

A Bird View of Chemistry Role in the Drugs Discovery from the Pharmaceutical Industry

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Abstract

The major role of chemistry in the formation of chemical substances from the pharmaceutical industry, the compounds that are extracted from the plants or the synthetic procedure to synthesize, which were of medicinal importance, but medicinal values are often obtained only in very minimal amounts. Therefore, to encourage production on a large-scale, they should be less cost-effective and novel, degradable products.

Keywords: Therapeutic drugs, Novel approaches, Degradable products, Current scenario, Computational chemistry

Pharmaceutical chemistry occupies a significant role in the development of new compounds. It involves the special field of technological know-how, which is to be used to bring out pharmaceutical drug compounds. Computational chemistry was concerned with the design of the latest chemicals as medicine. Pharmaceutical chemistry and Organic chemistry are concerned about the guidance of pharmaceutical drugs. Analytical chemistry involves the very well management and evaluation of pharmaceuticals. Pharmaceutics address the issues in making drug formulations like tablets, pills, injections, vaccines. etc., the area of pharmacology offers to take a look at the efficacy and toxicities of newly designed pharmaceutical compounds (1). The pharmaceutical industry produces significant amounts of data during the drug development process, most of them, which are not released into the public domain due to concerns over confidentiality and intellectual property, includes data in compound libraries and data on screening, number of quality drug and clinical trials, which becomes redundant in private databases when the drug discovery (2).

Role of Chemistry: Chemists and the chemical sciences have performed an important position in the improvement of the current medicinal drugs and they may need to play also a major function in developing inside the next technology of medical treatments and diagnostic technologies.

Chemists shall be capable of finding a targeted remedy of novel drug goals through supporting to recognize the molecular foundation of sickness. This would encourage pharmaceutical researchers to design a current set of safer drug candidates with a greater risk of successfully making it through the drug improvement procedure and onto the market.

By working with biologists and with a varied field of scientists, chemists can investigate the overall suite of interactions between drug applicants and biological molecules consisting of proteins and DNA. Chemists are constructing complex biomolecules from simple starting substances and the advance subject of 'in vivo' chemistry is enabling particular chemical alterations to be carried out internally in live cells and, sooner or later, to entire internal organisms (Fig-1)(3).

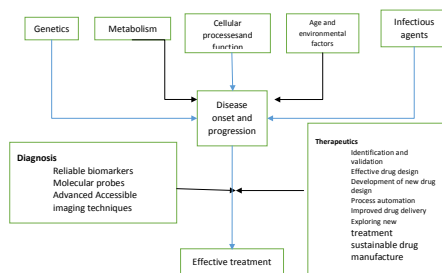
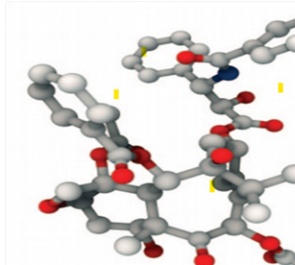


Figure 1: The Chemical Sciences Helps in the Development of Diagnosing and Optimizing the Development of a New Therapeutic Drug. (Figure Regenerated Chemistry-for-better-health-cs3-white-paper)

Identifying diseases: Infectious diseases are still the main reason for death in many developing countries, due to a lack of accessibility to cheaper drugs and vaccine treatments. Poverty and a loss of getting admission to the newer drugs mean that infectious diseases that are rare or under control in excessive-profit nations (consisting of diarrheal contamination, TB, and human immunology virus/ obtained immunodeficiency syndrome (HIV/AIDS)) still has top priority in causes of death.

Non-infectious diseases cannot be cured due to blended genetic and environmental factors. Therefore, it should be controlled, with the introduction of modern drugs. Many are more unusual with growing age and are becoming an increasing number every day in nations with ageing populations. It has been that, in 2030, non-infectious diseases will account for the deaths of 69% global population, this is a challenge for the modern technological world (4). The illnesses required the remedy over upcoming periods and desired alternative models (5).

Novel approaches: Chemists are looking beyond the traditional conventions of drug design and are investigating the capacity of newly-found chemistry, consisting of tissue engineering and synthetic biologics, implementing therapeutics like Nanotechnology, and this will increase efficacy in cancer drugs.



Paclitaxel (sold as Taxol®) is a potent anti-tumour agent, originally isolated from a natural product from the bark of the Pacific Yew tree (*Taxus brevifolia*). Chemical synthesis entitle the invention of the synthetic biologic Abraxane® – a protein-bound form of the anti-cancer drug. Taxol® that has successfully used as the injectable formulation in the treatment of certain types of cancer and as a chemotherapy drug that inhibits the cell. Abraxane is Taxol® that is bound to albumin nanoparticles, which act as an alternative delivery agent. The bound protein accompany in targeting the drug towards tumor cells (6, 7).

Manufacturing degradable Products: Chemists can go along with supplying higher attainment of the persuasion in biological and chemical degradation of producing waste in the surroundings, together with admiration of the role and impact on soil ecosystems. This co-ordination will perfect awareness about phenomenal chemical functional groups that are transformed and degraded inside the environment. Pharmaceutical waste isn't just acquired via medicine; however, also employing their reuse (8).

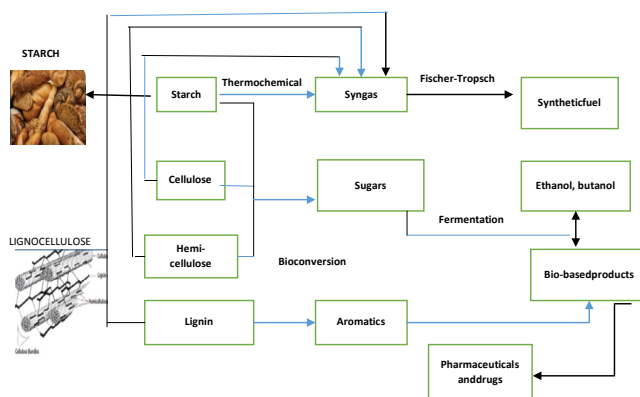


Figure 3. The Pathways in Biological and Chemical Degradation of Producing Waste in the Surroundings. (Figure Regenerated Chemistry-for-better-health-cs3-white-paper).

The Pharmaceutical Industry in India and its Current Scenario



India is the largest provider of generic drugs globally. Indian pharmaceutical sector supplies over 50% of global demand for various vaccines, 40% of drugs in the US, and 25% of all medicine in the UK.. India chooses an important role in the global pharmaceuticals sector. The country also had a large pool of scientists and engineers with the potential to hike the industry across to greater heights. Presently, over 80% of the antiretroviral drugs used globally to combat AIDS (Acquired Immune Deficiency Syndrome) are supplied by Indian pharmaceutical 80 firms (9). India, known as the Pharmacy of the World, is the largest provider and supplier of generic drugs of low-cost vaccines globally. India is the 3rd largest globally, in terms of volume and 14th largest in terms of value. It contributes 3.5% of the total drugs and medicines exported globally and has contributed significantly to the global healthcare market by high quality, affordable and easily

available medicines worldwide. The pharmaceutical exports from India are reaching more than 200 nations worldwide, including the highly regulated markets of the USA, West Europe, Japan, and Australia. About 20% of the global export of generic drugs is met by the Indian government. The Government of India on 30th November 2020 has announced a stimulus package of Rs. 900 Core for the Mission CovidSuraksha to promote indigenous vaccine development. To achieve the goals of Vision 2030, the stakeholders need to work, on accelerating the matter of universal healthcare across India and in the world by providing access to high- quality, affordable drugs (10).

References

1. Pharmaceuticals-Sector-Chart-September_2020.jpg (715×312) (ibef.org)
2. Transforming Drug Discovery, <http://www.pressreleasepoint.com/dr-chas-bountra-transforming-drug-discovery>
3. Chemistry-for-better-health-cs3-white-paper
4. Global report for research on infectious disease of poverty, 2012, http://whqlibdoc.who.int/publications/2012/9789241564489_eng.pdf
5. Projections of Global Mortality and Burden of Disease from 2002 to 2030, Mathers CD, 2006, PLoS Med 3, e442, <http://www.plosmedicine.org/article/info:doi/10.1371/journal.pmed.0030442>
6. Preparation of blood-brain barrier-permeable paclitaxel-carrier conjugate and its chemotherapeutic activity in the mouse glioblastoma, Jir J, MedChemComm, 2011, 2, 270-273. <http://pubs.rsc.org/en/Content/ArticleLanding/2011/MD/c0md00235f>.
7. Nanotechnology enables precise cancer targeting, Dimond PF, 2010, <http://www.genengnews.com/insight-and-intelligenceand153/nanotechnology-enables-precise-cancertargeting/77899332/>
8. Chemistry-for-better-health-cs3-white-paper(Manufacturing degradable Products).RSC publication
9. Consolidated FDI Policy, Press Information Bureau (PIB), Media Reports, Pharmaceuticals Export Promotion Council, AIOCD-AWACS, IQVIA.
10. https://economictimes.indiatimes.com/industry/healthcare/biotech/pharmaceuticals/indian-pharma-industry-aspiring-to-grow-to-120-130-billion-by-2030ipa/articleshow/69861213.cms?utm_source=contentofinterest&utm_medium=text&utm_campaign=cppst.