The journey of the Indian pharmaceutical companies started at the dawn of the twentieth century resulting in the opening of their establishment in various parts of India. For example, Bengal Chemicals & PharmaceuticalsLtd. (1901), or Alembic Chemical Works (1907) started their initial business with the aim of manufacturing quality chemicals comprising pharmaceuticals and home products. During that era, the dream ofmaking indigenous drugs by those companies was boosted by the discovery of urea stibamine against visceral leishmaniasis (also known as kala-azar) by U. N. Brahmachary at Medical College, Calcutta (now Kolkata) during the year 1922. Historically, it was the second drug developed against an infectious disease after *Salvarsan*(against Syphillis) and much before the invention of the well-known antibiotic penicillin or sulfa drugs (other than Salvarsan). More importantly, it saved the life of countless patients in the next two decades after its discovery. Just after ~~post-~~independence,another landmark discovery was oral rehydration therapy or ORT (i.e., drinkingwater with controlled amounts of salt and sugar) by H. N. Chatterjee, a medicalpractitioner working on cholera patients in Calcutta.He published his invention in Lancet journal during 1953, although this product was not a drug. A landmark was achieved when the newly formed government after independence decided to establishCentre Drug Research Institute, a wing of CSIR,at Lucknow, with a strong desire to promote the discovery efforts of indigenous drugs against various diseases prevailing in India during that time. Thereafter, many academic institutions including IITs and regional institutes were formed and anumber of companies including various multinationals were established to empower the Indian innovation engine.

However, the scenario of drug research changed drastically by the introduction of the Indian patent act of 1970 which abolished product patents for pharmaceutical ingredients,recognizing only patents with a decreased term (5–7years) for process improvements. The regulatory body during that time also introducedprice cap for certain drugs and limited the ownership of multinational companiesin their Indian enterprisesto 40%. As a consequence, many multinational companies left India.This strengthened the local generics industries and made them self-reliant,accountingfor 10% of the global pharmaceutical production and 20% ofglobal exports of generics in volume terms. In 1991, the then government of India liberalizedthe new economic policy and joined the world trade organization (WTO) in 1995. After a decade, the amended patent act of the year 2005 opened the floodgate of innovationsin both generic and proprietary drugs. Besides, this favourable ambience of business gave birth to many contract research organizations (CRO) and new start-up companies including biotech and pharma. Thus India emerged as a favourite destination of chemistry outsourcing through CROs like GVK(Hyderabad), Syngene(Bangalore),Chembiotek(Kolkata)and many more. The global pharmaceutical and biotechnology companies initially started outsourcing of non-IP-sensitive chemistry suchas buildingchemical libraries, intermediates and reference compounds

from these CROs. Thereafter, the service offerings expanded into biology and pharmacology, and a number ofdeals gradually evolved into IP-generating collaborations with Indian inventors.

The next few years saw the evolutionof CROs who played a key role in designing and identifying molecules against specific targets using modern drug discovery tools. Notable among them are Aurigene Discovery Technologies (Bengaluru), Invictus Oncology (Delhi), Jubliant Biosystem (Bengaluru), Advinus Therapeutics (Pune), and Orchid Research Laboratories (Chennai). These organizations demonstrated their commendable capabilities in discovering lead compounds of pharmaceutical relevance undercontract withmany multinationals that performed bio-evaluation, IPR and subsequent works in their establishments to give final shape to those leads.

Another process that contributed to this evolutionary process is the public-private partnership model in which big Indian pharma giants invested their money in building research foundations to accelerate drug discovery in areas of their interest having significant business potential. To name a few, Dr. Reddy's research foundation, Ranbaxy research foundation, and AVRA research foundation have proved their capabilities in discovering several bioactive leads and even drug candidates.Other Indian pharma giants have taken different routestowards "drug discovery". The approach is to set up inhouse "NCE (New Chemical Entities) discovery units", which serve as the key component ofinnovation; besides, they have also established biotech-likedrug discovery units outside the country to develop and provide the logical end for NCEs through collaboration. These modes haveculminated in a steady increase in the number ofcompounds of clinical relevance.

In addition to the Indian Pharma companies, many public funded institutions have made commendable contributions in the drug discovery space.Their researches have primarily been supported by the funding of dedicated agencies of the government of India including Biotechnology Industry Research Assistance Council/Biotechnology Industry PartnershipProgramme (BIRAC/BIPP) byDepartment of Biotechnology,Open Source Drug Discovery (OSDD) and New Millennium Indian Technology Leadership Initiative (NMITLI) by Council of Scientific and Industrial Research (CSIR)among others. Indeed, this innovation drivehas permitted realization of the dream of making indigenous drugs. For example, CDRI Lucknow has launched more than twelve drugs including *E-Mal*, a potent antimalarial drug approved in 1998 to cure multidrug-resistant or chloroquine-resistant *Plasmodium falciparum,* and *Centchroman* (marketed as *Saheli*), a nonsteroidal oral contraceptive pill. In addition, CSIR-IIIM(Jammu), in collaboration with Cadilla Pharmaceuticals, has developed a new combination drug *Risorine* useful against TB.

Despite these encouraging examples, the overall drug innovations scenario in India is somewhat gloomy because of many reasons,so that the Indian pharmaceutical establishment lags

behind the global players in the matter of innovation. To tide over this situation, the model popularly known as “me too”, is being adopted by many Indian pharmaceutical companiesand academia as well. More specifically, this approach looks forward to explore those molecules whose structures are mostly similar to the patented drugs. These drug-like molecules significantly reduce the cost, time and risk associated with the discovery processand indeed, this model has seen the light of success with the endeavour of many organisations.

In the preceding sections, we have focused on the results of drug discovery coming out from the researchesspecifically on small-molecules. Alongside, many biologics, vaccines, botanical drugs, and herbal extracts have found wide applications to effectively cure a range of diseases. Therefore, a significant amount of research & development has been carried out to launch a diverse range of such products in the market. For example, in the area of biologicals, CSIR-Institute of Microbial Technology(Chandigarh) developed a recombinant streptokinase,a smart clot buster that has been licensed to Nostrum, aUSA based company. In the area of herbal drugs, CSIR-Indian Institute of Chemical Biology (Kolkata)has developed an herbal formulation for the treatment of benign prostate hyperplasia, which is currently being marketed by East India Pharmaceuticals, Kolkata under the trade name of “*Prostalyn*”.

The expectations from the Indian drug discovery fraternity are much more compared to the pharmas of developed nations; the former has to serve the need of affordability and accessibility, and develop drugs for special category of diseases like malaria, chikungunya, leshmania, TB etc, prevalent only in tropical countries. Indeed, India has to go a long way to be self reliant in the drug fieldto satisfy the demands relevant in the Indian context. However, despite the many odds, the contribution of India in the production of off-patented generic drugs is laudable. Indeed, the country has been a global player in the production of high quality generic drugs and has been ranked as third in terms of manufacturing of generic pharmaceutical products by volume. Besides, India has also found its own niche in the development of herbal products by exploring its rich heritage of traditional knowledge and is possessing a significant amount of the share of the global market.