

## INTRODUCTION:

### Dhanvantari: God of Ayurvedic Medicine & Physician of the Gods



*This was designed in order to reflect traditional culture of the land in the field of Pharmacy and Medicine.*

**Dhanvantari**, lord of Ayurvedic Healing, holds a **golden leech** (symbol of blood purification) and a **medicinal plant** in his right hand, and the **Cronch** of wisdom and **Pot of rejuvenating nectar** in his left. The **tulsi-seed mala** around his neck, **plant-wreath halo**, and his **blue tinted skin** emphasize his connection with Vishnu, the Preserver.

Dhanvantari was an early Indian Practitioner and One of the World's First Surgeons. He perfected many herbal based cures and natural remedies and was credited with the discovery of the Antiseptic Properties of **Turmeric** and Preservative Properties of **Salt**, which he incorporated in his cures. As a result of the Brilliance and achievements he displayed in the field of medicine, he was adjudged as One of the Nine Gems in early Indian ruler Vikramaditya's court.

## PHARMACY DEFINITION:

*Pharmacy is the art and science of manufacturing and dispensing of drugs prepared by natural and synthetic sources, and using them for the treatment and prevention of diseases.*

## PHARMACY SYMBOLS AND THEIR SIGNIFICANCE:



A symbolic representation of the process of preparation of Medicine through crushing, grinding and mixing.



Bowl of Hygieia is a greek Goddess holding a Patera (Medicine Bowl) with a snake taxingly coiling.



Symbolizing essential recipe in the form of Medicine



Green cross symbolizes the sustained healthcare

## HISTORY OF PHARMACY:

Archeological evidence reveals that **drug taking** is an extremely old human phenomenon. It has developed from ancient civilizations that used parts of plants or animals to concoct (formulate) various potions (liquid remedy) to eliminate pain, control suffering, and counteract disease. It has progressed from **the era of empiricism** (the theory that all knowledge is based on experience derived from the senses) to the present age of **specific therapeutic agents**.

In ancient times, people used to think that the diseases are caused due to evil forces or God's anger. Thus some magicians or religious persons were involved in the treatment of patients. Ancient man learned from observation of birds and beasts. Eventually, he applied his knowledge for the benefit of others. As the time progressed, the human race used to depend up on the plant derivatives for the treatment of illness. The use of plants as a source of medicine lies deep in the roots of antiquity.

In our country, Ayurvedha was the ancient science of life, which deals with **Tridosha** (Vata, Pitta, Kapha), **Sapta dhosas** (Rasa, Rakta, Mansa, Medo, Asthi, Majja, Sukra) **Trimalas** (Purusha, Mootra, Sweta). Vedas and Upanishads provide information pertaining to medicinal plants. Next to Ayurvedic system, Siddha system was in practice in south India and with the advent of Mughals, Unani system came into practice.

Before the dawn of history, ancient man used cool water, leaf, dirt or mud as his soothing agents. In ancient Babylon provides the earliest known record of practice of apothecary in 2000B.C. The symptom of illness, the prescription and direction for compounding are recorded as medical tests on clay tablets.

In ancient china, **Shen Nung**, an emperor was known to investigate on several herbs. He wrote the first **Pen T-Sao containing 365 drugs** by examining various herbs, barks and roots. **Papyrus Eber's**, an ancient Egyptian record has a collection of 800 prescriptions in 1500.B.C.

**Mithridates**, king of Pontus (100.B.C.) found art of preventing and counteracting poisoning. **Galen** was the foremost person who practiced and thought the principles of preparing and dispensing medicines. **Galenicals-class** of pharmaceuticals was named after him.

From this humble beginning, medicine and pharmacy gradually emerged along separate paths: the physician diagnosed the ailment and prescribed the remedy, and the apothecary or pharmacist specialized in the collection, preparation, and compounding of the substance.

The first therapeutic agent to bear a trademark was **Terra Sigillata** (Sealed Earth), a clay tablet originating on the Mediterranean island of Lemnos before 500 B.C. One day each year, clay was dug from a pit on a **Lemnian hillside** in the presence of governmental and religious dignitaries. It is washed, refined, rolled into a mass of proper thickness, and was formed into pastilles and impressed with an official seal by **priestesses**, then sun-dried. The tablets were then widely distributed commercially.

Traditionally, pharmacy was regarded as a transitional discipline between the health and chemical sciences and as a profession charged with ensuring the safe use of medication.

- ***In the early 1900s***, pharmacists fulfilled the role of apothecary —preparing drug products **secundum artem** (according to the art) for medicinal use.
- ***By the 1950s***, large-scale manufacturing of medicinal products by the pharmaceutical industry, and the **introduction of prescription-only** legal status for most therapeutic agents, limited the role of pharmacists to compounding, dispensing and labelling prefabricated products.
- ***In response, by the mid-1960s*** pharmacists had evolved toward a more **patient-oriented practice** and developed the concept of **clinical pharmacy**. This marked the beginning of a period of rapid transition that was characterized by an expansion and integration of professional functions, as well as increased professional diversity and closer interaction with physicians and other health care professionals.
- ***By the early 1990s*** the pharmaceutical care model was adopted to emphasize that the role of the pharmacist involves “**the responsible provision of drug therapy for the purpose of achieving definite outcomes that improve a patient's quality of life.**”

To varying degrees across the spectrum of practice environments and specialization in pharmacy, pharmacists are currently recognized as drug experts whose role is to work in collaboration with patients, physicians and other health care professionals to optimize medication management to produce positive health outcomes.

- ***The current transition*** involves an expansion of the scope of pharmacy practice and, in some jurisdictions, the assumption of the authority to prescribe medications in defined situations.

### **PHARMACY IN INDIA – Tradition system to Western system**

Pharmacy as a concept was practiced in India from an ancient period. For example, the *Ayurveda* and *Siddha* systems of medicine contain extensive literature on the selection of sources for natural medicines, and compounding and dispensing of those primitive medications, without describing their short- and long-term adverse effects.

In ancient India the sources of drugs were of vegetable, animal and mineral origin. They were prepared empirically by few experienced persons. Knowledge of that medical system was usually kept secret within a family. There were no scientific methods of standardization of drugs. The Indian system of medicine declined during the Muslim rule while the Arabic or the Unani-Tibbi system flourished.

### **British rule in India**

The western or the so-called Allopathic system came into India with the British traders who later become the rulers. Under British rule this system got state patronage. At that time it was meant for the ruling race only. Later it descended to the people and become popular by the close of 19<sup>th</sup> Century.

**Before 1940**

Initially all the drugs were **imported from Europe**. Later some drugs of this system began to be manufactured in this country.

1901: Establishment of the Bengal Chemical and Pharmaceutical Works, Calcutta by Acharya P.C. Ray.

1903: A small factory at Parel (Bombay) by **Prof. T.K. Gujjar**.

1907: **Alembic Chemical Works** at Baroda by **Prof. T.K. Gujjar**.

Drugs were mostly exported in crude form and imported in finished form. During World War-I (1914 – 1920) the imports of drugs were cut-off. Imports of drugs were resumed after the War.

**Few laws were there having indirect bearing on drugs, but were insufficient.**

1878	Opium Act	Dealt with cultivation of poppy and the manufacture, transport, export, import and sale of opium.
1889	Indian Merchandise Act	Misbranding of goods in general
1894	Indian Tariff Act	Levy of customs duty on goods including foods, drinks, drugs, chemicals and medicines imported into India or exported there from.
1898	Sea Customs Act	Goods with 'false trade description' were prevented from importing under this act.
1919	Poisons Act	Regulated the import, possession and sale of poisons.
	Indian Penal Code	Some sections of IPC have mention of intentional adulterations as punishable offence.

**Some state-level law had indirect references to drugs:**

1884	Bengal Municipal Act	Concerned with food.
1901	City of Bombay District Municipal Act	
1909	Bengal Excise Act	
1911	Punjab Municipal Act	
1912	United Provinces (now Uttar Pradesh) Prevention of Adulteration Act	Refers to adulteration of foods and drugs.
1914	Punjab Excise Act	
1916	United Provinces Municipalities Act	Inspection of shops and seizure of adulterated substances.
1919	Bengal Food Adulteration Act	
1919	Bihar and Orissa Prevention of Adulteration Act	
1919	Madras Prevention of Adulteration Act	Chiefly concerned with food adulteration
1922	Bihar and Orissa Municipal Act	
1922	Central Provinces Municipalities Act	
1925	Bombay Prevention of Adulteration Act	
1929	Punjab Pure Food Act	
1901	City of Bombay District Municipal Act	

The laws were too superficial and had indirect link to drugs.

***Drug enquiry committee***

Government of India on **11<sup>th</sup> August 1930**, appointed a committee under the chairmanship of **Late Col. R.N.Chopra** to see into the problems of Pharmacy in India and recommend the measures to be taken. This committee published its report in **1931**. It was reported that there was no recognized specialized profession of Pharmacy. A set of people known as compounders were filling the gap.

Just after the publication of the report **Prof. M.L.Schroff** (Prof. Mahadeva Lal Schroff) initiated pharmaceutical education at the university level in the **Banaras Hindu University**. In 1935 United Province Pharmaceutical Association was established which later converted into Indian Pharmaceutical Association.

The Indian Journal of Pharmacy was started by Prof. M.L. Schroff in 1939. **All India Pharmaceutical Congress Association** was established in **1940**. The Pharmaceutical Conference held its sessions at different places to publicize Pharmacy as a whole.

- 1937 : Government of India brought '**Import of Drugs Bill**'; later it was withdrawn.
- 1940 : Govt. brought '**Drugs Bill**' to regulate the import, manufacture, sale and distribution of drugs in British India. This Bill was finally adopted as '**Drugs Act of 1940**'.
- 1941 : The first **Drugs Technical Advisory Board (D.T.A.B.)** under this act was constituted. Central Drugs Laboratory was established in Calcutta
- 1945 : 'Drugs Rule under the **Drugs Act of 1940**' was established.  
The Drugs Act has been modified from time to time and at present the provisions of the Act cover Cosmetics and Ayurvedic, Unani and Homeopathic medicines in some respects.
- 1945 : **Govt. brought the Pharmacy Bill to standardize the Pharmacy Education in India**
- 1946 : **The Indian Pharmacopoeial List** was published under the chairmanship of late Col.R.N. Chopra. It contains lists of drugs in use in India at that time which were not included in British Pharmacopoeia.
- 1948 : **Pharmacy Act 1948** published.
- 1948 : **Indian Pharmacopoeial Committee** was constituted under the chairmanship of late **Dr. B.N. Ghosh**.
- 1949 : **Pharmacy Council of India (P.C.I.)** was established under Pharmacy Act 1948.
- 1954 : Education Regulation have come in force in some states but other states lagged behind.
- 1954 : **Drugs and Magic Remedies (Objectionable Advertisements) Act 1954** was passed to stop misleading advertisements (e.g. Cure all pills)
- 1955 : **Medicinal and Toilet Preparations (Excise Duties) Act 1955** was introduced to enforce uniform duty for all states for alcohol products.
- 1955 : **First Edition of Indian Pharmacopoeia was published.**

- 1985 : **Narcotic and Psychotropic Substances Act** has been enacted to protect society from the dangers of addictive drugs.
- 1995 : **Drugs (Prices Control) Order.**  
Govt. of India controls the price of drugs in India by Drugs Price Order changed from time to time.

## PHARMACY EDUCATION IN INDIA

The origin of modern pharmacy institutions in India dates back to **1899**. At that time, training of pharmacists was mostly conducted at Madras (now called Chennai). The State Medical Faculty of Bengal followed this pharmacy training procedure by starting a similar programme in 1928. The first undergraduate (UG) course in pharmacy was started at **Benaras Hindu University** around 1932 by **Professor Mahadeva Lal Schroff**, fondly called the *“Father of Pharmaceutical Education in India”*. In those days, the curriculum included Pharmaceutical Chemistry, Pharmacy and Analytical Chemistry, which prepared the graduates for working in pharmaceutical industries and not in community pharmacy shops. Subsequently, the other universities in India which followed suit were Andhra University in 1937(B.Sc. Honours degree of chemical technology), Madras University in 1938(B.Sc. (Pharmacy)), Bombay University in 1943(B.Sc (Pharmaceuticals & Fine Chemicals), Punjab University in 1944 and L.M. College in 1947.

### First 10 Pharmacy Colleges/Universities Offering Degree Programs in India

Year of Inception	Colleges/Universities	Category	Current Degrees Offered
1932	Department of Pharmaceutical Engineering, Institute of Technology, Banaras Hindu University, Varanasi	Central University	BPharm, MPharm, PhD
1944	University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh	State University	BPharm, MPharm, PhD
1947	L. M. College of Pharmacy, Ahmedabad	Private College	BPharm, MPharm, PhD
1950	Department of Pharmacy, Madras Medical College, Chennai	Medical College	BPharm, MPharm
1950	Birla Institute of Science and Technology, Pilani	Private University	BPharm, MPharm, PhD
1951	College of Pharmaceutical Sciences, Andhra University, Visakhapatnam	State University	BPharm, MPharm, PhD
1952	Department of Pharmaceutical Sciences, Dr. H.S. Gour University, Sagaur	Central University	BPharm, MPharm, PhD
1956	Department of Pharmaceutical Sciences, Nagpur University, Nagpur	State University	BPharm, MPharm, PhD



1958	Pharmaceutical Department, University Institute of Chemical Technology, Mumbai University, Mumbai	State University	BPharmSci, MPharmSci, PhD (Tech)
1963	Department of Pharmaceutical Technology, Jadavpur University, Kolkata	State University	BPharm, MPharm, PhD

At independence in 1947, India inherited a system for the pharmacy profession from the British rulers that was unorganized and there was no legal restriction on the practice of pharmacy. The concept of pharmacy practice was not realized until after independence was gained.

**In 1948, the Pharmacy Act was enacted as the nation's first minimum standard of educational qualification for pharmacy practice to regulate the practice, education, and profession of pharmacy.** Currently, one needs at least a diploma in pharmacy to practice as a pharmacist. Provisions of the Act are implemented through the Pharmacy Council of India (PCI). The Act requires individual states to establish state pharmacy councils that are responsible for controlling and registering pharmacists in their respective states. English is the only language of instruction for all pharmacy institutions.

## PHARMACY EDUCATIONAL PROGRAMS

Various of pharmacy programs are offered in India:

Diploma in Pharmacy (D.Pharm)	: 2 Years Course
Bachelor of Pharmacy (B.Pharm)	: 4 Years Course
Master of Pharmacy (M.Pharm)	: 2 Years Course
Doctor of Philosophy in Pharmacy (PhD)	: 3 Years

To train the graduate pharmacist to provide clinical-oriented services, program was introduced in 2008 (Regulations framed under section 10 of the Pharmacy Act, 1948 (8 of 1948).No.19, PART III, SECTION 4, THE GAZETTE OF INDIA)

Doctor of Pharmacy (Pharm.D)	: 6 Years Course
Doctor of Pharmacy Post Baccalaureate (Pharm.D PB)	: 3 Years Course

## GROWTH OF PHARMACY EDUCATION

- Prior to mid 1980s, the growth of publicly funded institutions of higher education (including pharmacy institutions) was very slow. Until early 1980s, there were 11 universities and 26 colleges offering pharmacy education at the Bachelor's and Master's levels. In addition, there was at least one government school in every Indian state offering the D.Pharm program.

- Since the late 1980s, due to rapid industrialization in the pharmaceutical sector, privatization, and economic growth, pharmacy education has been developing faster in India than anywhere in the world.
- A growth spurt followed, and according to the *PCI 2005 calendar*, there were **220 recognized degree institutions** with an enrolment of **12,506 students** and as per **AICTE**, the total number of **degree colleges were 445** with a total admission of **24,672 students**.
- In 2007, the number increased to **854** with an intake of **more than 52,000** students and there were also **583 institutions providing Diploma in Pharmacy** with a capacity of **more than 34,000 students**.

The majority of these pharmacy institutions are self funded, and the private sector now accounts for an astounding 91% of all pharmacy students admitted. With such a large number of pharmacy colleges in India, one would expect that the whole country would have somewhat of an equal share of pharmacy training programs, but alas, this is not the case. Disparity reigns and hence an excess of self funded universities are situated more in the states of Gujarat, Andhra Pradesh, Maharashtra, Tamil Nadu and Karnataka. An increased presence of pharmaceutical companies in the North-Eastern state of Sikkim resulted in pharmacy colleges being started in this state too.
















- Currently, there are **more than 1500 institutions** offering various pharmacy programmes across the country. With an annual enrolment of **around 100,000 students**, the influx of students into pharmacy colleges is at an all time high.
- The pharmaceutical education imparted to students in India concentrates more on increasing self-employability quotient, and enhancing their entry into academia and the pharmaceutical industry. This approach has succeeded, and will continue to prove to be an important cog (part/component) in the wheel for the growth of the pharmaceutical sector. The growth of the pharmaceutical industry will, of course, depend on the employment of able and competent pharmacists, and this seems to be one of the major reasons for the proliferation of pharmacy colleges in India.



## PHARMACEUTICAL COMPANIES ACROSS THE WORLD

The pharmaceutical industry discovers, develops, produces, and markets drugs or pharmaceutical drugs for use as medications. Pharmaceutical companies may deal in generic or brand medications and medical devices. They are subject to a variety of laws and regulations that govern the patenting, testing, safety, efficacy and marketing of drugs.

The following is a *list of the top independent pharmaceutical companies ranked by their revenue generated (\$10 billion) in the financial year 2018*.

Rank	Company	2018 USD billions
1	 Johnson & Johnson	20.01 (Q1)
2	 Roche	13.74 (Q1)
3	 Pfizer	12.90 (Q1)
4	 Novartis	12.69 (Q1)
5	 Sanofi	9.56 (Q1)
6	 GlaxoSmithKline	10.04 (Q1)
7	 Merck & Co.	10.04 (Q1)
8	 AbbVie	7.93 (Q1)
9	 Bayer	
10	 Abbott Laboratories	7.39 (Q1)
11	 Gilead Sciences	5.09 (Q1)
12	 Eli Lilly & Co	5.70 (Q1)
13	 Amgen	5.55 (Q1)
14	 AstraZeneca	
15	 Teva Pharmaceutical Industries	
16	 Boehringer Ingelheim	
17	 Bristol-Myers Squibb	5.20 (Q1)
18	 Novo Nordisk	4.34 (Q1)
19	 Takeda Pharmaceutical	
20	 Merck Group	

## PHARMACEUTICAL COMPANIES IN INDIA

The pharmaceutical industry in India ranks 3<sup>rd</sup> in the world terms of volume and 14<sup>th</sup> in terms of value. According to Department of Pharmaceuticals, Ministry of Chemicals and Fertilizers, the total turnover of India's pharmaceuticals industry between 2008 and September 2009 was US\$21.04 billion.

Hyderabad, Mumbai, Bangalore and Ahmedabad are the major pharmaceutical hubs of India. The domestic market was worth US\$13.8 billion in 2013.

The demand for pharmaceutical products in India is significant and is driven by low drug penetration, rising middle-class & disposable income, increased government & private spending on healthcare infrastructure, increasing medical insurance penetration etc.

### *Top 10 Publicly Listed Pharmaceutical Companies in India by Market Capitalization*

Rank	Company	Market Capitalization
1	Sun Pharmaceutical Industries Ltd.	Rs. 1,89,139 Crores
2	Lupin	Rs. 76,613 Crores
3	Dr. Reddy's Laboratories	Rs. 50,103 Crores
4	Cipla	Rs. 48,788 Crores
5	Aurobindo Pharma Limited	Rs. 47,588 Crores
6	Cadilac Pharmaceuticals Limited	Rs. 31,542 Crores
7	Divi's Laboratories	Rs. 28,609 Crores
8	Glaxosmithkline	Rs. 26,954 Crores
9	Glenmark	Rs. 23,410 Crores
10	Torrent Pharma	Rs. 22,392 Crores

List of Pharmaceutical Companies across the world and different types of dosage forms are listed in Appendix I - II

## DRUGS DISCOVERED BY INDIAN SCIENTISTS

**Yellapragada Subbarao** was an Indian biochemist who developed **methotrexate** (1947) for the treatment of **cancer** and discovered a broad spectrum antibiotic **Auromycin** and **Tetracycline**.

The first modern synthetic drug to be developed in India was **Urea Stibamine** in 1922 by **Rai Bahadur Sir Upendranath Brahmachari** against visceral leishmaniasis. *Visceral leishmaniasis* was a severe health burden during the early part of the 20<sup>th</sup> century, and it was a life saving drug for a large section of the population. Historically, it was the second drug

developed against an infectious disease after Salversan (against Syphilis) and well before penicillin or sulfa drugs. It is still in use in many countries in a modified form.

From seminal discovery of UN Brahmachari, the pharmaceutical industry in India grew very significantly. Today Indian pharmaceutical industry is recognized as a global leader in the production of high quality generic drugs and is ranked third in terms of manufacturing pharmaceutical products by volume.

In spite of many odds, Indian pharmaceutical and biotech companies have been able to pile up an impressive array of more than **120 new chemical entities (NCEs)** currently progressing in various preclinical and clinical stages of developments. In June 2013, Zydus Cadila launched saroglitazar (Lipaglyn), the first glitazar in the world to be approved for the treatment of dyslipidemia or hypertriglyceridemia in patients with type 2 diabetes. Earlier, in April 2012, Ranbaxy launched India's first domestically developed antimalarial drug, Synriam. A fixed dose combination of arterolane with piperaquine, Synriam was developed as a simplified single-dose once-a-day therapy for 3 days for the treatment of acute, uncomplicated *Plasmodium falciparum* malaria in adults.

#### Geographic Distribution of Pharmaceutical Companies in India

S. No.	State	Number of manufacturing units		Total
		Formulation	Bulk Drugs	
1.	Maharashtra	1,928	1,211	3,139
2.	Gujarat	1,129	397	1,526
3.	West Bengal	694	62	756
4.	AP	528	199	727
5.	Tamil Nadu	472	98	570
6.	Others	3,423	422	3,845
	TOTAL	8,174	2,389	10,563

#### Andhra Pradesh Pharmaceutical Cluster:

AP has become a hub for various activities relating to the pharmaceutical industry. The broad segmentation of companies consists of manufacturers of APIs, manufacturers of formulations (finished dosage forms), CROs (Contract Research Organizations), CMOs (Contract Manufacturing Companies), and those companies involved in bio sciences, bio-equivalency studies, and clinical trials.

The pharmaceutical industry in AP was initiated by large scale players such as IDPL (1967), Dr. Reddy's Laboratory (1984), and Aurobindo Pharma (1986). Some of the other key players in AP include Matrix (Mylan) Labs, Hetero Drugs, Divi's Labs, Natco Pharma, Neuland Labs, Gland Pharma, Granules India, MSN Labs, Sri Krishna Pharma and so on.

The table below summarizes the different components of India's pharmaceutical industry:

<i>Active Pharmaceutical Ingredients (APIs)</i>	US\$9B export market as of 2010 India is expected to be the second largest producer of APIs globally soon
<i>Contract research &amp; Manufacturing services</i>	US\$3B market in 2009 with more than 1,000 players
<i>Formulations</i>	Domestic market size is currently valued at about US\$10B; substantial growth expected over the next five years
<i>Bio-Similars</i>	Expected to grow to US\$600M by 2013 from US\$200M in 2008
<i>e.g., Toritz RA (Biosimilar rituximab, Torrent Pharmaceutical Limited)</i> <i>Reditux (Biosimilar rituximab, Dr. Reddy's Laboratories)</i> <i>Eripro (Recombinant human erythropoietin, Biocon)</i> <i>Insugen (Recombinant human insulin, Biocon)</i>	

## THE DEPARTMENT OF PHARMACEUTICALS

The Department of Pharmaceuticals was created on the 1st of July in the year 2008 in the Ministry of Chemicals & Fertilizers so as to provide greater focus for the growth of the high potential Pharmaceuticals industry.

The Department has set for itself the following Vision –

**Vision of the Department:** To make India the Largest Global Provider of Quality Medicines at Reasonable Prices.

This Vision has to be achieved keeping the following **Mission** into picture –

- Develop Human Resources for Pharmaceutical Industry and Drug Research and Development
- Promote Public-Private Partnership for development of pharmaceuticals Industry
- Promote Pharma Brand India through International Cooperation
- Promote environmentally sustainable development of Pharmaceutical Industry
- Enable availability, accessibility and affordability of drugs

## **POLICIES FROM GOVT. OF INDIA:**

- **Drug Policy 1986:** Measures for Rationalisation, Quality Control and Growth of Drugs & Pharmaceutical Industry In India.
- Pharmaceutical Policy 2002
- National Pharmaceutical Pricing Policy 2012
- Uniform Code of Pharma Marketing Practices - 2014
- Pharmaceutical Policy – 2017

## **ROLE OF PHARMACISTS:**

Pharmacists are healthcare professionals involved in medication management and an important member of the health care team.

Pharmacists are involved in

- **Research and Innovation** by discovering and developing new Drugs and Devices.
- **Manufacture of Quality Medicines** by using the latest technologies so as to lower the cost of medicines.
- **Distribution and Dispensing of Medicines** by ensuring that the right medicine, at the right dose and at the right time are dispensed to the patients.
- **Providing Primary and Community Health Care** by facilitating public health campaigns in local communities.
- **Support and Educate** Young pharmacy graduates on the current trends in pharmaceutical Sciences and help them be updated.
- **Enforcing Law and Regulations** by Regulating the manufacture, distribution, sales and import of medicines and medical devices.

## ***PHARMACIST***

*I am a specialist in medication*

*I am a companion of the physician*

*I am a counselor to the patient*

*I am a guardian of public health*

### ***Pharmacist's Oath***

- I swear by the code of ethics of Pharmacy Council of India, in relation to the community and shall act as an integral part of health care team.
- I shall uphold the laws and standards governing my profession.
- I shall strive to perfect and enlarge my knowledge to contribute to the advancement of pharmacy and public health.
- I shall follow the system which I consider best for Pharmaceutical care and counseling of patients.
- I shall endeavor to discover and manufacture drugs of quality to alleviate sufferings of humanity.
- I shall hold in confidence the knowledge gained about the patients in connection with my professional practice and never divulge unless compelled to do so by the law.
- I shall associate with organizations having their objectives for betterment of the profession of Pharmacy and make contribution to carry out the work of those organizations.
- While I continue to keep this oath unviolated, may it be granted to me to enjoy life and the practice of pharmacy respected by all, at all times !
- Should I trespass and violate this oath, may the reverse be my lot !

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***Sarve Jana Sukhino Bhavantu***



## Appendix- I. List of Pharmaceutical Companies

### #–A

3M Pharmaceuticals  
Abbott Laboratories  
AbbVie  
Acadia Pharmaceuticals  
Acorda Therapeutics  
Actavis  
Actelion  
Adcock Ingram  
Advanced Chemical Industries  
Advaxis  
ACG Worldwide  
Ajanta Pharma  
Alcon  
Alembic Pharmaceuticals Ltd  
Alexion Pharmaceuticals  
Alkaloid  
Alkermes  
Allergan  
Alliance Boots  
Almirall  
Alphapharm  
Altana Pharma AG  
Amgen  
Anfatis  
Apotex Inc.  
Aspen Pharmacare  
Astellas Pharma  
AstraZeneca  
Aurobindo Pharma  
Avax Technologies  
Avella Specialty Pharmacy  
Axcan Pharma

### B–D

Bargn Farmaceutici Phils Co  
Barr  
Basi  
Bausch & Lomb  
Baxalta  
Baxter International  
Bayer Schering Pharma AG  
Beximco Pharmaceuticals Ltd  
Bial  
Biocon  
Biogen  
Biolex  
BioMarin Pharmaceutical  
Bionovo  
Biotechnol  
Biovail  
Biovitrum  
Bluepharma  
Boehringer-Ingelheim  
Bosnalijek  
Bristol-Myers Squibb  
BTG plc  
Cadila Healthcare  
Canadian Plasma Resources

The Cathay Drug Co., Inc.  
Celgene  
Cephalon  
Chiesi Farmaceutici S.p.A.  
Chugai Pharmaceutical Co.  
CinnaGen  
Cipla  
Clovis Oncology  
CoCo Therapeutics  
Concordia Healthcare  
Covance  
Crucell  
CSL Limited  
Dabur  
Daiichi Sankyo  
Dainippon Sumitomo Pharma  
Dawakhana Shifaul Amraz  
Debiopharm  
Diabetology Ltd  
Diffusion Pharmaceuticals  
Dr. Reddy's Laboratories

### E–L

Ego Pharmaceuticals  
Eisai  
Elder Pharmaceuticals  
Eli Lilly and Company  
Emcure Pharmaceuticals  
Emergent BioSolutions  
Endo Pharmaceuticals  
Eskayef Bangladesh Limited  
F. Hoffmann–La Roche Ltd., *which owns Genentech and Chugai Pharmaceuticals*  
Fabre-Kramer Pharmaceuticals  
Ferring Pharmaceuticals  
Fresenius Kabi  
Fresenius Medical Care  
Galderma Laboratories  
Gedeon Richter Ltd.  
General Pharma  
Gilead Sciences  
Glatt group  
GlaxoSmithKline  
Glenmark Pharmaceuticals  
GPC Biotech  
Grifols  
Grindeks  
Gulf Pharmaceutical Industries (Julphar)  
G.F. Harvey Company  
Help Remedies  
Hetero Drugs  
Hexal Australia  
Hikma Pharmaceuticals  
Hoffmann–La Roche  
Horizon Pharma  
Hovione  
Incepta Pharmaceuticals  
Institute for OneWorld Health  
Intas Biopharmaceuticals

Interphil Laboratories  
 Ionis Pharmaceuticals  
 Ipca Laboratories  
 Ipsen  
 Janssen Pharmaceutica Products,  
*a subsidiary of Johnson & Johnson*  
 Jenapharm,  
*a subsidiary of Bayer Schering Pharma*  
 JN-International Medical Corporation  
 Johnson & Johnson  
 Julphar  
 Juno Therapeutics  
 Kimia Farma  
 Kyowa Hakko Kirin  
 Lundbeck  
 Lupin Limited

## M

Mallinckrodt Pharmaceuticals  
 MannKind Corporation  
 McGuff  
 Medinfar  
 Melior Discovery  
 Menarini  
 Merck & Co.  
 Merck KGaA  
 Mitsubishi Pharma  
 Mylan  
 Mayne Pharma

## N

NovaBay Pharmaceuticals  
 Novartis  
 Novo Nordisk  
 Noxxon

## O

Octapharma  
 Orexo  
 OrgaNext  
 Orion Pharma  
 Ortho-McNeil Pharmaceutical

*a subsidiary of Johnson & Johnson*  
 Otsuka Pharmaceutical Co.

## P

Panacea Biotec Ltd  
 Par Pharmaceutical  
 Patheon  
 Perrigo  
 Pfizer  
 Pharmaceutical Product Development  
 Pharma Medica  
 Pharma Nord

Pharmacosmos  
 Pharmascience  
 Pierre Fabre Group  
 Piramal Healthcare  
 Pliva  
 Procter & Gamble  
 Purdue Pharma

## R

Ranbaxy Laboratories  
  
*generics arm of Sun Pharmaceuticals*  
 Reckitt Benckiser  
 Regeneron Pharmaceuticals  
 Renovo  
 Repligen  
 Rubicon Research








## S-T

Salix Pharmaceuticals  
 Sanofi  
 Serum Institute of India  
 Servier Laboratories  
 Shionogi  
 Shire plc  
 Sigma Pharmaceuticals  
 Sinopharm Group  
 Solvay Group  
 Square Pharmaceuticals  
 STADA Arzneimittel  
 Strides Arcolab  
 Sun Pharmaceutical  
 Sunovion  
 Takeda Pharmaceutical Co.  
 Tasly  
 Teva Pharmaceuticals  
 Taro Pharmaceuticals  
 Torrent Pharmaceuticals  
 Turing Pharmaceuticals

## U-Z

UCB  
 Unichem Laboratories  
 USV Private Limited, formerly USV Limited  
 Valeant Pharmaceuticals International, formerly  
 ICN Pharmaceuticals  
 Veloxis Pharmaceuticals  
 Vertex Pharmaceuticals  
 Vion Pharmaceuticals, Inc.  
 Wallace Pharmaceuticals  
 Wockhardt  
 Yuhan Corporation  
 Zandu Pharmaceuticals  
 Zentiva

## Appendix- II. Different dosage forms

Routes of administration, dosage forms				
Oral	Digestive tract (enteral)	Solids	Pill, Tablet, Capsule, Pastille, Time release technology, Osmotic delivery system (OROS)	
		Liquids	Decoction, Elixir, Electuary, Emulsion, Extended-release syrup, Effervescent powder or tablet, Herbal tea, Hydrogel, Molecular encapsulation, Powder, Softgel, Solution, Suspension, Syrup, Syrup Concentrate for dilution and/or addition of carbonated water, Tincture	
	Buccal (sublabial), sublingual	Solids	Orally disintegrating tablet (ODT), Film, Lollipop, Sublingual drops, Lozenges, Effervescent buccal tablet, Chewing gum	
		Liquids	Mouthwash, Toothpaste, Ointment, Oral spray	
	Respiratory tract	Solids	Smoking device, Dry-powder inhaler (DPI)	
		Liquids	Anaesthetic vaporizer, Vaporizer, Nebulizer, Metered-dose inhaler (MDI)	
		Gas	Oxygen mask and Nasal cannula, Oxygen concentrator, Anaesthetic machine, Relative analgesia machine	
Ophthalmic, otologic, nasal	Nasal spray, Ear drops, Eye drops, Ointment, Hydrogel, Nanosphere suspension, Insufflation, Mucoadhesive microdisc (microsphere tablet)			
Urogenital	Ointment, Pessary (vaginal suppository), Vaginal ring, Vaginal douche, Intrauterine device (IUD), Extra-amniotic infusion, Intravesical infusion			
Rectal (enteral)	Ointment, Suppository, Enema, Solution, Hydrogel, Murphy drip, Nutrient enema			
Dermal	Ointment, Topical cream, Topical gel, Liniment, Paste, Film, DMSO drug solution, Electrophoretic dermal delivery system, Hydrogel, Liposomes, Transfersome vesicles, Cream, Lotion, Lip balm, Medicated shampoo, Dermal patch, Transdermal patch, Contact (rubbed into break in the skin), Transdermal spray, Jet injector			
Injection, infusion (into tissue/blood)	Skin	Intradermal, Subcutaneous, Transdermal implant		
	Organs	Intracavernous, Intravitreal, Intra-articular injection, Transscleral		
	Central nervous system	Intracerebral, Intrathecal, Epidural		
	Circulatory, musculoskeletal	Intravenous, Intracardiac, Intramuscular, Intraosseous, Intraperitoneal, Nanocell injection, Patient-Controlled Analgesia pump, PIC line		