

BIOCHEMISTRY AND CLINICAL PATHOLOGY, SOCIAL PHARMACY, COMMUNITY PHARMACY AND MANAGEMENT, GENERAL KNOWLEDGE

MODULE-6



**START YOUR
PREPARATION
WITH US!**



USEFUL FOR

**AIIMS, DSSSB, ESIC, RAILWAY, CGHS
ISRO, NHM, SECL, NTPC, NCL, SEPOY,
STATE & CENTRAL GOVT.
PHARMACIST EXAMINATION**



BIOCHEMISTRY, SOCIAL PHARMACY, COMMUNITY PHARMACY AND MANAGEMENT, GENERAL KNOWLEDGE

Pharmacist Competitive Examination

Theory Book

ESIC | AIIMS | NHM | RRB | CGHS | ZILA PARISHAD | ISRO
| DSSSB | RAJASTHAN | KERALA



Central Government Health Scheme



DOWNLOAD OUR APP

Download PHARMACY INDIA App from
Google Play Store

FOR PHARMA RELATED UPDATES

www.pharmacyindia.co.in

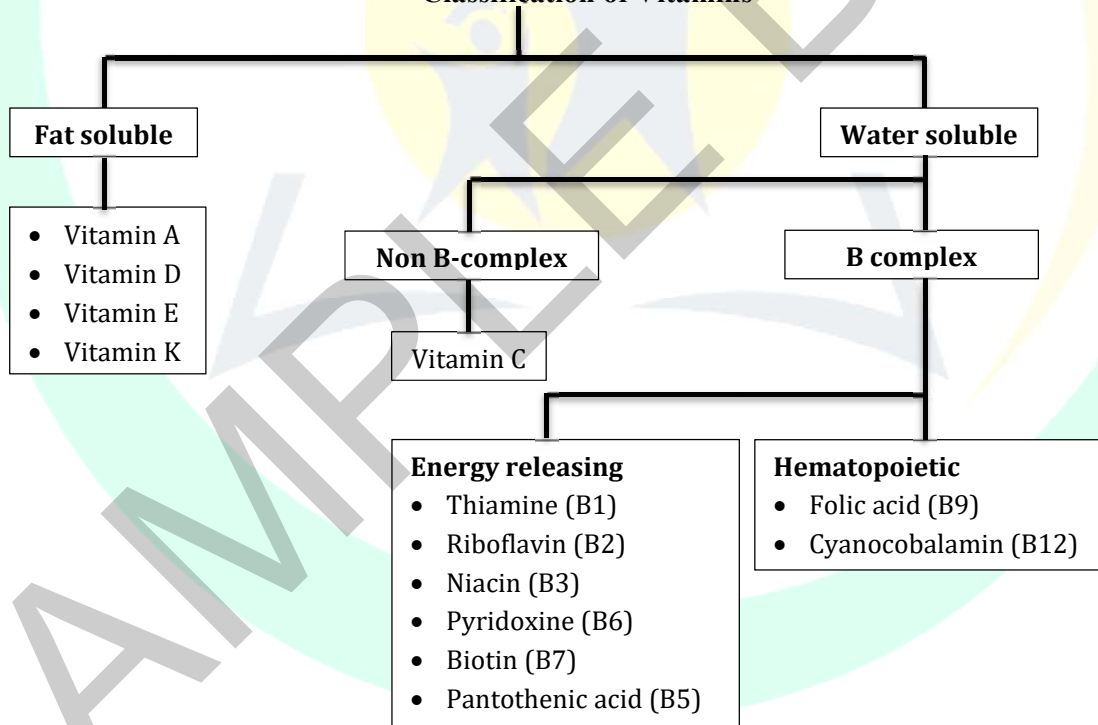
TABLE OF CONTENT

S.NO.	TOPIC	PAGE NO.
1.	Vitamins	1-3
2.	Enzymes	4-5
3.	Proteins And Amino Acidss	6-10
4.	Chemistry Of Lipids And Their Metabolism	11-21
5.	Chemistry Of Carbohydrates	22-36
6.	Nucleic Acid And Nucleotides	37-43
7.	Minerals	44-45
8.	Water And Electrolytes	46-48
9.	Organic Function Tests	49-52
10.	Introduction To Pathology Of Blood And Urine	53-60
SOCIAL PHARMACY		61-76
COMMUNITY PHARMACY AND MANAGEMENT		77-100
GENERAL KNOWLEDGE		101-142

INTRODUCTION

- Vitamins may be regarded as organic compounds required in the diet in small amounts to perform specific biological functions for normal maintenance of optimum growth and health of the organism.
- Vitamins may be defined as organic compounds occurring in small quantities in different natural foods and necessary for growth and maintenance of good health in human beings and in experimental animals.
- Funk (1913) isolated an active principle (an amine) from rice polishings and, later in yeast, which could cure beri-beri in pigeons. He coined the term vitamin (Greek: vita-life) to the accessory factors with a belief that all of them were amines.

Classification of Vitamins



Vitamers

- The term vitamers represent the chemically similar substances that possess qualitatively similar vitamin activity.
- **Examples:**
 - Retinol, retinal and retinoic acid are vitamers of vitamin A.
 - Pyridoxine, pyridoxal and pyridoxamine are vitamers of vitamin B.

	Methionine	Met		Thioether
Acidic amino acids	Aspartic acid	Asp		β-carboxyl
	Asparagine	Asn		Amide
	Glutamic acid	Glu		γ-carboxyl
	Glutamine	Gln		amide
Basic amino acids	Lysine	Lys		ε-amino
	Arginine	Arg		Guanidino
	Histidine	His		Imidazole
Aromatic amino acid	Phenylalanine	Phe		Benzene or phenyl
	Tyrosine	Tyr		Phenol
	Tryptophan	Trp		Indole
Imino acid	Proline	Pro		Pyrrolidine

Nutritional classification of amino acids

- **Essential amino acids** → "Any Help In Learning These Little Molecules Proves Truly Valuable"
- Arginine and Histidine are semi-essential amino acids; while others are essential.

Diagnosis of Ketosis

1. Rothera's test
2. Gerhardt's test for acetoacetic acid

List of Lipid storage diseases

S. NO.	DISEASE	DEFECTIVE ENZYME	MAJOR STORAGE COMPOUND
1.	Niemann-pick disease	Sphingomyelinase	Sphingomyelins
2.	Farber's disease	Ceramidase	Ceramide
3.	Gaucher's disease	β -glucosidase	Glucocerebroside
4.	Krabbe's disease	β -galactosidase	Galactocerebroside
5.	Tay-sachs disease	Hexosaminidase A	Ganglioside GM ₂
6.	Fabry's disease	α -galactosidase	Ceramide trihexoside

Diseases/ disorders related to Lipids/ fatty acids

- **Obesity** → Abnormal increase in body weight due to excessive fat deposition.
- **Xanthomatosis** → The deposition of yellow-orange colour lipids in liver, spleen and flat bones of the skull is known as xanthomatosis (Greek: xanthos → yellow). This is usually associated with severe hyperlipidemia and hypercholesterolemia.
- **Atherosclerosis** → Atherosclerosis (Greek athero-mush) is a complex disease characterized by thickening or hardening of arteries due to the accumulation of lipids (particularly cholesterol, free, and esterified) collagen, fibrous tissue, proteoglycans, calcium deposits etc. in the inner arterial wall.
- **Cachexia** → This is exactly opposite of what is seen in obesity. Cachexia is characterized by a failure to maintain normal lipid stores in the body. It involves higher rate of fat mobilization than the deposition. In extreme cases, the adipose tissue may totally disappear.
- **Cholelithiasis** → a cholesterol gall stone disease, is caused by a defect in the absorption of bile salts from the intestine or biliary tract obstruction.
- **Hypercholesterolemia** → Increase in plasma cholesterol (> 200 mg/dl) concentration is known as hypercholesterolemia and is observed in diabetes mellitus, atherosclerosis and coronary heart disease.
- **Types of Hyperlipoproteinemias**

HYPERLIPOPROTEINEMIA TYPES	INCREASED PLASMA LIPOPROTEINS	INCREASED PLASMA LIPID	PROBABLE METABOLIC DEFECTS
I	Chylomicrons	Triacylglycerols	Deficiency of lipoprotein lipase
IIa	LDL	Cholesterol	Deficiency of LDL receptors
IIb	LDL and VLDL	Triacylglycerols and cholesterol	Overproduction of apo-B
III	LDL	Triacylglycerols and cholesterol	Abnormality in apo-E
IV	VLDL	Triacylglycerols	Overproduction of TG
V	Chylomicrons and VLDL	Triacylglycerols	–

Type IV	Amylopectinosis Anderson's disease	Branching enzyme	Glycogen with few branches; hepatosplenomegaly; mild hypoglycemia; death by age of 5
Type V	McArdle's disease	Muscle phosphorylase	Exercise intolerance; accumulation of glycogen in muscles
Type VI	Hers' disease	Liver phosphorylase	Mild hypoglycemia; hepatomegaly; better prognosis than other types
Type VII	Tarui's disease	Muscle PFK	Glycogen in muscles accumulated; exercise intolerance; hemolytic anemia
Type VIII		Liver phosphorylase kinase	Mild hypoglycemia; better prognosis
Type IX		Muscle phosphorylase kinase	Mild exercise intolerance; better prognosis
Type X		Protein kinase A	Hepatomegaly

Chemical test for carbohydrates

S. NO.	TEST NAME	PROCEDURE	OBSERVATION
1.	Reduction of Fehling's Solution	Solution of carbohydrate + equal quantity of Fehling's solutions A and B → after heating	brick red precipitate is obtained
2.	Molisch Test	Solution of carbohydrate + α -naphthol + concentrated sulphuric acid	gives purple colour
3.	Resorcinol Test for Ketones (Selivanoff's Test)	A crystal of resorcinol + carbohydrate solution → warmed on a water bath with an equal volume of concentrated hydrochloric acid	rose colour is produced if a ketone is present (e.g. fructose, honey or hydrolysed inulin).
4.	Test for Pentoses	Heat a solution of the substance in a test tube + equal volume of hydrochloric acid containing a little phloroglucinol	Formation of a red colour indicates pentoses
5.	Keller-Kiliani Test for Deoxysugars	A Deoxysugar (found in cardiac glycosides) + acetic acid + trace of ferric chloride → transferred to the surface of concentrated sulphuric acid	at the junction of the liquids a reddish-brown colour is produced which gradually becomes blue.
6.	Furfural Test	A carbohydrate sample is heated in a test tube + a drop of syrupy phosphoric acid to convert it into furfural → disk of filter paper moistened with a drop of 10% solution of aniline in 10% acetic acid → placed over the mouth of the test tube → bottom of the test tube is heated for 30–60s	pink or red stain appears on the reagent paper

ORAL REHYDRATION THERAPY (ORT)

- Oral rehydration therapy is a treatment for dehydration.
- It involves drinking a special mixture of water, glucose and salts to return the amount of fluids, sugars and electrolytes in the body to normal levels.
- ORT is the preferred treatment for fluid and electrolyte losses due to diarrhea in children with mild to moderate dehydration.

There are two basic treatment Phases:

- **Rehydration Phase:** It involves the replacements of fluid and electrolytes lost through diarrhoea and vomiting.
- **Maintenance Phase:** It is the replacement of losses due to continuing diarrhea and vomiting, and of normal loss due to respiration, sweating, and urination which are especially high in infants.

ELECTROLYTE

- An electrolyte is a substance that dissociates in water into positively (cation) and negatively (anion) charged particles.
- Electrolytes are found in the human body, and the electrolyte balance in our bodies is necessary for our cells and our organs to function normally.
- Electrolytes in living systems include sodium, potassium, chloride, bicarbonate, calcium, phosphate, magnesium, copper, zinc, iron, manganese, molybdenum and chromium.

Composition of Body Fluids

- Water is the main component of all body fluids making up 45-75% of the total body weight.
- **Sources of water include** - Ingested foods and liquids (performed water). Metabolic water produced during dehydration synthesis of anabolism.
- **Solutes are broadly classified into**
 - Electrolytes
 - Non-electrolytes
- Electrolytes have greater osmotic power than non-electrolytes.
- Water moves according to osmotic gradients.
- Electrolyte Composition of Body Fluids

Extracellular Fluids	Intracellular Fluids
<ul style="list-style-type: none"> • ECFs are similar except for the high protein content of plasma. • Sodium • (Na⁺) is the major cation. • Chloride (Cl) is the major anion 	<ul style="list-style-type: none"> • Have low sodium and chloride ions. • Potassium (K) is the main cation. • Phosphate (PO) is the main anion.

PRINCIPLE PHYSIOLOGICAL IONS

Electrolytes	Description	Function
Sodium ions (Na⁺)	<ul style="list-style-type: none"> • It is a principle cation of extracellular fluid. • Na⁺ maintain hydration and osmotic pressure. 	<ol style="list-style-type: none"> 1. Sodium ion regulates fluid distribution throughout the body. 2. It preserves the normal irritability of muscle and permeability of the cell.
Potassium ions (K⁺)	<ul style="list-style-type: none"> • It is principal cation of intracellular fluid associated with cell function and metabolism. 	<ol style="list-style-type: none"> 1. It is essential for carbohydrates metabolism of glycogen storage and protein synthesis. 2. It controls acid-base balance.

- Respiratory irritants (smoke, dust, fumes etc)is the main cause of COPD, hence quit/avoid smoking.
- Avoid second hand smoke and chemical fumes and get rid of air pollutants.
- To prevent complications, lifestyle changes involving healthy eating plans, some form of exercise, weight management need to be emphasized. It is better to take five or six small meals per day.
- Ask the patient to keep emergency contact numbers all the time with him. Advice the patient to take plenty of fluids.
- Encourage patient to call/contact doctor/pharmacist, if he has any questions about therapy or any related problems.

AIDS

1. Name, strength, dosage, route of administration

- Educate the patient briefly about HIV and AIDS Show the patient medications prescribed one by one telling him the purpose of each medication.

2. When and how to take medications

- For each medication showing and calling by its name, explain the patient how and when to take the medications.
- Classically the infection is treated with three classes of antiretroviral agents-

• Protease inhibitors	Ritonavir, Lopinavir, Indinavir, Nelfinavir, Saquinavir
• Nucleoside Reverse Transcriptase Inhibitors	Zidovudine, Lamivudine, Stavudine
• Non-nucleoside Reverse Transcriptase Inhibitors	Efavirenz, Nevirapine, Delavirdine

3. Potential precautions

- Explain the patient about limitations of using single antiretroviral drug and hence the need of taking HAART.
- Taking multiple drugs is associated with side effects and adverse effects. Such possible effects include, hypersensitivity, allergic reactions, fever, nausea, vomiting, headache, diarrhea, fatigue, dry mouth.
- Most of these effects are manageable but some can be serious.
- Long-term side effects include depression, diabetes, insomnia, osteoporosis and increased cholesterol.
- Inform the patient about serious effects like extreme fatigue, fever, persistent-vomiting, swelling of face throat or tongue and in such cases emergency treatment should be taken.

4. Drug interactions

- Many medications both prescription and non-prescription supplements and herbal products have been known to interfere with antiretroviral agents.
- Antacids may reduce the effectiveness of some of the antiretroviral agents. Some of the antiretroviral agents may make oral contraceptives less effective resulting in unplanned pregnancy.
- On the other hand, oral contraceptives may make some of the antiretroviral agents less effective.
- Interactions of antiretroviral agents with antifungal, antibiotics and some foods have been known.

- The pharmacist must ensure the proper storage of these products.
- 3. As a trainer and supervisor**
- To ensure up-to-date quality service, the pharmacist must encouraged to participate in continuing professional development activities such as continuing education.
 - The pharmacist is often assisted by non-pharmacist staff must ensure that the services provided by these auxiliaries correspond to established standards of practice.
- 4. As a collaborator**
- It is imperative that pharmacists develop quality collaborative relationships with:
 - Other health care professionals
 - National professional associations
 - The pharmaceutical industry
 - Governments (local/national)
 - Patients and the general public
 - In so doing, opportunities to tap into resources and expertise, and to share data and experiences, in order to improve self-care and self-medication, will be enhanced.
- 5. As a health promoter**
- As a member of the health-care team, the pharmacist must:
 - Participate in health screening to identify health problems and those at risk in the community
 - Participate in health promotion campaigns to raise awareness of health issues and disease prevention.
 - Provide advice to individuals to help them make informed health choices.



RESPONDING TO SYMPTOMS, MINOR AILMENTS, AND ADVICE FOR SELF-CARE IN CONDITIONS

1. Pain Management:

- Pain alerts us to injury or disease. It can vary from person to person.
- Pain can be caused by a variety of conditions and examples of these commonly seen in the pharmacy are headache, toothache, musculoskeletal pain and period pain.

Types of Pain (symptoms)	Advice for Self care	
	Pharmacologic	Non-Pharmacologic
Headache in common cold – Head feels heavy due to sinus infection Headache in hyperacidity - It is presented with other symptoms like fullness of stomach, burning chest and nausea	(a) Analgesics in common cold – aspirin, ibuprofen, acetaminophen, indomethacin, Naproxen, (b) Cough remedies expectorants (c) Antacids – Sodium bicarbonate, oral liquids, chewable tablets, painkillers should be avoided.	Massage, steam inhalation cold/hot compress, drinking water, take tea get adequate sleep (a) Avoid fasting's (b) Avoid Tea, coffee, smoking (c) Avoid drinking alcohol

GENERAL KNOWLEDGE

LIST OF DAMS AND RESERVOIRS IN INDIA

List of Dams in India 2023 State Wise		
State	List of Dams/Reservoirs in India 2023	River
Andhra Pradesh	Nagarjunasagar Dam	Krishna
	Somasila Dam	Penna
	Nizamsagar Dam	Manjira
	Srisaillam	Krishna
	Kalyani Dam	Swarnamukhi
	Veligallu Dam	Papagni
	Ramagundam	Godavari
	Singur dam	Manjira
	Jalaput Dam	Godavari
	Tatipudi Reservoir	Gosthani
	Gandipalem Reservoir	Pillaperu
	Gandikota Reservoir	Penna
Arunachal Pradesh	Dibang	Dibang
	Ranganadi	Ranganadi
Bihar	Nagi Dam	Nagi River
Chhattisgarh	Dudhawa dam	Mahanadi
	Minimata Bango (Hasdeo)	Hasdeo
	Gangreal Dam (R.S. Sagar)	Mahanadi
	Kutaghat	Kharang
Gujarat	Sardar Sarovar Dam	Narmada
	Ukai Dam	Tapi
	Dantiwada	West Banas
	Kandana	Mahi
	Kamleshwar	Hiran
	Dharoi	Sabarmathi
	Dholidhaja	Bhogavo
	Karjan dam	Karjan
Himachal Pradesh	Chamera Dam	Ravi
	Maharana Pratap Sagar Dam	Beas
	Pandoh Dam	Beas
	Bhakra Nangal Dam	Sutlej
	NathpaJakhri Dam	Sutlej
	Koldam	Sutlej
	Kishau	Tons
	Pong Dam	Beas
	Gobind Sagar Reservoir	Sutlej
	Maharana Pratap Sagar Reservoir	Pong Dam Lake
Jammu and Kashmir	Salal Dam	Chenab
	Uri Dam	Jhelum
	Baglihar Dam	Chenab
	Cholal Dam	Cholal Choe
	Chutak Hydroelectric Plant	Suru
	Nimoo Bazgo Hydroelectric Plant	Indus
Jharkhand	Konar Dam	Konar












08 May		World Red-cross Day	
12 May		World Chronic Fatigue Syndrome Awareness Day	
12 May		International Nurse's Day	
16 May		National Dengue Day	
19 May		World Family Doctor Day	
28 May		International Day of Action for Women Health / International Women Health Day	
30 May		World Multiple Sclerosis Day	
31 May		Anti-tobacco Day / World no-tobacco Day	
JUNE			
05 June		World Environment Day	
08 June		World Brain Tumor Day	
14 June		World Blood Donation Day	
JULY			
01 July		National Doctor's Day	
11 July		World Population Day	
28 July		World Hepatitis Day	
29 July		ORS Day	
AUGUST			
01 to 07 August		Breast feeding Week	
20 August		World Mosquito Day	
25 Aug to 08 September		National Eye Donation Fortnight	
SEPTEMBER			
01 to 07 September		Nutrition Week	
05 September		Spinal Cord Injury Day	
10 September		World Suicide Prevention Day	
19 September		World Marrow Donor Day	
21 September		World Alzheimer's Day	
25 September		World Pharmacist Day	
28 September		World Rabies Day	
29 September		World Heart Day	
21 to 27 September		World Day of Deaf (Starts last week of September and ends on last Sunday of September)	
OCTOBER			
October		Breast Cancer Awareness Month	
01 October		International Day for the Elderly	
01 October		World Vegetarian Day	
02 October		National Anti Drug Addiction Day	
06 October		World cerebral Palsy Day	
08 October		World Sight Day	
10 October		World Mental Health Day	
11 October		International Day of the Girl Child	
11 October		World Obesity Day	
12 October		World Arthritis Day	
13 October		World Thrombosis Day	
15 October		Global Hand washing Day	
16 October		World Food Day	
20 October		World Osteoporosis Day	
21 October		World Iodine Deficiency Day	
24 October		World Polio Day	
29 October		World Stroke Day	
29 Oct to 03 Nov		Vigilance Week	

the Award. Arjuna Award for the outstanding performance from the sports persons in Sports and Games.

- Important facts about Arjuna Award:
 - Instituted in 1961.
 - Given by Sports Ministry, Government of India.
 - These are given for the special achievements in different types of sports.
 - Cash prize - ₹ 15,00,000

Arjuna Award Winners

Awardee		Category
2022		
Seema Punia		Athletics
Eldhose Paul		Athletics
Avinash Sable		Athletics
Lakshya Sen		Badminton
Prannoy H. S.	Badminton	Badminton
Amit Panghal		Boxing
Nikhat Zareen		Boxing
Bhakti Kulkarni		Chess
R Praggnanandhaa	Chess	Chess
Deep Grace Ekka		Hockey
Shushila Devi Likmabam		Judo
Sakshi Kumari		Kabaddi
Nayanmoni Saikia		Lawn Bowl
Sagar Kailas Ovhalakar		Mallakhamba
Elavenil Valarivan		Shooting
Om Prakash Mitharwal		Shooting
Sreeja Akula		Table Tennis
Vikas Thakur		Weightlifting
Anshu Malik		Wrestling
Sarita Mor		Wrestling
Praveen Kumar		Wushu
Manasi Girishchandra Joshi		Badminton
Tarun Dhillon		Badminton
Swapnil Sanjay Patil		Swimming
Jerlin Anika		Badminton
2021		
Arpinder Singh		Athletics
Simranjit Kaur		Boxing
Shikhar Dhawan		Cricket
Bhavani D. C. A. Sundhararaman		Fencing
Amit Rohidas		Hockey
Birendra Lakra		Hockey
Dilpreet Singh		Hockey
Gurjant Singh		Hockey
Hardik Singh		Hockey
Harman Preet Singh		Hockey
Lalit Kumar Upadhyay		Hockey
Mandeep Singh		Hockey
Monika		Hockey

CHYAWA NPRASH	DABUR 	Cooked mixture of sugar, honey, ghee, Indian gooseberry (amla) jam, sesame oil, berries and various herbs and spices	Improves digestion and eases constipation. It enhances energy. It purifies the blood and eliminates toxins. It normalises blood pressure.	
KESARI JEEVAN	EMAMI 	Amla, Ashwagandha, Cardamom, Clove, Ginger, Pippali, Saffron, Moti (Pearl calcium)	It supplies calcium and strengthens bones and helps you keep your energy even as you age.	
RING GUARD	Reckitt Benckiser Group 	Miconazole Nitrate Neomycin Sulphate	Aids in treating fungal infections and prevents it from spreading	
ITCH GUARD	Reckitt Benckiser Group 	Benzyl alcohol Terbinafine Hydrochloride	It helps kill fungus and inhibits it from spreading further	
VICKS INHALER	Procter & Gamble Hygiene and Health Care Limited 	Kapoor Pudinah Ke Phool Wintergreen oil	Fast relief from cold Opens up clogged nose due to cold, hay fever and upper respiratory tract allergy	
VICKS VAPO RUB	Procter & Gamble Hygiene and Health Care Limited 	Pudinah ke phool Karpoor Ajowan ke phool Tarpin ka tel Nilgiri tel	Relieves cough Relieves minor aches and pains of muscles and joints	

Tetracycline	Resteclin Hostacycline	Antibiotic	Tetracycline is an antibiotic used to treat many different bacterial infections, such as urinary tract infections, acne, gonorrhoea, chlamydia, and others
Vancomycin	Vanconyx	Antibiotic	Vancomycin is used to treat an infection of the intestines caused by <i>Clostridium difficile</i> , which can cause watery or bloody diarrhea. This medicine is also used to treat staph infections that can cause inflammation of the colon and small intestines.
Clofazimine	Hansenpran Fazim	Antileprotic	Clofazimine is used in the treatment of leprosy.
Dapsone	Dopliv Dapocare	Antileprotic	It is used to treat leprosy and acne. It works by stopping the growth of disease causing organisms in the body. It also helps to reduce redness and swelling associated with acne (commonly known as pimples)
Ofloxacin	Oflox Oflostar Folon	Antibiotic	It is also used in treating infections of the urinary tract, nose, throat, skin and soft tissues and lungs (pneumonia). It cures the infection by stopping the further growth of the causative microorganisms.
Fluconazole	Flukem Fluca Fczole	Antifungal	used to treat infections caused by fungus, which can invade any part of the body including the mouth, throat, esophagus, lungs, bladder, genital area, and the blood.
Griseofulvin	Grisovin-FP	Antifungal	It is used to treat fungal infections of the skin, nails, scalp, or hair. This medicine is usually used when other medicines failed to clear up the infection or are not appropriate.

AIIMS



RRB



CGHS,
HPPSC, BTSC, ISRO,
KERALA PSC,
MP PHARMACIST,
SECL, DSSSB,
BCCL

UP NHM

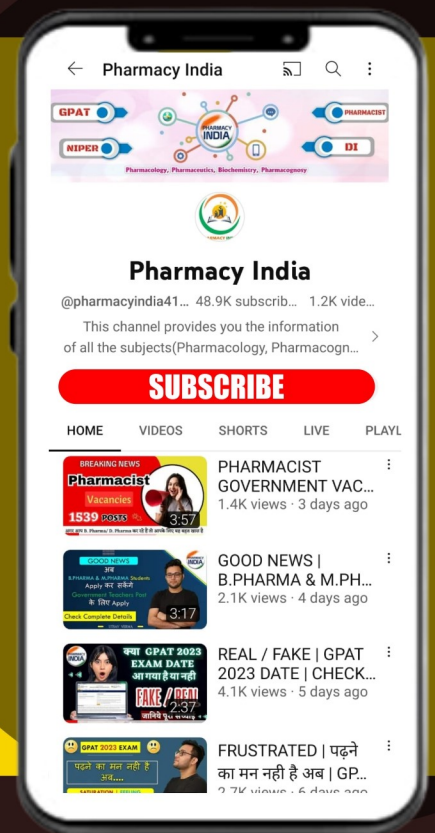


ESIC



ABOUT PHARMACY INDIA

Our classes set up with an aim to provide coaching to the aspiring students who are dedicated and want to achieve excellence in their career. we nurture aspirants and facilitated achievement and we specialized in providing correct and relevant information related to Pharma institute admission for higher education.



PHARMACY INDIA

Dayalpuram, Street-4, Khatauli Muzaffarnagar, 251201



8171313561, 8006781759



pharmacyindia24@gmail.com

