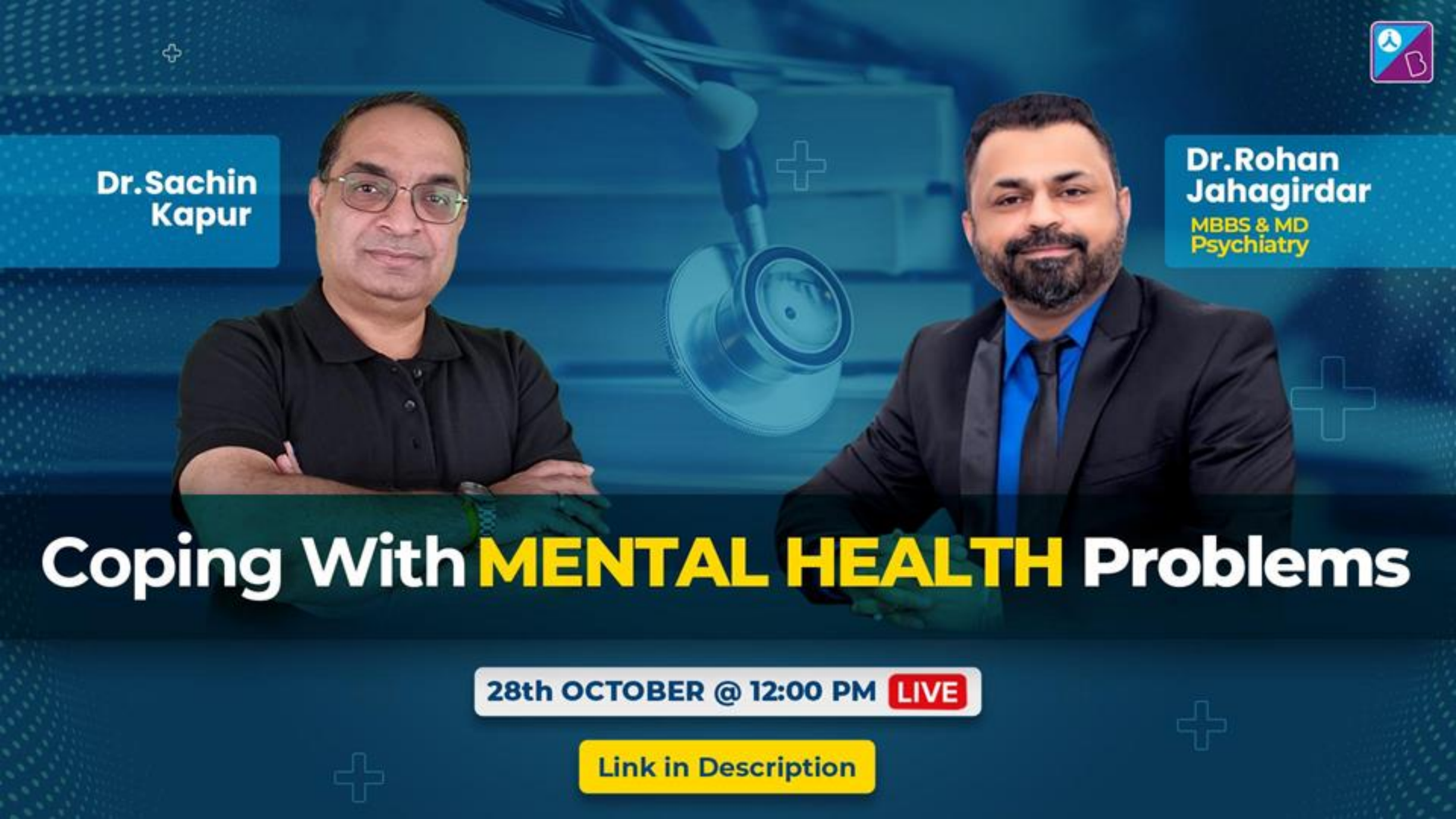
# CHEMISTRY IN EVERYDAY LIFE

CHEMISTRY

ANOOP SIR


Dr.Sachin Kapur
Dr.Rohan Jahagirdar
MBBS & MD Psychiatry
Coping With MENTAL HEALTH Problems
28th OCTOBER @ 12:00 PM LIVE
Link in Description

# ANTHE

AAKASH NATIONAL TALENT HUNT EXAM

Your Gateway To Success

**For Class VII to XII**

Current Students & Passouts


MISSION MBBS

BIO की रण NEETi

CHEMISTRY SUPER 30

PHY की रण NEETi

MON - SAT | 12 PM - 8 PM

FREE

Aakash + BYJU'S

# SMART PLAYLIST

## FREE NEET RESOURCES

## MISSION MBBS 2023 & 2024

- ALL YOUTUBE LECTURES
- ANNOTATED SESSION NOTES
- DAILY PRACTICE QUESTION & ANSWERS

**LINK IN DESCRIPTION**

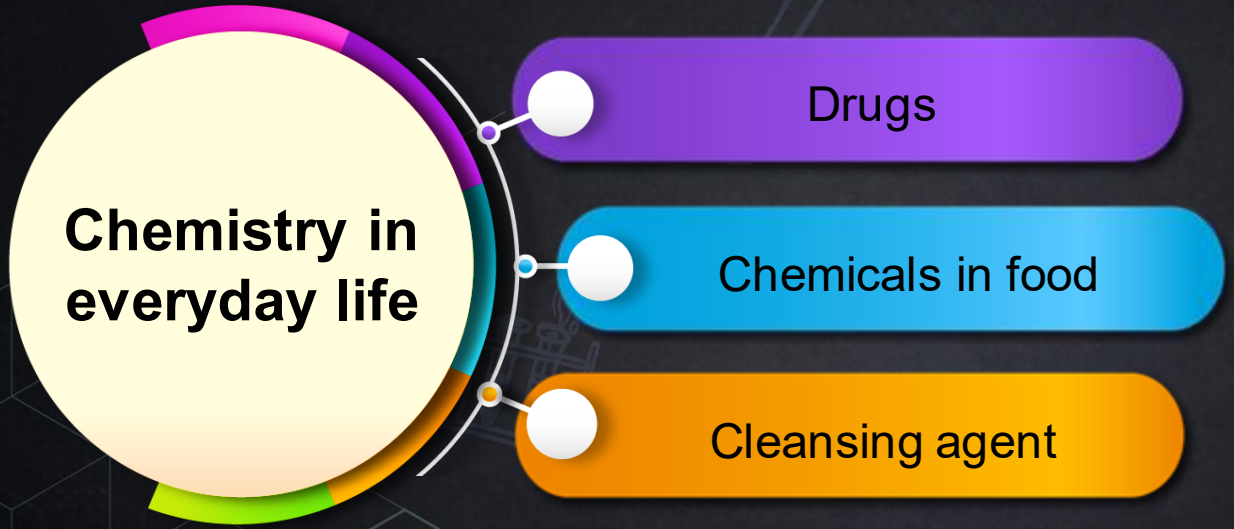
Aakash
BYJU'S

# NEET

# STUDENTS' SURVEY

LINK IN DESCRIPTION


https://t.me/neetaakashdigital

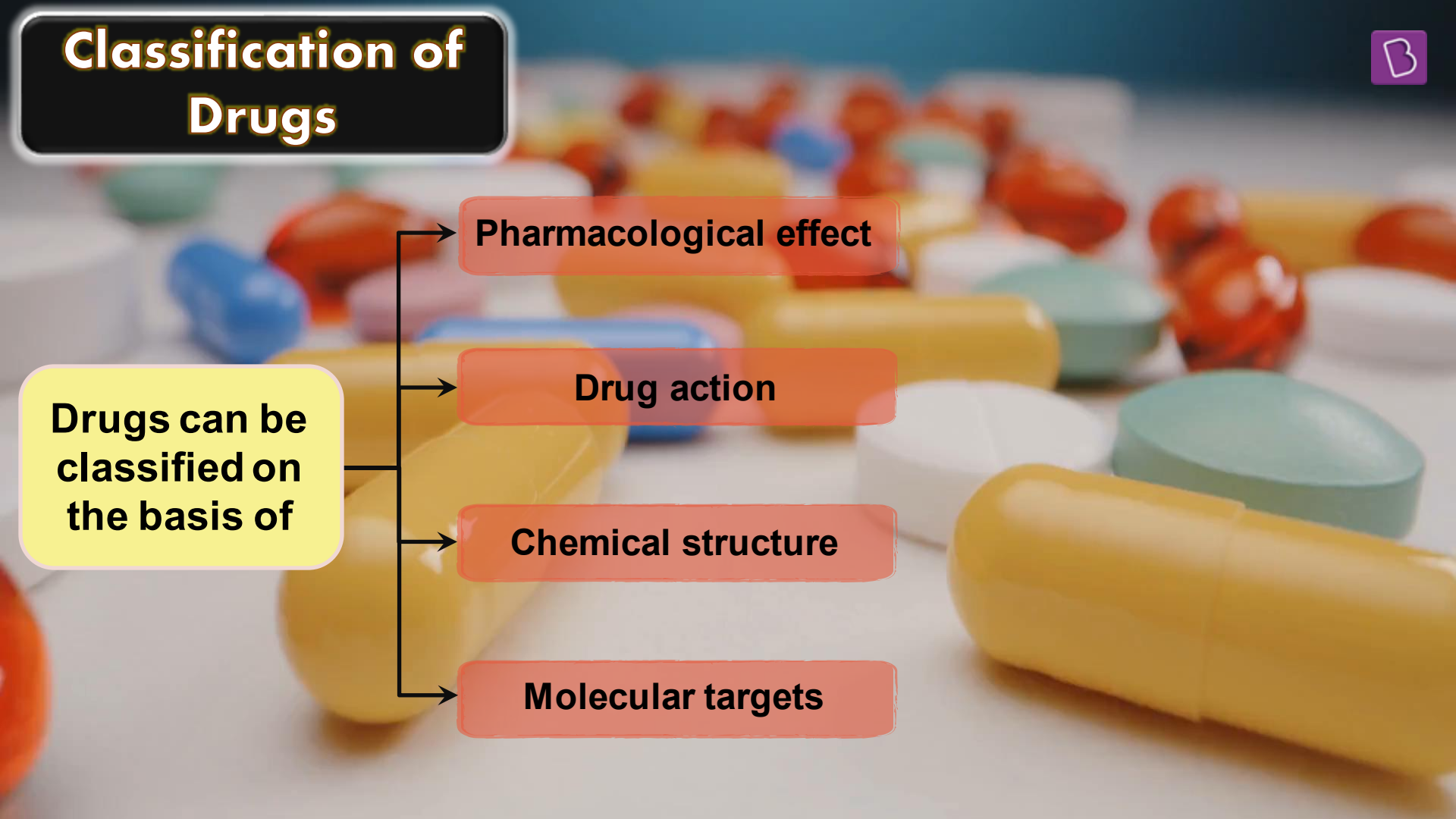

Chemistry in everyday life
Drugs
Chemicals in food
Cleansing agent

# Drugs

~100-500 u

Chemicals with **low molecular mass** that interact with **macromolecular targets** and produce **biological response**

# Classification of Drugs



# Pharmacological Effect

Useful for doctors as it provides them the **whole range** of drugs available for **treatment.**

For a particular type of **problem**

# Drug Action

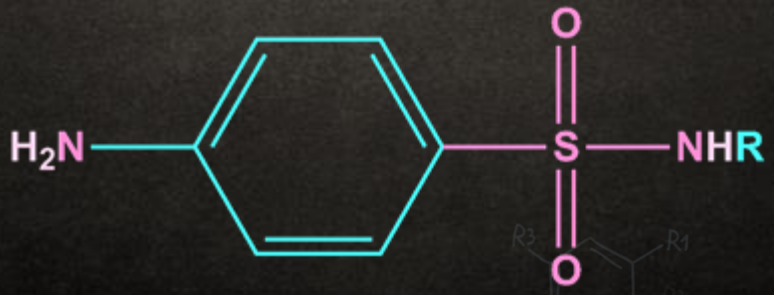

All **antihistamines** inhibit the action of **histamine.**

Causes **inflammation** in the body

# Chemical Structure

The drugs classified share common **structural features** and often similar **pharmacological activities.**

**Sulphonamides**



# Molecular Targets

Drugs usually **interact** with **biomolecules.**

**Carbohydrates, lipids, proteins** and more

**Target** molecules

Drug possessing some common **structural features**

They may have the **same** mechanism of **action** on targets.

# Drug-Target Interaction

**When drug-target is a/an**

- Enzyme
- Receptor

# Catalytic Action of Enzymes

# Drug-Enzyme Interaction

Drugs **inhibit** the **activity** of enzymes by **two** ways

1. Drugs **block** the **binding site** of the enzyme

**Prevents** binding of **substrate**

2. Drugs can **inhibit** the catalytic **activity** of the enzyme

**Enzyme inhibitor**

# Drug-Enzyme Interaction

Drugs **inhibit** the attachment of **substrates** on the **active site** of the enzyme by

- Competitive inhibitors
- Using allosteric site

# Competitive Inhibitor

Drugs that **compete** with a **natural substrate** to get attached on an **active site**

# Allosteric Site

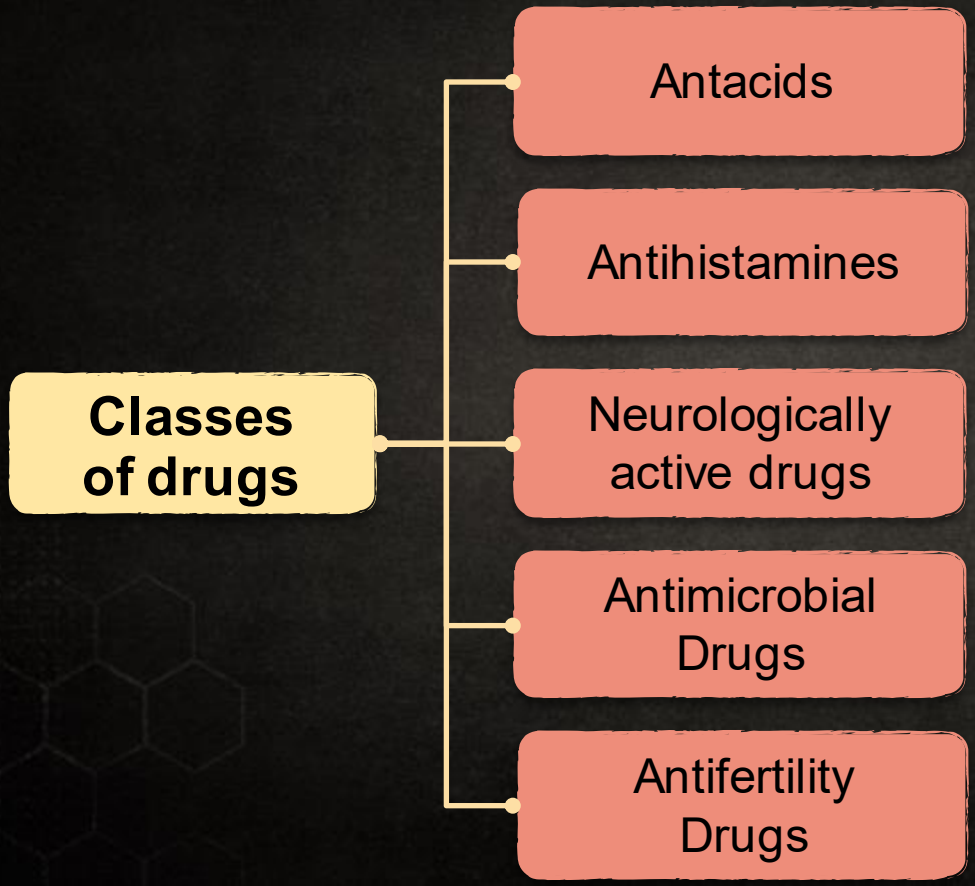
Some drugs **bind** to a **different site** of an enzyme.

**Allosteric site**

It **changes** the **shape** of an **active site**.

**Unrecognizable** by a substrate

# Classes of Drugs



# Antacids

Previously **antacids** such as $NaHCO_3$ or a mixture of $Al(OH)_3$ and $Mg(OH)_2$ were **used.**

**But**

Excessive **hydrogen carbonate** can make the **stomach alkaline** and **trigger** the production of even **more acid.**

# Antacids


## Histamine


It stimulates the secretion of **pepsin** and **HCl** in the **stomach.**

# Antacids

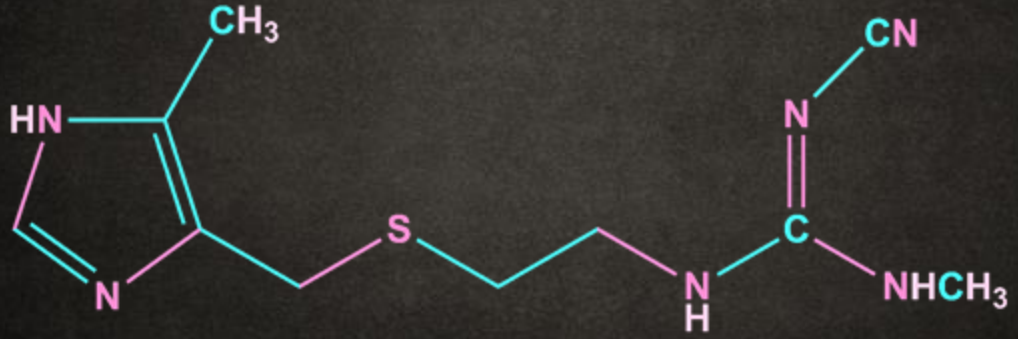
**Cimetidine (Tegamet)**

It **prevents** the interaction of histamine with **receptors** present in the **stomach** wall.

It results in the **release** of **lesser** amount of **acid**.

# Structure of Cimetidine


**Cimetidine**



# Which of the following compounds is not an antacid?

AIIMS 2017

a. Phenelzine

b. Ranitidine

c. Aluminium hydroxide

d. Cimetidine

# Functions of Histamine

1. Potent **vasodilator**
2. Relaxes **muscles**
3. Responsible for **nasal congestion**

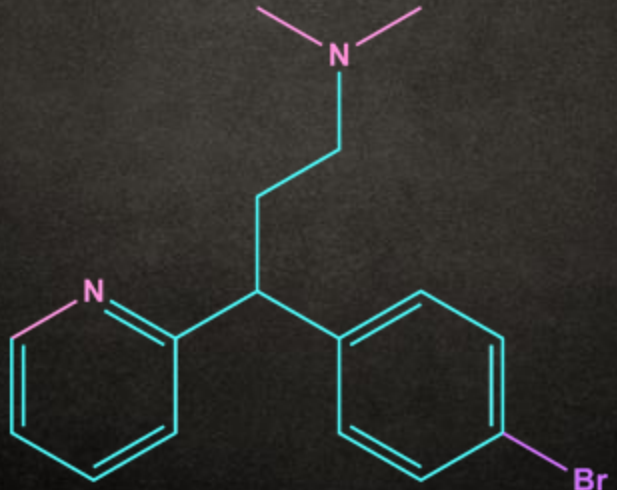
# Antihistamines

Drugs that **interfere** with natural action of **histamine** by competing with histamine for the **binding sites** of a **receptor.**

Where **histamine** exerts its effect

# Antihistamines


**Brompheniramine**
**(Dimetapp, Dimetane)**



# Which one of the following is employed as antihisatmine?

AIPMT 2011

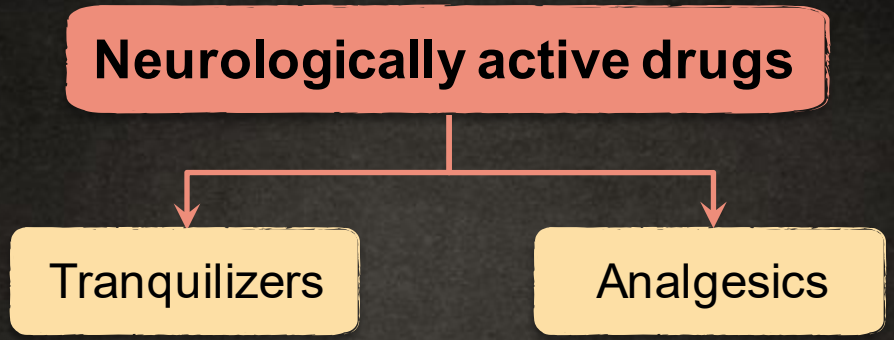
a. Chloramphenicol

b. Diphenylhydramine

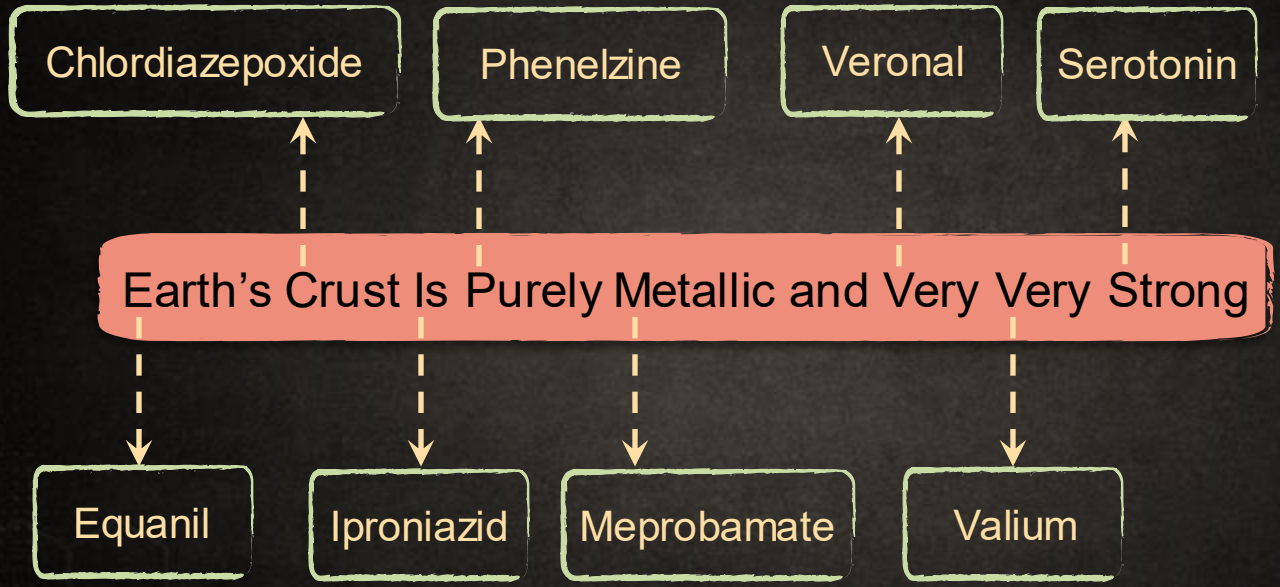
c. Norothindrone

d. Omeprazole

# Neurologically Active Drugs

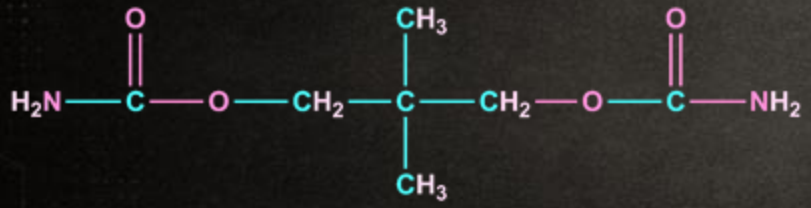


# Tranquilizers



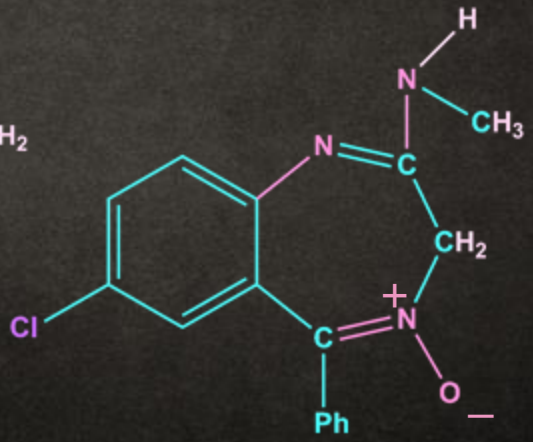
# Equanil and Chlordiazepoxide

Used in controlling the **depression** and **hypertension.**



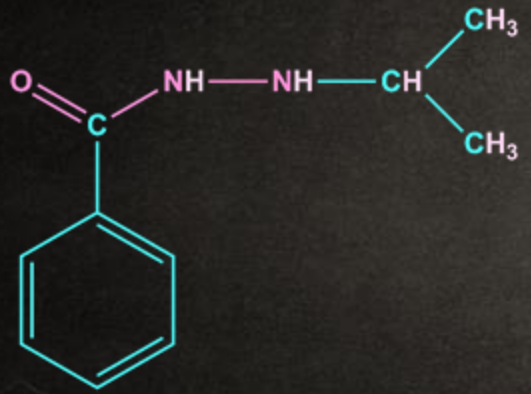

**Equanil**

**Mild tranquilizer** for **reducing tension.**



# Iproniazid and Phenelzine

**Antidepressant drugs**



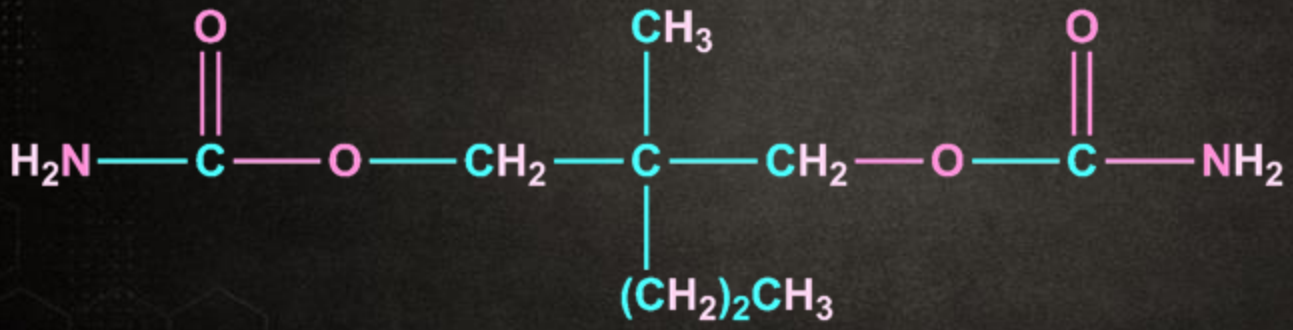

Iproniazid


Phenelzine

**Nardil**

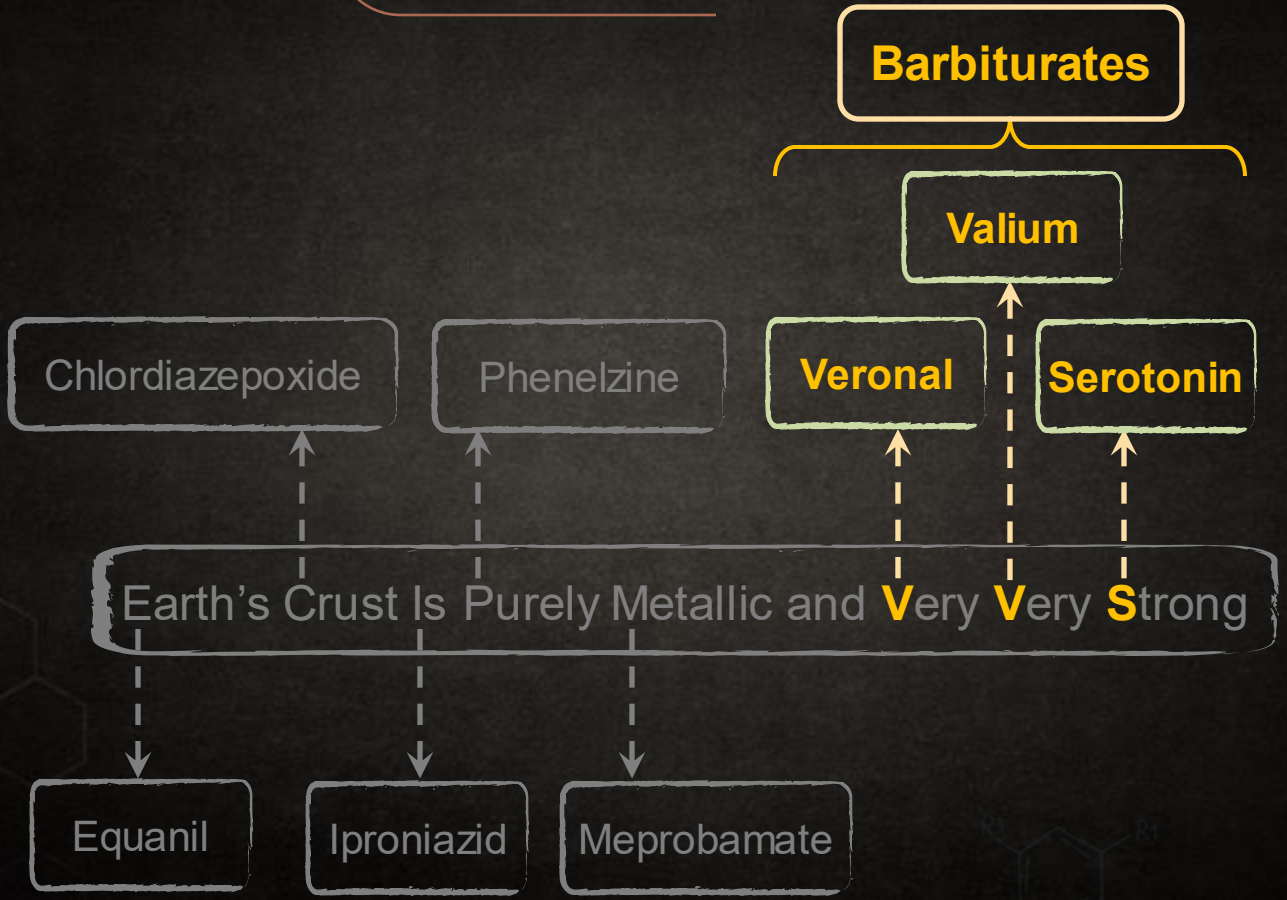
# Meprobamate

Mild tranquilizer for
**relieving tension**




**Meprobamate**

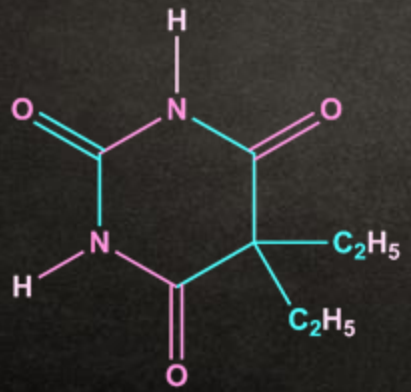
# Tranquilizers



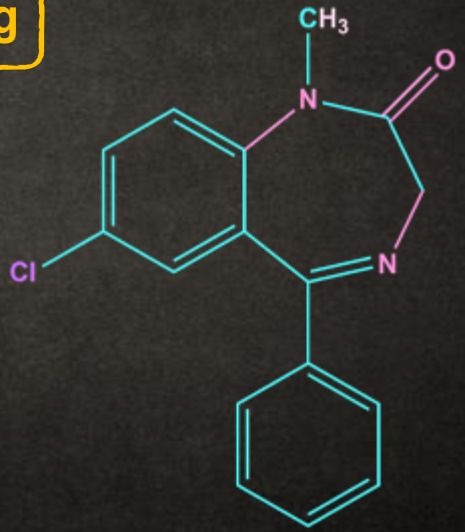
# Barbiturates

**Hypnotic**

**Sleep-producing**

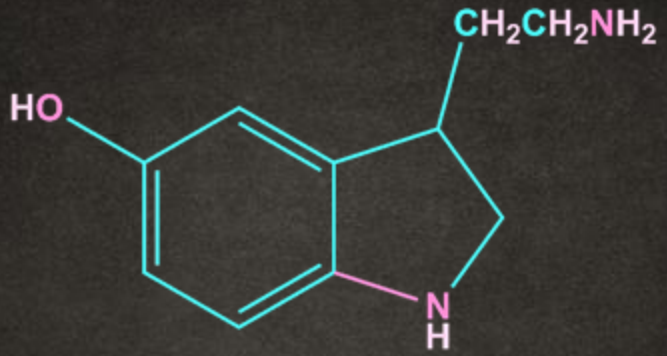




**Veronal**




**Valium**

# Barbiturates


Serotonin

# Which one of the following is employed as a tranquilizer drug?

AIPMT 2010

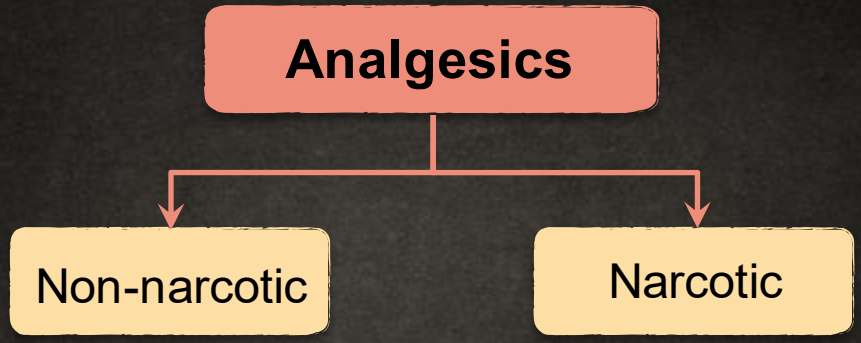
a. Promethazine

b. Valium

c. Naproxen

d. Mifepriston

# Neurologically Active Drugs



# Non-Narcotic Drugs

1. Relieve **skeletal pain**

2. Reduce **fever**

**Antipyretic**


**Aspirin and Paracetamol**

# Narcotic Drugs

1. **Relieve pain** and **produce sleep**

2. In poisonous doses, produce **stupor, coma,** and **ultimately death**


**Morphine** and many of its **homologues**

# Which of the following is an analgesic?

NEET 2016

a. Streptomycin

b. Chloromycetin

c. Novalgin

d. Penicillin

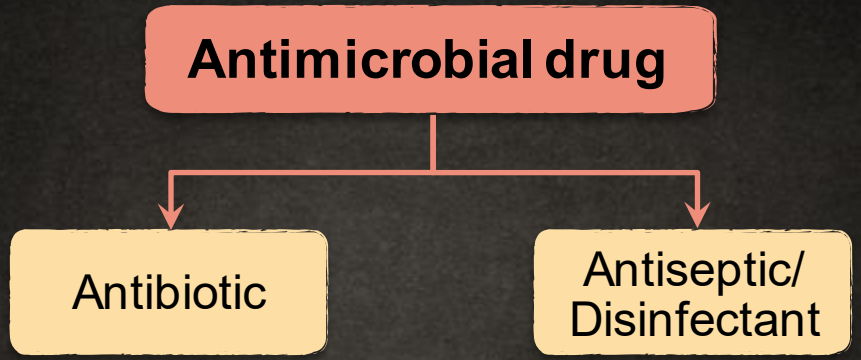
# Antimicrobial Drugs

Disease in **human beings** and **animals** may be caused by a variety of **microorganisms.**

**Virus, bacteria, fungi,** and more

**Antimicrobial** tend to **destroy/prevent** the development or inhibit the action of **microbes.**

# Antimicrobial Drugs



# Antibiotics

Drugs required to treat **infections** because of **low toxicity** for **human** and **animals.**

# Antibiotics

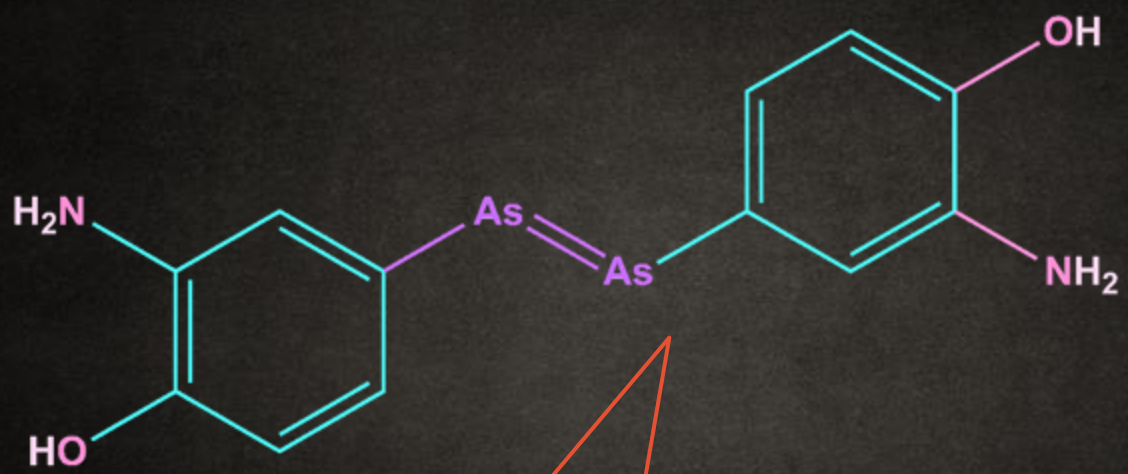
Developed medicine
**Arsphenamine**
**(Salvarsan)**

German
bacteriologist

**PAUL ELRICH**

Noble Prize — 1908

# Salvarsan

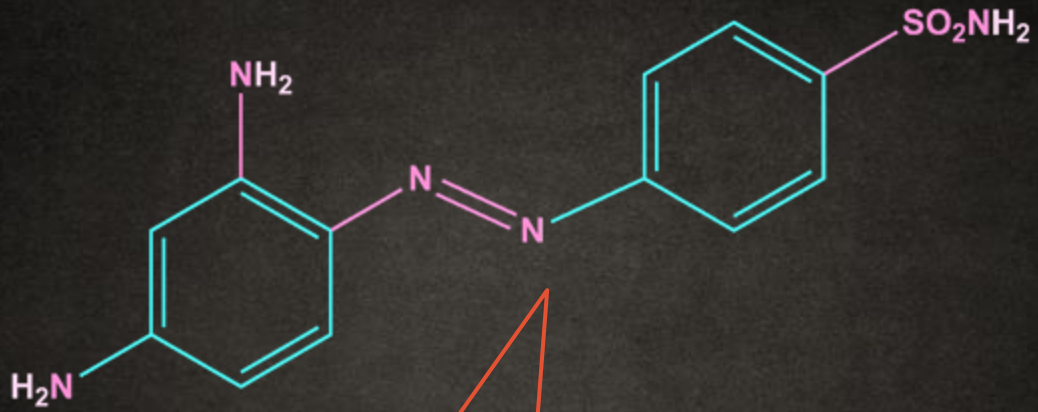



**First effective drug** for treatment of **syphilis**

# Antibiotics

In **1932**, **Paul Ehrlich** succeeded in preparing the **first antibacterial drug.**

# Prontosil



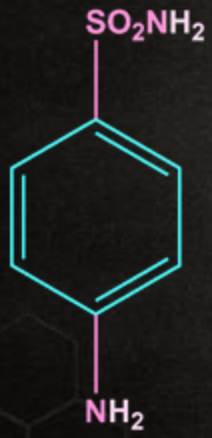

Resembles with **Salvarsan**

# NOTE

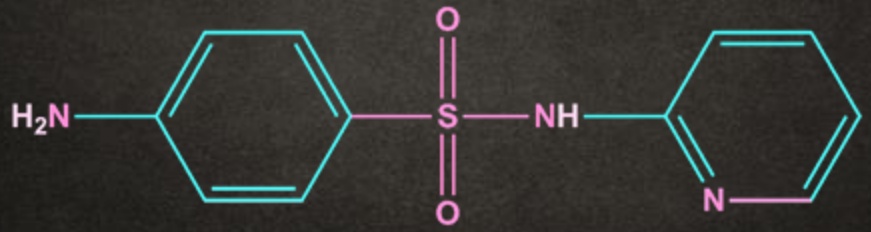
Later, it was discovered that prontosil converts to a compound called **sulphanilamide.**

Real **active** compound

# Sulphanilamides


Sulpha drug




Sulphapyridine

# NOTE

The real revolution in **antibacterial** therapy began with the discovery of **antibacterial properties** of ***Penicillium*** **fungus.**

By **Alexander Fleming** in **1929**

# Which of the following is an antidiabetic drug?

AIIMS 2015

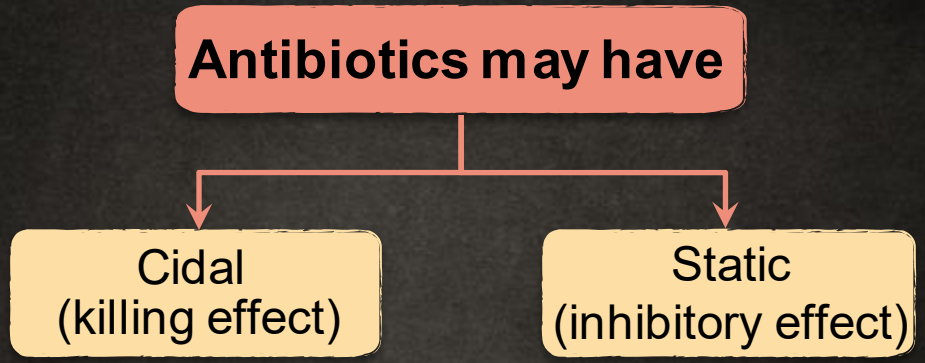
a. Insulin

b. Penicillin

c. Chloroquine

d. Aspirin

# Effects of Antibiotics



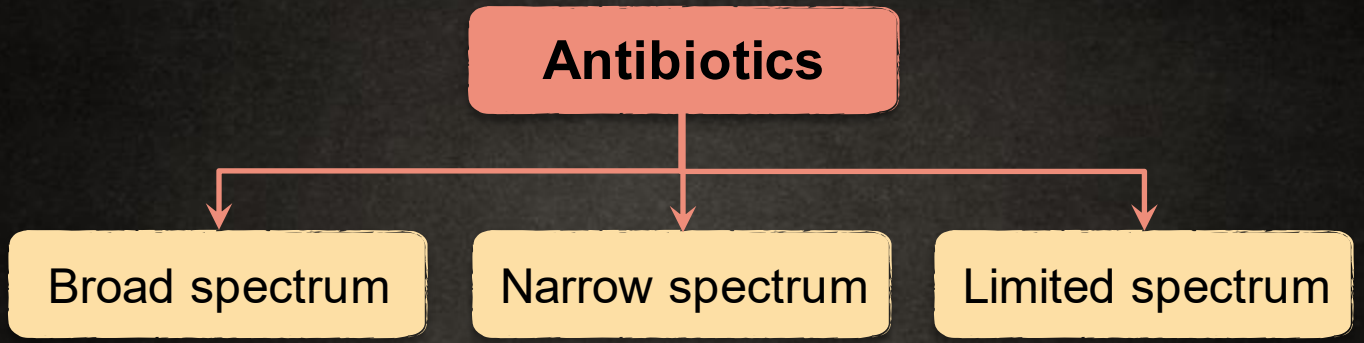
# Antibiotics

| Bactericidal | Bacteriostatic |
| --- | --- |
| Penicillin | Erythromycin |
| Aminoglycosides | Tetracycline |
| Ofloxacin | Chloramphenicol |

# Spectrum of Action

The range of a **bacteria** or a **microorganism** that is affected by a **certain antibiotic.**

# Antibiotics



# Broad Spectrum Antibiotics

Antibiotics that kill or inhibit a wide range of **gram–positive** and **gram–negative** bacteria


- Chloramphenicol
- Vancomycin
- Ofloxacin

# A broad spectrum antibiotic is:

AIIMS 2014

a. paracetamol

b. penicillin

c. aspirin

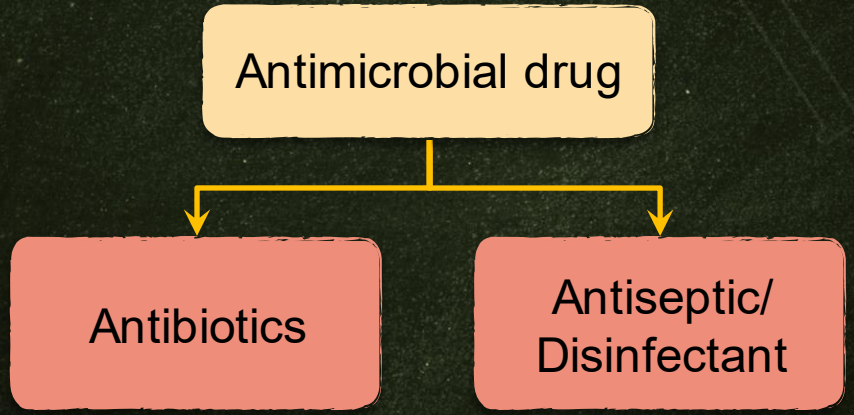
d. chloramphenicol

# Narrow Spectrum Antibiotics

These **antibiotics** are effective mainly against gram–positive **or** gram–negative bacteria.


**Penicillin G**

# Antimicrobial Drugs



# Antiseptics

Applied to **living tissues**

**Wounds, cuts, ulcers,** and more


**Furacine, Soframycin,** and more

# Mixture of chloroxylenol and terpineol acts as:

NEET 2017

a. antiseptic

b. antipyretic

c. antibiotic

d. analgesic

# Bithionol

Also known as **bithional**

**Bithionol** is added to **soaps.**

To impart **antiseptic properties**

Biothional is generally added to the soaps as an additive to function as a/an:

NEET 2015

a. buffering agent

b. antiseptic

c. softener

d. dryer

# Tincture of Iodine

**Powerful antiseptic**

It is a mixture of **2-3 % iodine** solution in an **alcohol–water** mixture.

# Disinfectants

**Disinfectants** are applied to **inanimate objects**.

**Floor, drainage systems,** and more

# Disinfectants

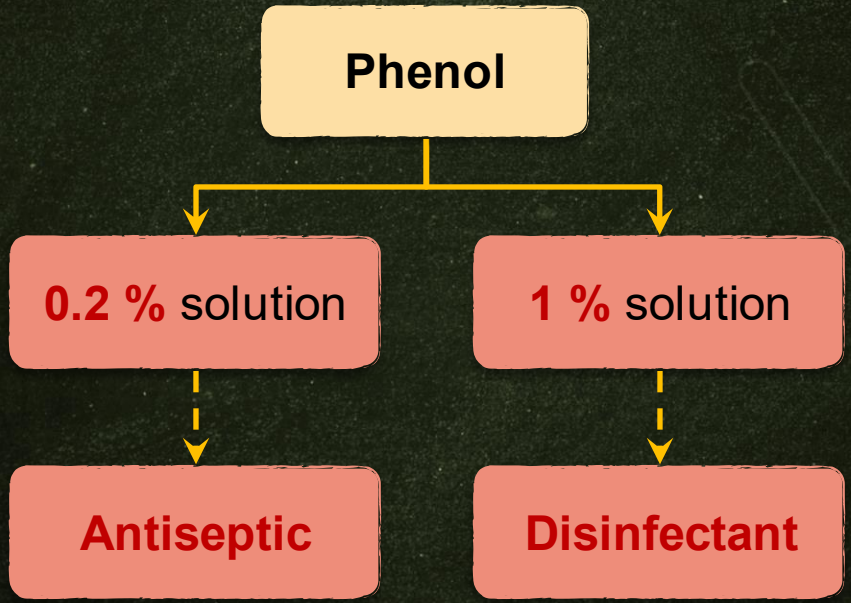

**0.2–0.4 ppm** in aqueous solution

**Chlorine**

$SO_2$

**Low concentration**

# Antiseptics and Disinfectants

# Antiseptics and disinfectants either kill or prevent the growth of microrganisms. Identify which one of the following is not true.

NEET 2013

a. Dilute solution of boric acid and hydrogen peroxide are strong antiseptic

b. Disinfectant harm the living tissues.

c. A 0.2% solution of phenol is an antiseptic while 1% solution acts as a disinfectant.

d. Chlorine and iodine are used as strong disinfectant

# Antifertility Drugs

To **control overpopulation**, the concept of family planning came into the picture.

**Antifertility** drugs are **used** for this purpose.

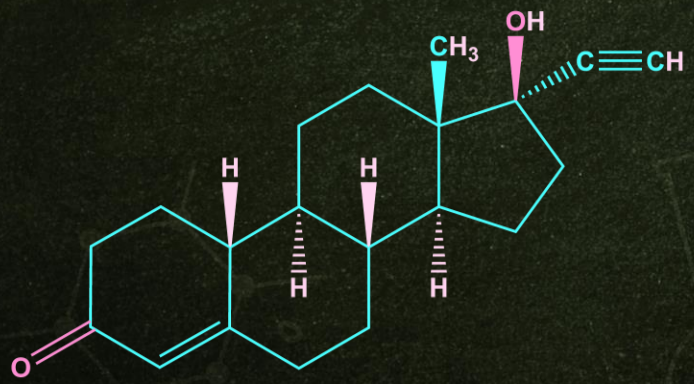
# Antifertility Drugs

EXAMPLES

**Norethindrone** — Suppresses ovulation

↓

Synthetic **progesterone**



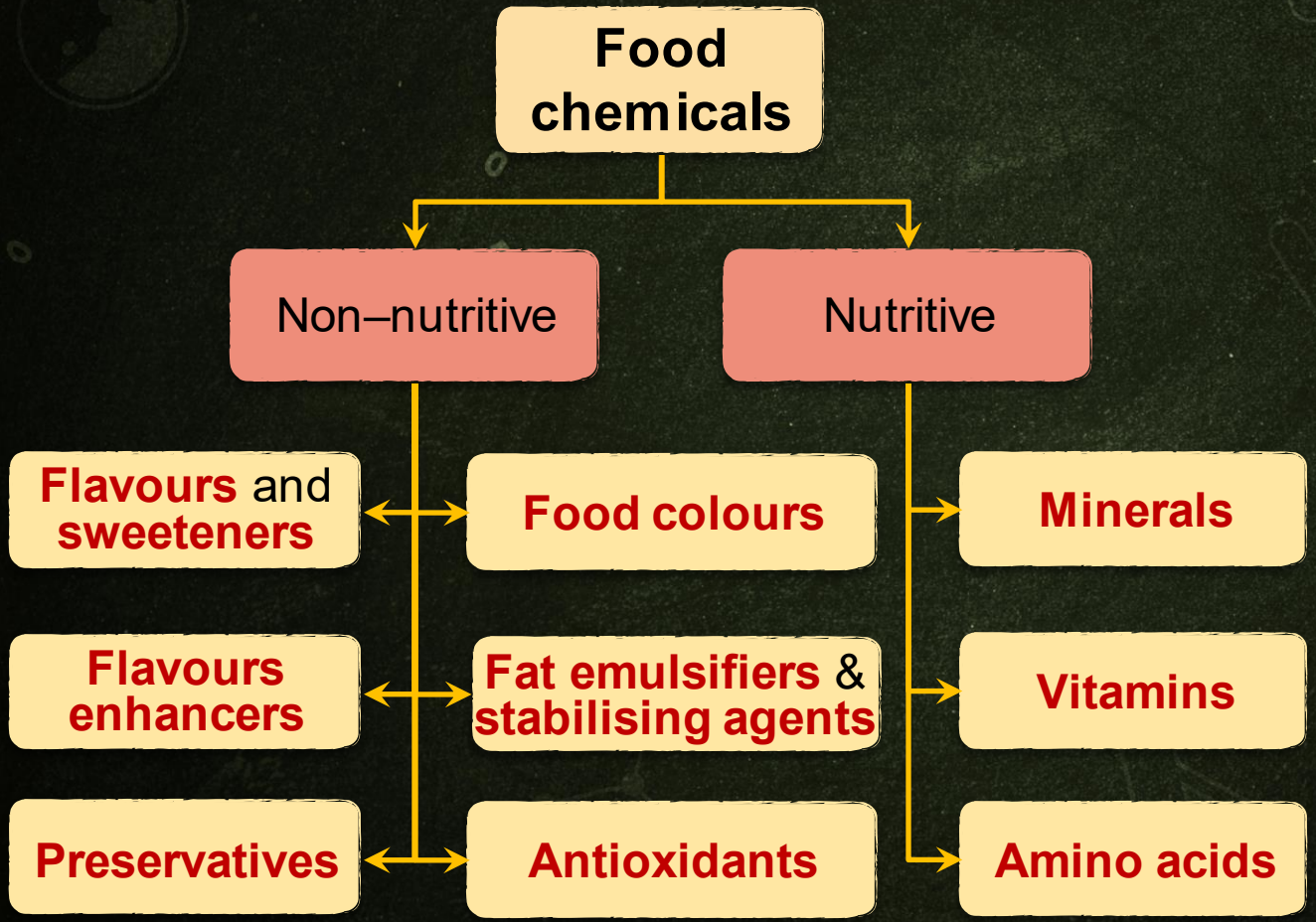
# Chemicals In Food

Chemicals are added to **food** for:

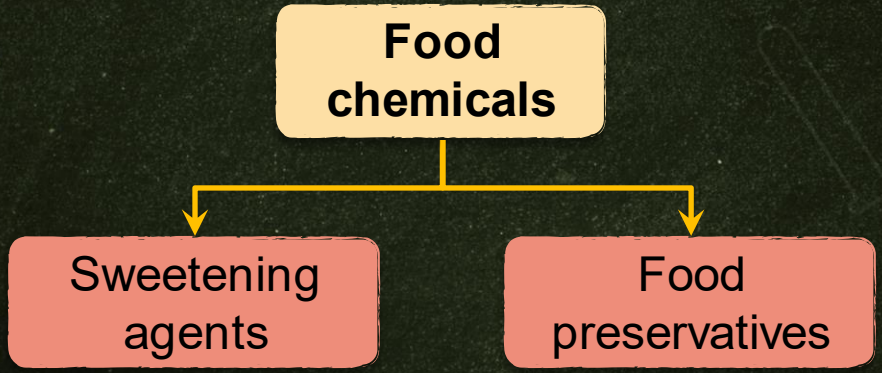

**Preserving**


Enhancing **appeal**

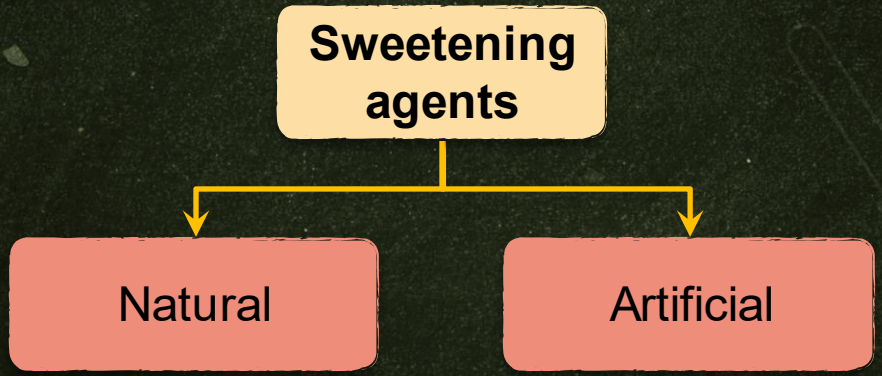

Adding **nutritive value**


Food chemicals
Non–nutritive
Nutritive
Flavours and sweeteners
Food colours
Minerals
Flavours enhancers
Fat emulsifiers & stabilising agents
Vitamins
Preservatives
Antioxidants
Amino acids

# Chemicals In Food



# Chemicals In Food



# Chemicals In Food

**Sweetening agents**

- **Natural**
- Artificial


**Sucrose**

Adds **calories**

# Artificial Sweeteners

# Artificial Sweeteners

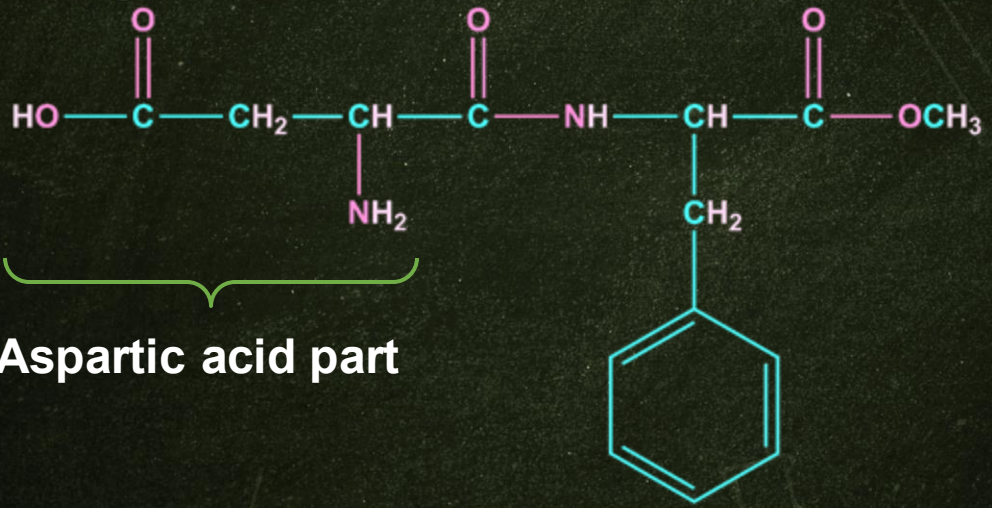
## Aspartame

**100 times** as sweet as cane sugar

**Aspartame** is the most successful and widely used **artificial sweetener.**

# Structure of Aspartame

Aspartame is **methyl ester** of **dipeptide**




**Aspartic acid part**

**Phenylalanine methyl ester part**

# Use of Aspartame

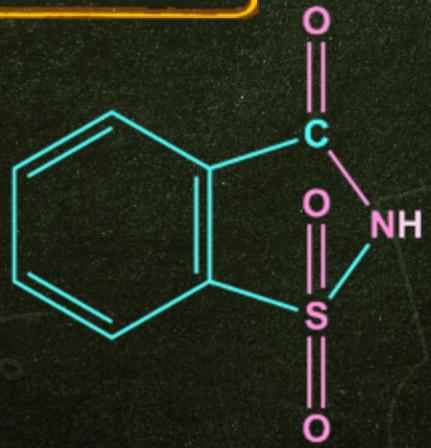
Aspartame is limited to **cold foods** and **soft drinks**.

**Unstable** at cooking temperature

# Saccharin

It is the first popular **artificial sweetening agent.**

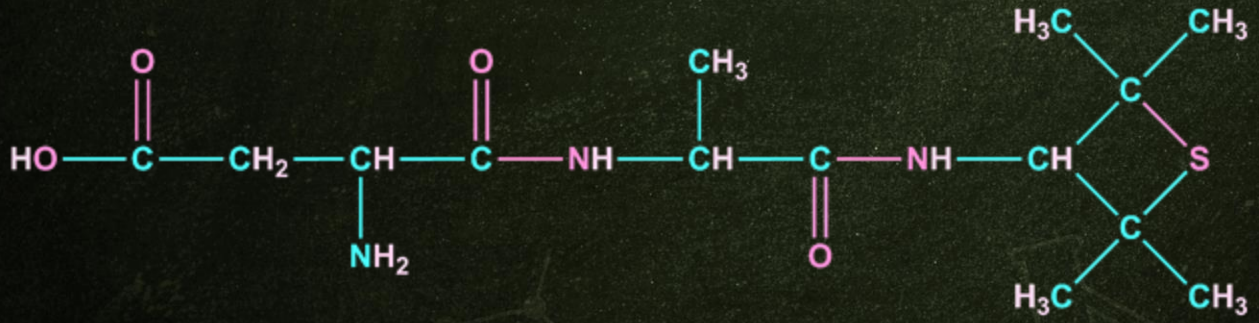
**550 times** sweeter than cane sugar



# Alitame

It is a potent sweetener that is **more stable** than aspartame.

However, it is diffcult to control the **sweetness** while using it.

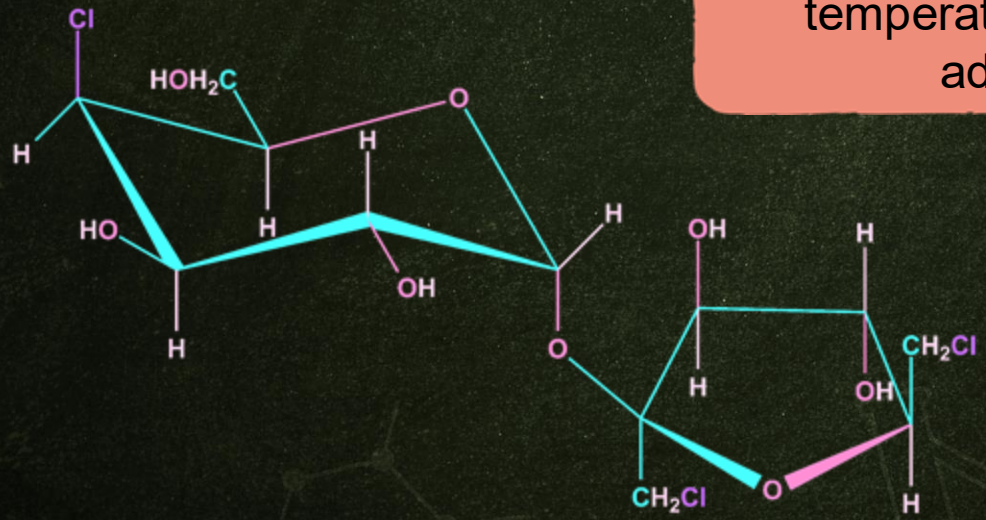



Alitame

# Sucralose

**600 times** sweeter than cane sugar

**Sucralose** is **stable** at cooking temperature and does **not** add **calories**.




Sucralose

# Artificial sweetner which is stable under cold conditions only is:

NEET 2014

a saccharine

b sucralose

c aspartame

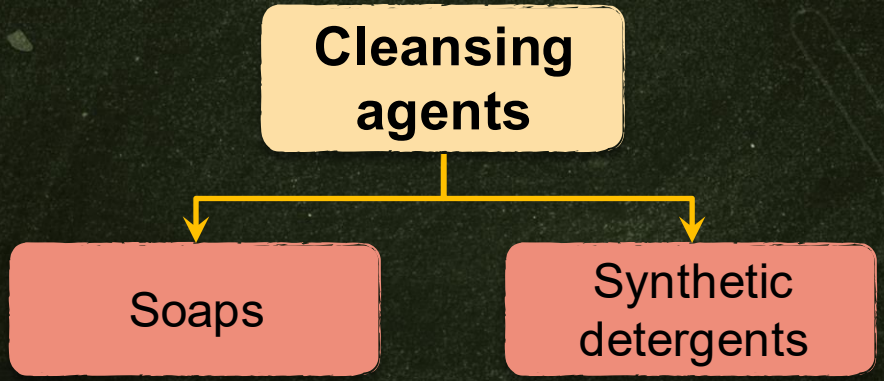
d alitame

# Food Preservatives

They **prevent** the spoilage of food due to **microbial growth**.


- **Table salt**
- **Sodium benzoate**
- **Sugar**
- Salts of **sorbic acid** and **propanoic acid**
- **Vegetable oil**

# Cleansing Agents



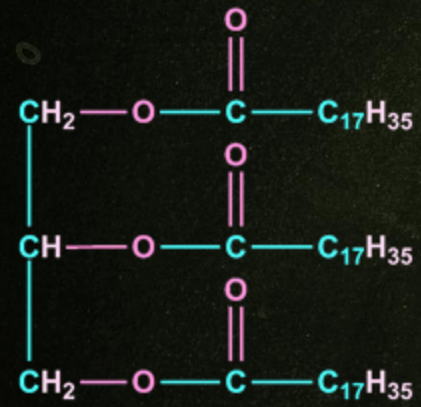
# Soaps

Soaps are **sodium** or **potassium salts** of long chain **fatty acids.**

**Stearic, Oleic,** and **palmitic acid**

# Saponification Reaction

## Preparation



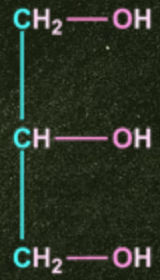

Glyceryl ester of stearic acid (fat)

+ $3NaOH$ ⟶

Sodium hydroxide

$3C_{17}H_{35}COONa$ +

Sodium stearate




Glycerol (or glycerine)

# Toilet Soap

To **remove** excess of **alkali**

These are prepared by using better grades of **fats** and **oils.**

**Perfumes** and **colors** are added to make them **more attractive.**

# Transparent Soaps

They are made by **dissolving** soap in **ethanol** and then **evaporating** the excess solvent.

# Medicated Soaps

They are made by adding **substances** of **medicinal** value.

# Shaving Soap

It contains **glycerol** to **prevent** rapid drying.

Forms **sodium rosinate,** which lathers well

**Rosin gum** is added while making such soaps.

# Laundry Soap

**Sodium rosinate, sodium silicate, borax, $Na_2CO_3$,** and more

They contain **fillers**.

# Synthetic Detergents

Synthetic detergents are **cleansing agents** that have all **properties** of soaps.

**But**

They actually **do not** contain any **soap.**

# Synthetic Detergents

They can be used in **soft** and **hard water**

They give **foam** even in **hard water**

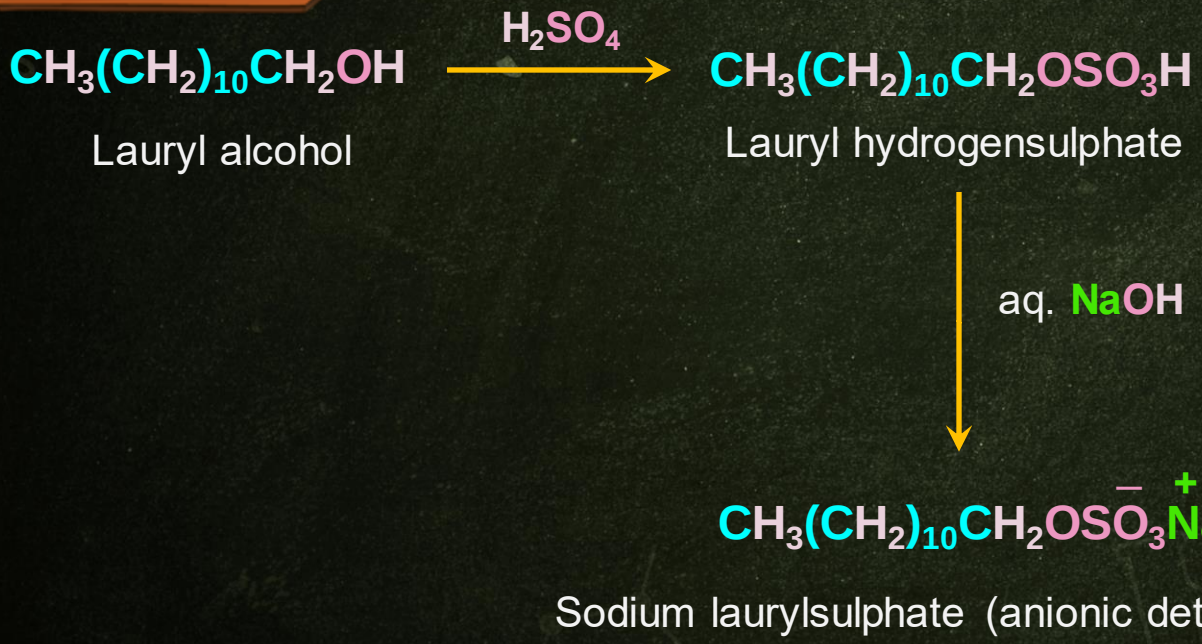
Some detergents give **foam** even in **ice cold water**

# Anionic Detergents

They are the **sodium salts** of sulphonated long chain **alcohol** or **hydrocarbon**.

# Anionic Detergents

## Preparation




Lauryl alcohol

Lauryl hydrogensulphate

Sodium laurylsulphate (anionic detergent)

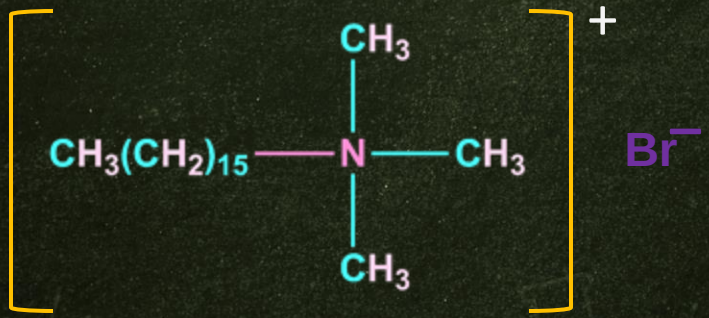
# Cationic Detergents

**Quaternary ammonium salts** of amines with anion.

**Acetates, chlorides** or **bromides**

# Cationic Detergents

Cationic part possess a **long hydrocarbon chain** and possess **positive** charge on **nitrogen** atom

# Which of the following forms cationic micelles?

AIPMT 2004

a. Sodium dodecyl sulphate

b. Sodium acetate

c. Urea

d. Cetyltrimethylammonium bromide

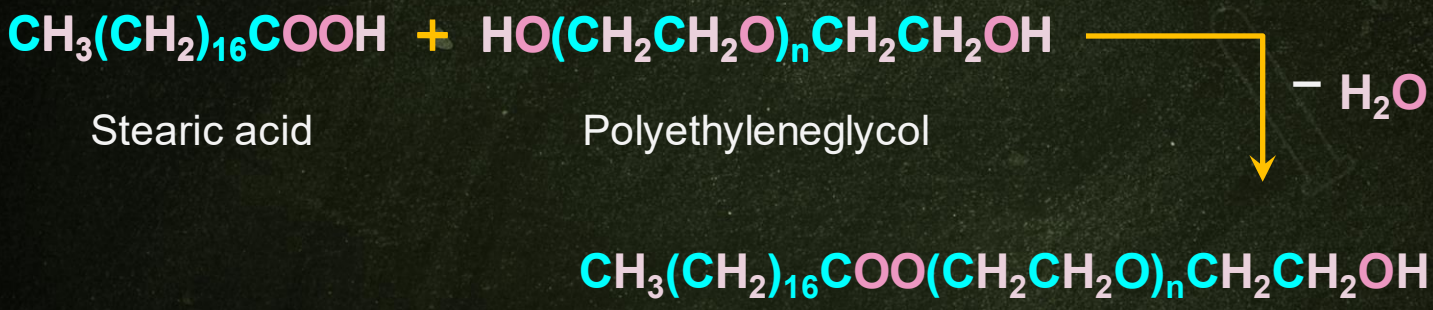
# Non-Ionic Detergents

They **do not** contain any **ion**


**Liquid dish washing detergent**

# Non-Ionic Detergents

## Preparation



# Disadvantage of Non-Ionic Detergents

If their **hydrocarbon chain** is **highly branched**,

↓

Bacteria **cannot** degrade easily

Now a days branching of hydrocarbon is **controlled** and kept to **minimum**

↓

**Unbranched chains** can be **biodegraded** easily

Stay Positive. Work Hard. Make It Happen!

# THANK YOU