

# **SNS COLLEGE OF PHARMACY AND HEALTH SCIENCES**

*Affiliated To The Tamil Nadu Dr. MGR Medical University, Chennai*

*Approved by Pharmacy Council of India, New Delhi.*

**Coimbatore -641035**

**COURSE NAME : PHARMACOGNOSY AND PHYTOCHEMISTRY II (BP504T)**

**V SEM / IIIYEAR**

**TOPIC 1 : ALKALOIDS**

## Understanding Alkaloids



## Alkaloid Etymology and History

Who coined the term "Alkaloid"?

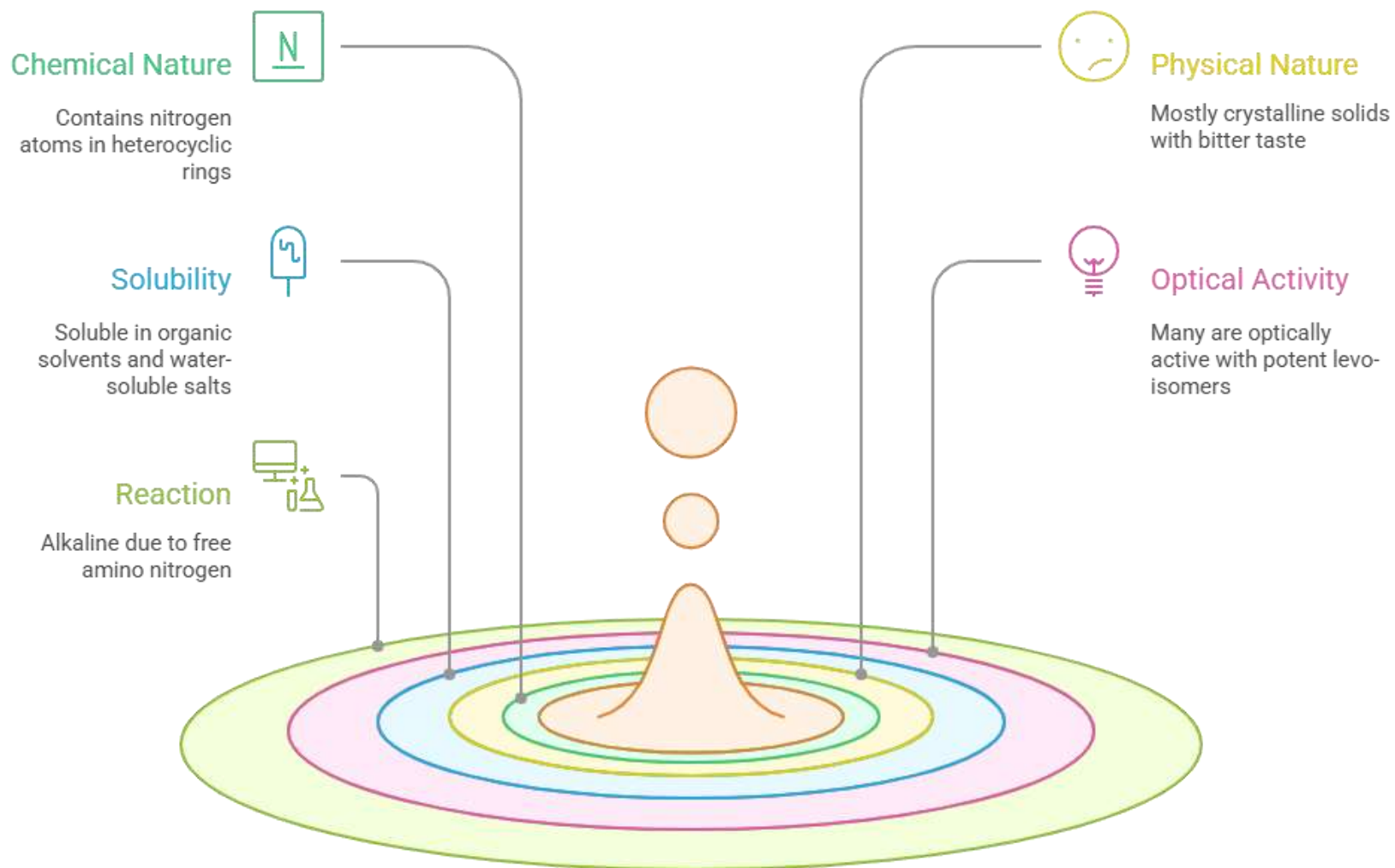
Carl F. W. Meissner in 1819, from "alkali-like".

What was the first alkaloid isolated?

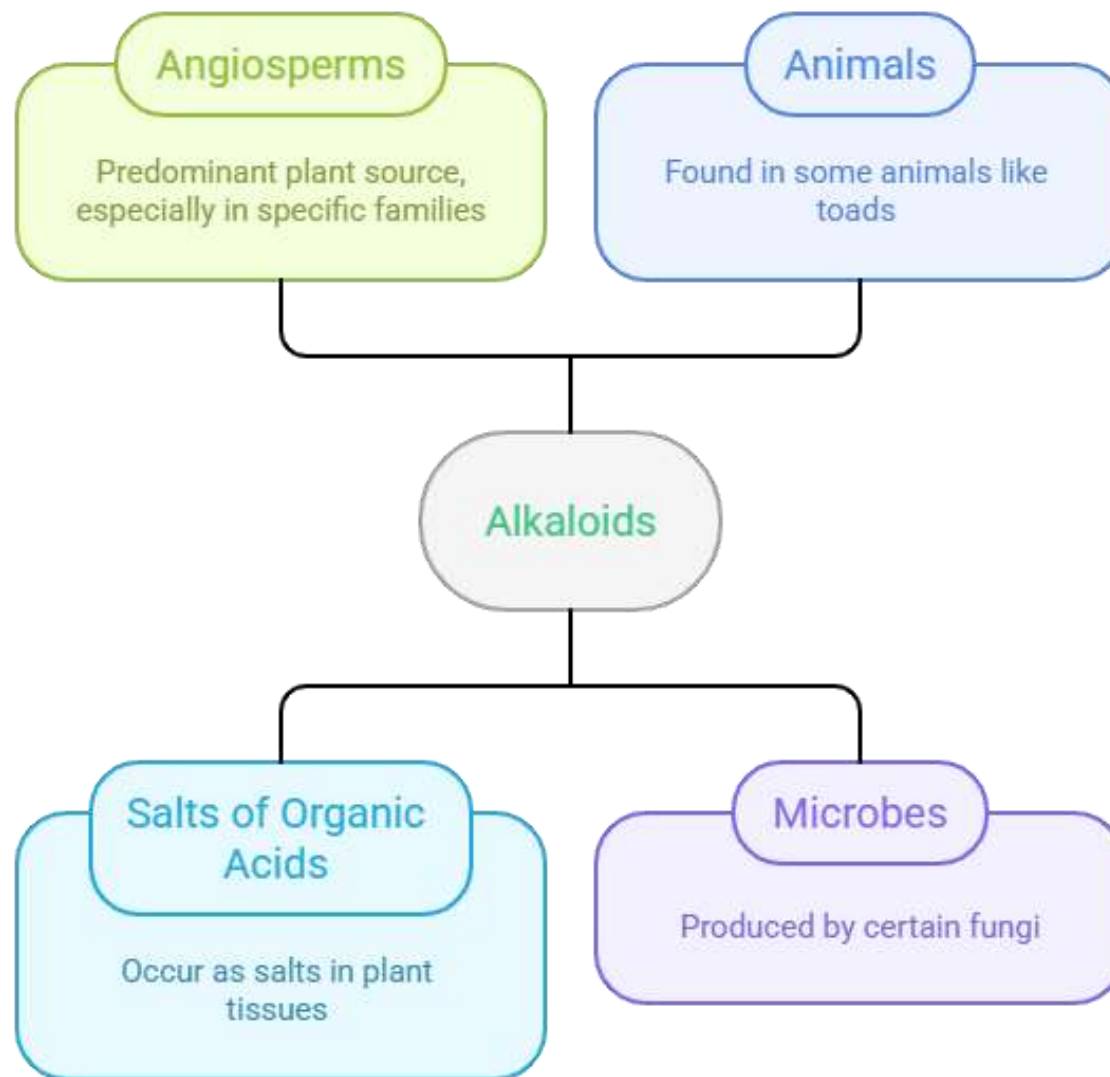
Morphine by Friedrich Sertürner in 1805 from *Papaver somniferum*.



## Alkaloid Properties



## Natural Sources of Alkaloids



## What are the characteristics of alkaloids?



**Chemical Nature**

Contains nitrogen atoms in heterocyclic rings



**Physical Nature**

Mostly crystalline solids, bitter-tasting



**Solubility**

Soluble in organic solvents, forms water-soluble salts



**Optical Activity**

Many are optically active, levo-isomers more potent

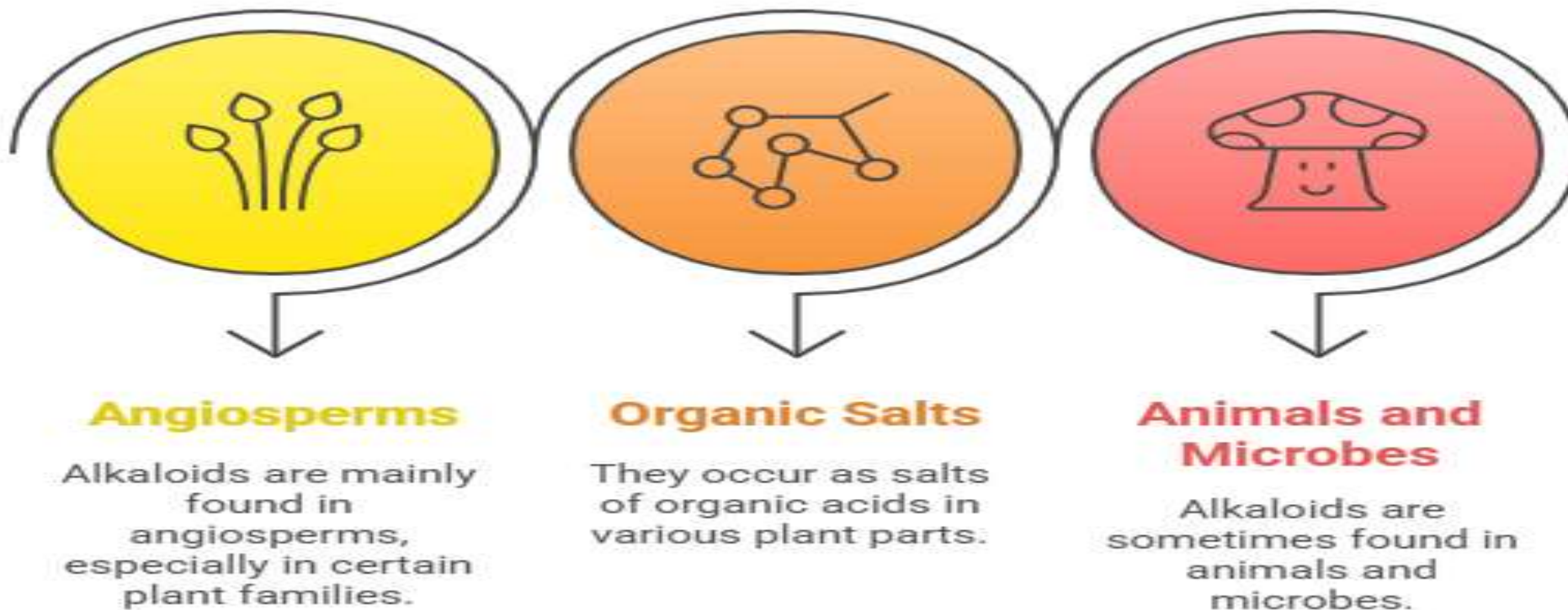


**Reaction**

Alkaline due to free amino nitrogen



## Alkaloid Occurrence





# Biological Role of Alkaloids in Plants

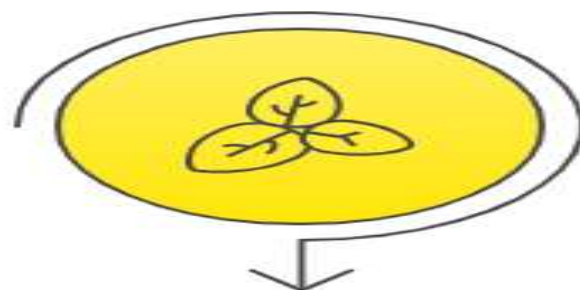


What is the biological role of alkaloids in plants?

They serve as defensive substances, function as end products of nitrogen metabolism, and play a role in growth regulation.

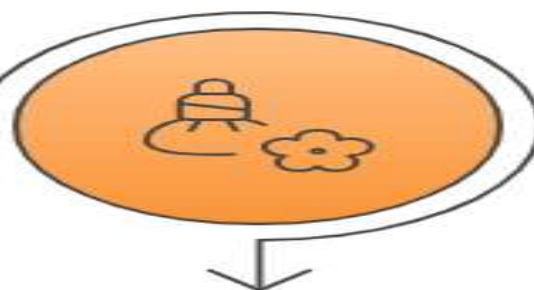


## Alkaloid Classification



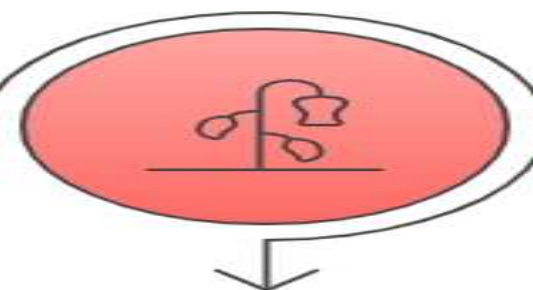
### Tryptophan

Tryptophan is a precursor to indole alkaloids found in Vinca and Rauwolfia.



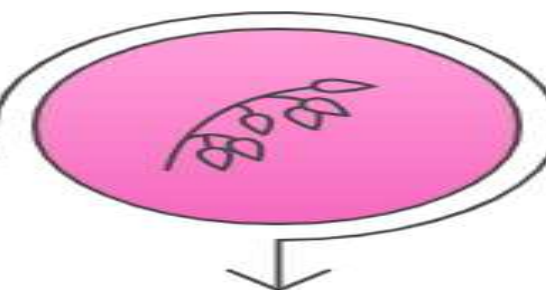
### Tyrosine

Tyrosine is a precursor to isoquinoline alkaloids found in opium.



### Ornithine

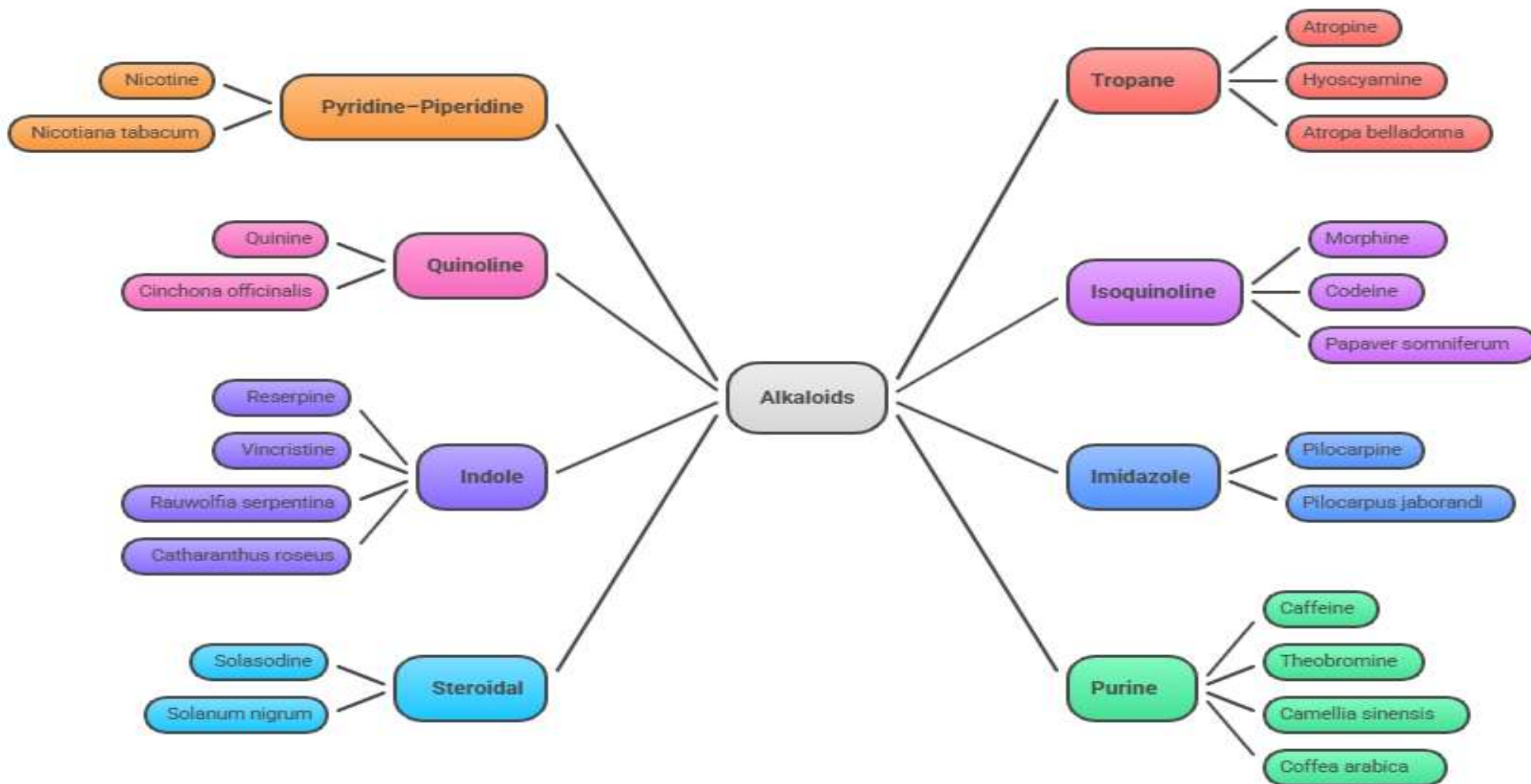
Ornithine is a precursor to tropane alkaloids found in belladonna.



### Lysine

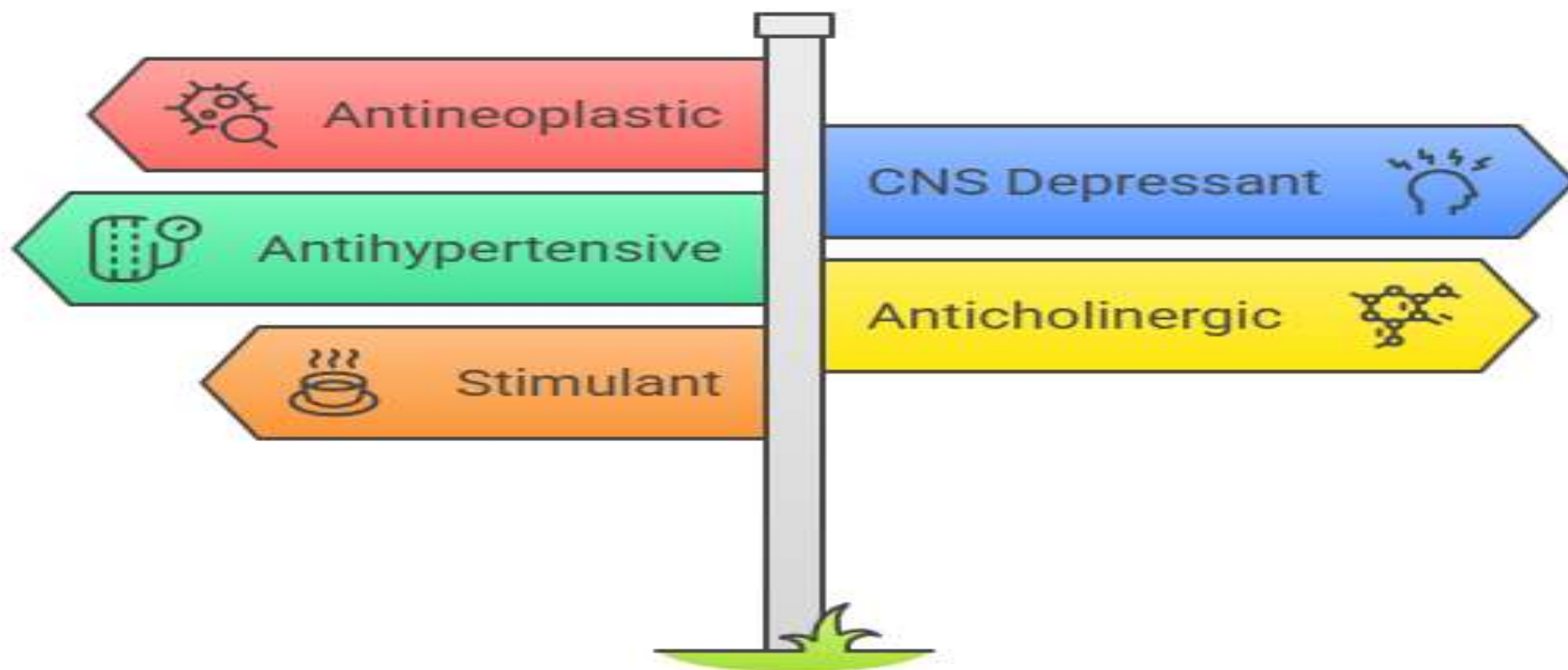
Lysine is a precursor to piperidine alkaloids found in lobelia.

## Classification of Alkaloids Based on Chemical Structure





## What is the pharmacological action of the drug?



## Alkaloid Chemical Tests

### Murexide test

For purine alkaloids, uses caffeine, HCl,  $\text{KClO}_3$ , and ammonia, producing a purple color.



### Tannic acid test

Uses tannic acid solution, resulting in precipitation.



### Hager's test

Involves picric acid, generating a yellow precipitate.



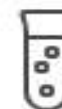
### Mayer's test

Uses potassium mercuric iodide, resulting in a creamy white precipitate.



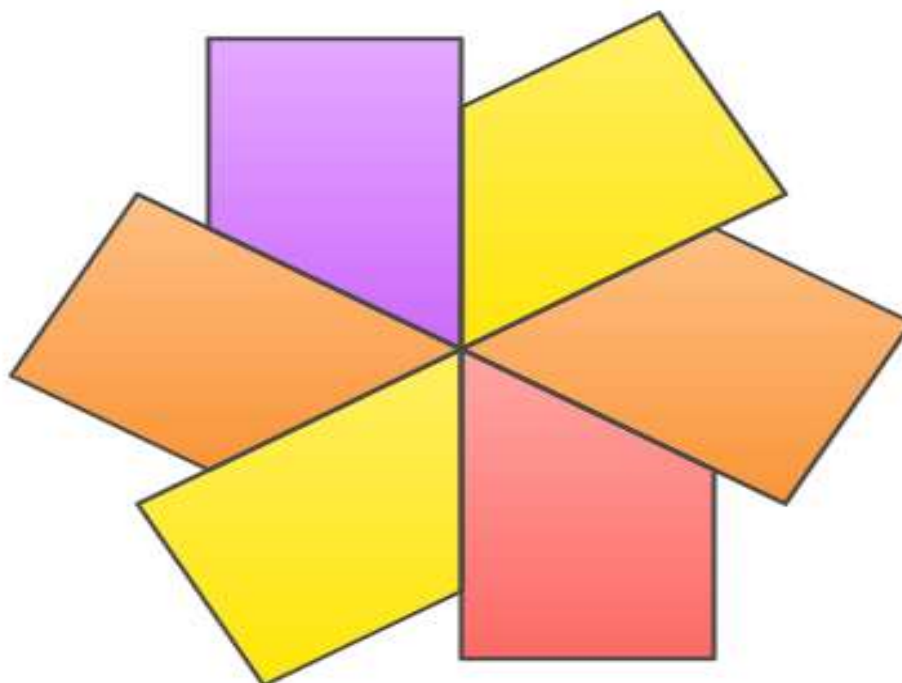
### Wagner's test

Employs potassium triiodide, producing a reddish-brown precipitate.



### Dragendorff's test

Utilizes potassium bismuth iodide, leading to an orange-red precipitate.



## Alkaloid Key Points



### Bioactive Compounds

Alkaloids are potent bioactive compounds with diverse pharmacological roles.

Most clinical alkaloid drugs are antineoplastic, antihypertensive, or CNS-active agents.

### Clinical Alkaloid Drugs



### Chemical Diversity

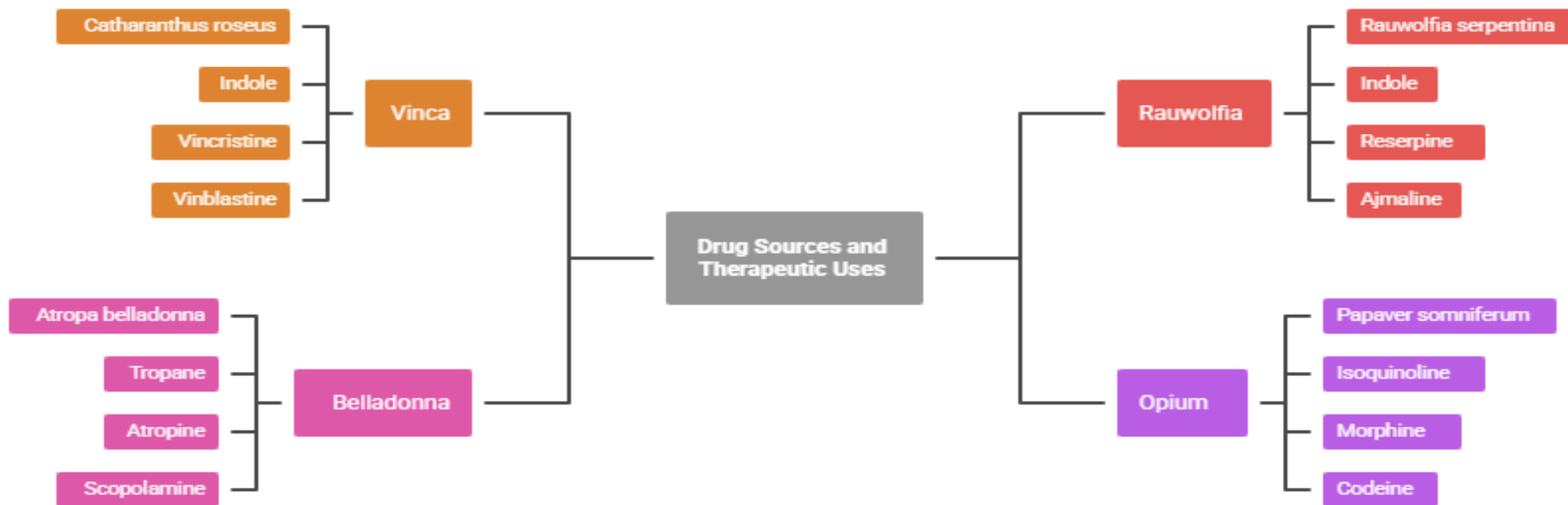
Their chemical diversity forms the foundation of modern synthetic drug design.

Knowledge of biosources, chemistry, and identification tests is vital in pharmacognostic standardization.

### Pharmacognostic Standardization



## Drug Sources and Therapeutic Uses



## Guess the Substance

I am bitter, nitrogenous, and fight cancer.

I contain two indole rings joined together.

I make pupils dilate in hospitals.

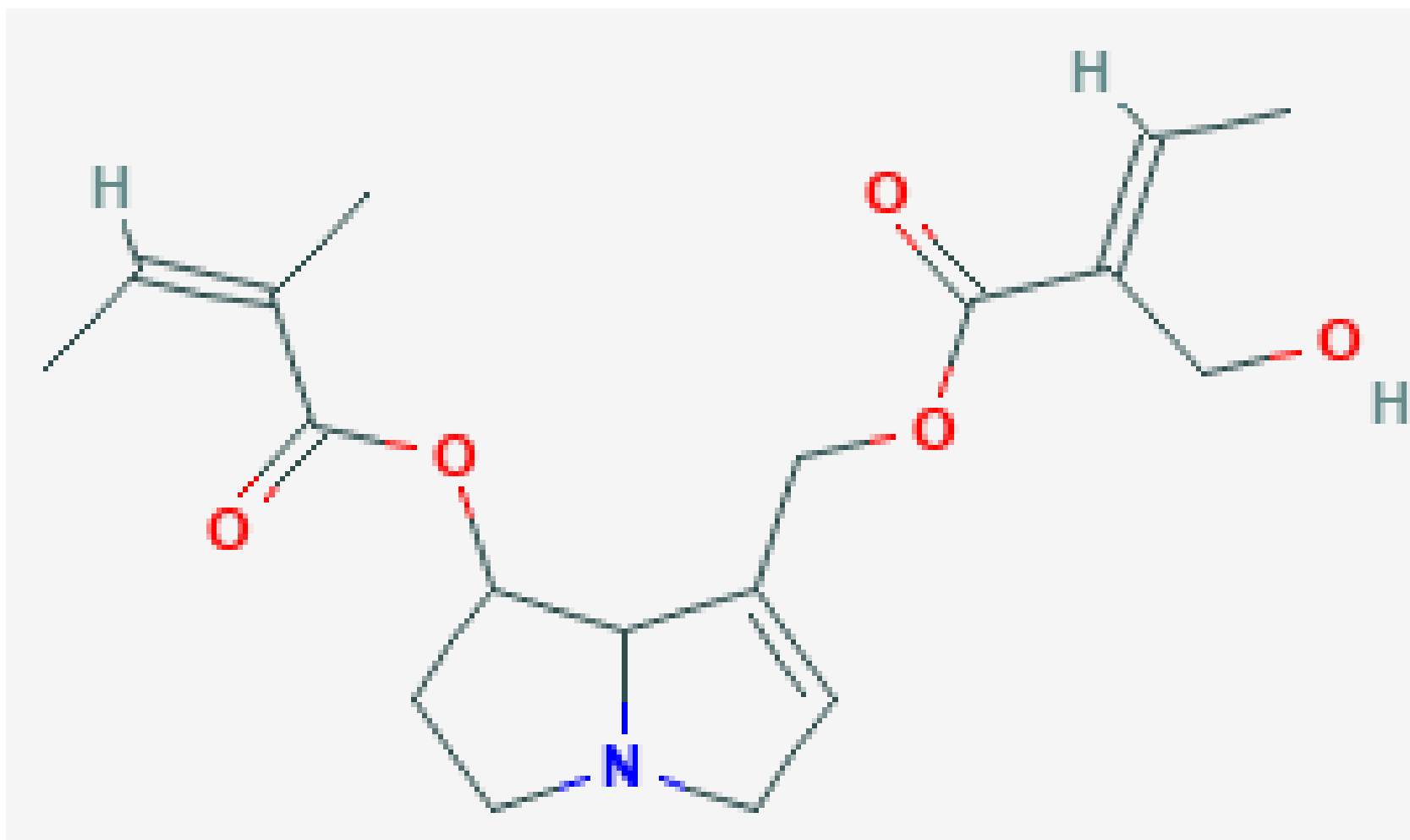
I am sweet outside but dangerous inside.

I am rich in EGCG and protect your cells.

I heal burns but my latex purges.







## Assessment towards you

01

**1. Alkaloids are best defined as:**

- A. Nitrogen-free secondary metabolites
- B. Acidic compounds present in plants
- C. **Basic nitrogen-containing organic compounds of plant origin**
- D. Carbohydrate derivatives



02

**2. Which of the following is a characteristic property of alkaloids?**

- A. Insoluble in organic solvents
- B. Neutral in nature
- C. **Form salts with acids**
- D. Sweet in taste



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**3. Dragendorff's reagent is commonly used for the detection of:**

- A. Glycosides
- B. Tannins
- C. Flavonoids
- D. **Alkaloids**



