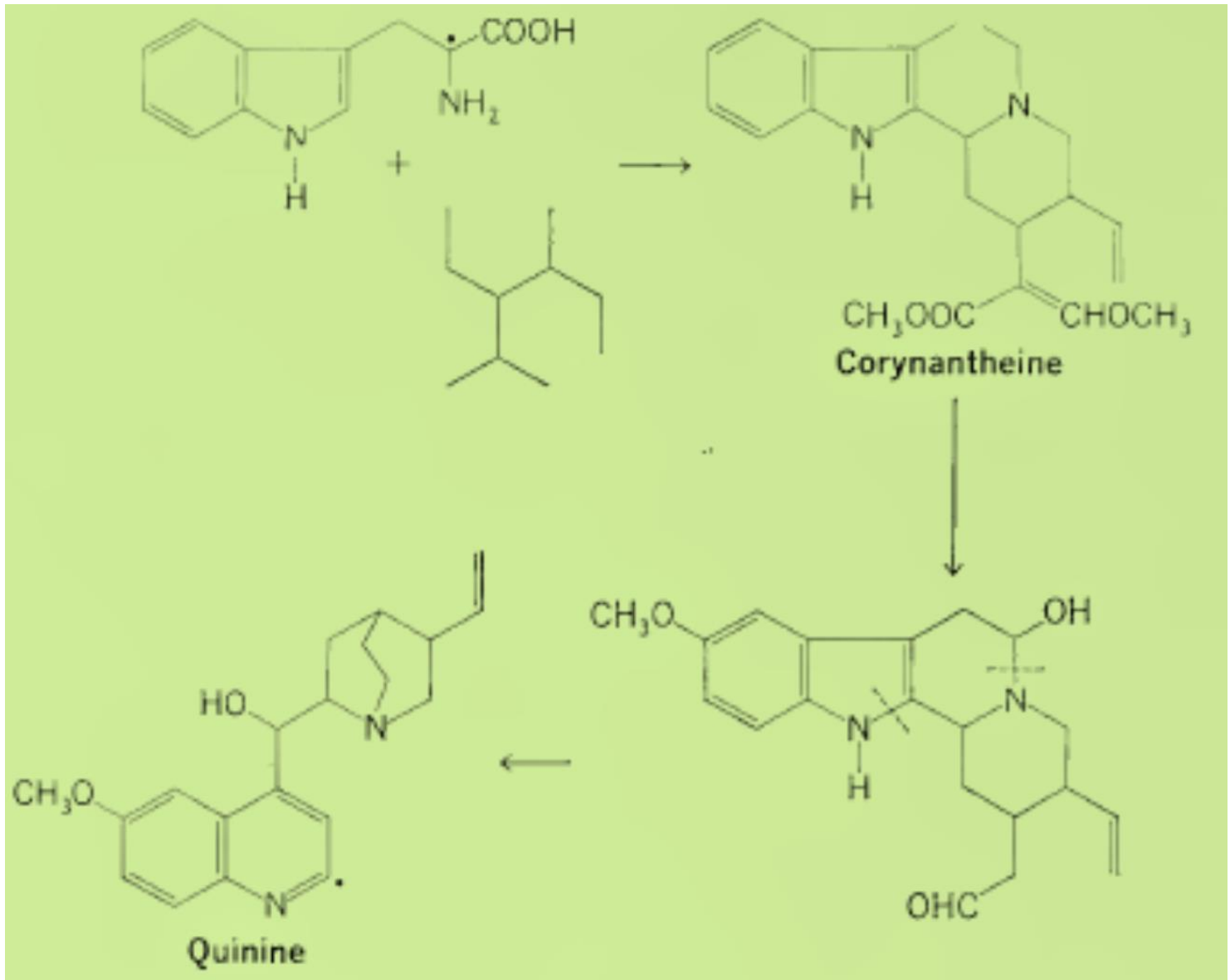
$R = \text{OMe}$, (-)-quinine
 $R = \text{H}$, (-)-cinchonidine



$R = \text{OMe}$, (+)-quinidine
 $R = \text{H}$, (+)-cinchonine

Biosynthetic pathway:

Studies with labeled geraniol and tryptophan indicate that quinine is metabolically derived from the monoterpene-tryptophan pathway.



Identification Tests of Quinine:

- **Fluorescence Test:** Quinine gives a distinct and strong blue fluorescence when treated with an *oxygenated acid*, such as: acetic acid, sulphuric acid.
- This test is very marked and pronounced even to a few mg concentration of quinine.
- Note: The hydrochloride and hydroiodide salts of quinine do not respond to this fluorescence test.
- **Thalleioquin Test:** Add to 2-3 ml of a weakly acidic solution of a quinine salt a few drops of bromine-water followed by 0.5 ml of strong ammonia solution, a distinct and characteristic emerald green color is produced.
- The colored product is termed as thalleioquin, the chemical composition of which is yet to be established.
- This test is so sensitive that quinine may be detected to a concentration as low as 0.005%.
- Notes: Quinidine gives also a positive response to this test; but cinchonine and cinchonidine give a negative test.

Uses:

- Cinchona & its alkaloids have been used in the treatment of malaria fever for many years.
- Quinine sulfate continues to be used for malaria in many parts of the world (it poisons the protozoa), as tonic, analgesic, in the treatment of cold.

Quinidine is used to treat various cardiac arrhythmias e.g. arterial & ventricular tachycardia, atria fibrillation & ventricular contraction.

Quinidine is found as salts (sulfate & gluconate).

It depresses myocardial excitability, conduction velocity & contractility.

Totaquine

- It is a mixture of total alkaloids, containing not less than 7% & not more than 12% of anhydrous quinine.

- It should contain 70-80% of total alkaloids.

It is used as anti malarial & for cold but it cannot be used as cardiac depressant. Usual dose 600mg.

Cinchonism or quinism:

- Treatment with cinchona products result in [symptoms](#) of mild cinchonism (which may occur from standard therapeutic doses of quinine).
- These symptoms include [flushed](#) and sweaty skin, ringing of the ears ([tinnitus](#)), blurred vision, impaired hearing, confusion, reversible high-frequency hearing loss, head ache, abdominal pain, rashes, [dysphoria](#), [nausea](#), [vomiting](#) and [diarrhea](#). Ringing in the ears is a symptom of toxicity.
- When these symptoms are produced as the result of continuous use of cinchona or of quinine the condition has been called cinchonism.