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## Drug Discovery: A Complex and Time Consuming Aspect

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### Review Article

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#### Abstract

Drug discovery process is a complex and time consuming aspect. In olden days, the process begins with the selection of a synthesized or extracted molecule and screening it for various activities. Innovation does not mean to forget the classical drug discovery. In a developing country like India, every pharmaceutical industry cannot cop up with the novel technologies of drug discovery. Government is encouraging the companies to undertake the job of drug discovery by providing tax exemptions, sponsoring projects through CSIR, DBT, DST. Global companies are outsourcing about US\$ 1billion to Indian CRO in the next 3-4 yrs. We may be replaced by China in the future just as we replaced European countries. World recognized Indian pharmaceutical industries to provide generic drugs but not recognized for innovations.

#### Introduction

Drug discovery process is a complex and time consuming aspect. In olden days, the process begins with the selection of a synthesized or extracted molecule and screening it for various activities. It is really a cumbersome job as thousands of molecules need to be screened for activity (Classical drug discovery process) [1-8]. India, regarding this aspect did not compete with the global countries due to poor knowledge, economic status and other reasons. We have to depend on other nations and hence making the drugs costlier. But by taking the advantage of process patent, we strived hard for the production of drugs. After 30 years, we are now in a position to manufacture drugs by ourselves and occupied 3rd position in the global market by exporting our drugs to other countries [9-21].

A revolutionary change has occurred globally in the process of discovery of new drug molecules by the advent of various sophisticated techniques like high throughput screening, robotics and computer simulations to minimize the time for the process of drug discovery. Neither the process is chemistry driven or technology driven. Rather it is the integration of both [22-34].

In the past, Investment of Indian companies in drug R&D is 0.6% of the turnover. Presently, pharma companies are spending 5% of turnover which increased 70 fold compared to 60s and 70s. The driving force behind R&D is obviously innovation. Innovation does not mean to forget the classical drug discovery. In a developing country like India, every pharmaceutical industry cannot cop up with the novel technologies of drug discovery [35-56]. Only Multinational companies can afford the cost of drug discovery. With the strong co-ordination

between Industry and academics, even medium scale companies in a region should step into the drug discovery process utilizing classical methods. Further, Indian industry is largely concentrating upon development of new dosage forms or ANDA s rather than on discovery of new drug molecules which requires huge investments and no guarantee of profits [57-72].

Government is encouraging the companies to undertake the job of drug discovery by providing tax exemptions, sponsoring projects through CSIR, DBT, DST. It is the responsibility of industries and academics to utilize these benefits and step more into the 'omic' era (proteomics, genomics) along with other countries. Emerging technologies like stem cell research, dendritic vaccines which are likely to be commercially exploitable in the near future should not be neglected [73-85]. Biotechnology products are the future of R&D efforts world over and they are going to occupy 30% of R&D [86].

Regulatory bodies should also react as quickly as possible. They should assist the industries in the process and reduce the time for approving a drug molecule like in European countries. The time taken for an IND approval in USA is 1month whereas in India it is unpredictable. China became the first to approve the H1N1 vaccine but we have not initiated the trail at least. Similarly, DNA vaccine sponsored by the DBT is not moving forward as it completed phase-II in other countries [87-92].

Strong co-ordination between Industry, Academics and Regulatory authorities reduces the complexity in the process to some extent and encourages more and more companies to undertake the responsibility. In a report given by the organization Stratfer states that the development in India cannot be predicted in the next 10 years and no significant changes will occur. It also reports that India is very rich in resources but did not use them completely till now. There is also a need to create a strong bridge between traditional systems of medicine and pharmacy particularly with the area of drug discovery [93].

Risorine (Rifampicin+Isoniazid+Piperine) by Cadila pharmaceuticals is a classic example which utilized traditional medicine in which the dose of rifampicin and isoniazid is reduced by utilizing the enhancing bioavailability property of piperine extracted from peppers [94,95].

India is going to be a hub of clinical trials for other countries due to more population and less cost. Global companies are outsourcing about US\$ 1billion to Indian CRO in the next 3-4 yrs. We may be replaced by China in the future just as we replaced European countries [96-98]. World recognized Indian pharmaceutical industries to provide generic drugs but not recognized for innovations. We have to provide also the patented products to world [99,100]. Let us utilize our own natural resources of traditional system of medicine, skilled work force and prove to the global market that we are not inferior to any other country in the process of drug discovery.

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