

## The State of Pharmaceutical Education and Research in India

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On September the 30<sup>th</sup> 2011, the government has decided to set-up six new National Institute of Pharmaceutical Education and Research (NIPERs) at Gandhinagar, Guahati, Hajipur, Hyderabad, Kolkata and Rae Bareli. It is a timely decision to meet the ever growing need of skilled pharmaceutical manpower for academia, government and industry. Though all these institutes have been functional partly through their mentor institutes for the last few years, the speed with which they are being set-up and their functioning need a quantum jump.

In 2011, the global pharmaceutical market has been estimated to touch US \$ 880 billion, after acquiring a growth of 5–7%. Compared to this, the Indian pharmaceutical industry continues to be relatively small (3<sup>rd</sup> in volume and 14<sup>th</sup> in value) and has crossed a turnover of Rs. 1, 00, 000 crore in Sept. 2009, registering a nearly 20-fold increase in the last two decades. Nevertheless, despite this achievement, nearly 70% population of India living in rural areas still does not have the desired access to medicines. These figures thus clearly indicate that there are tremendous opportunities for the growth of the Indian Pharmaceutical industry in the fast expanding domestic and overseas markets. These emerging opportunities thus justify larger investments in pharmaceutical sector.

In not a very distant future, India is poised to become a vibrant global industrial economy. And for this to happen, it is essential for the country to plan for long-term higher education, research and development, the areas which have been recognized world over as the engines of industrial growth. It is especially true for pharmaceutical industry which is a highly research and development-based and knowledge-driven industry. Therefore, it is necessary for India to invest in pharmaceutical education, research and development, and this will involve the allocation of additional financial resources. And not just allocation but also to ensure that these resources are made available timely to the right users, properly utilized, the accrued benefits are cost-effective, and are delivered to the needy and impact their lives.

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Just within one week of our independence, the then government decided to exclusively devote a Council of Scientific and Industrial Research (CSIR) laboratory to drug research. The alacrity with which the newly formed government took this decision showed the importance it attached to drug research. However, unfortunately, no efforts were made simultaneously to create an institute/university which should generate specifically educated and trained human resources for this lab. There were several “College of Pharmacy (CoPs)” around at that time. These CoPs churned out pharmacists mainly for the pharmacy profession and, they, in turn, provided excellent compounding and dispensing services to the country. However, their education and research training had very little to do if anything with what was especially required for new drug discovery research, which though related is an entirely different ball game. Fundamentally, the education of pharmaceutical sciences includes all aspects of pharmaceuticals i.e. right from their discovery to pharmacy practice. Pharmacy, which primarily comprises of practice, thus constitutes only a part of the whole gamut of pharmaceutical sciences. Hence, with no particular institute or university devoted to pharmaceutical education and research, the Indian drugs and pharmaceutical industry continued. In 1992 the first NIPER was created at S. A. S. Nagar, and in 1998 it was declared an “Institute of National Importance” through an act of parliament. Soon, several CoPs, for reasons best known to them, rechristened them as the “Institute of Pharmaceutical Sciences”.

New drug discovery research is a very expensive, long-drawn and risky venture full of uncertainties. Notwithstanding lots of disagreements, according to a nearly five year old estimate by the Tufts Centre for the study of drug development, USA, it costs nearly

US \$ 1.3 billion to bring a new drug into the market, and this does not include the costs of launching and marketing. Further, it may take more than 15 years and require the involvement of nearly 15,000 people. On an average, only one out of approximately 10,000 new chemical entities, under the best of conditions, stand the chance of making it to the market. Out of these enormous investments and efforts, barely 30% is spent on the actual molecule and the remaining is spent in zeroing on to the molecule. However, in India, given the low costs of manpower, utilities and materials, it can be presumed that new drug discovery research can be relatively cheaper. Even with this presumed low cost, it seems difficult for any one single private organization in our country to undertake such an expensive and risky venture.

In the sixties and seventies, besides 4-5 CSIR laboratories, there were 7-8 research centres belonging to pharmaceutical companies (including multi-national companies) which were involved in new drug research. However, in the eighties and nineties, the pharmaceutical companies world over were not doing well due to market, research, technical and several other constraints, and thus most of these private players were forced to close their research centres. It was very unfortunate because some these centres had an excellent team of scientists, good infrastructure and had done very good work. There was a lot of hue and cry made by several leading scientists to save these centres but to no good. The NIPERs are now expected to fill this void with an added education dimension.

The Public Private Partnership (PPP or P<sup>3</sup> or P<sup>3</sup>) is one of the most important and effective mechanisms of fund generation and delivery of services as it combines the strengths of both the public and private sectors. PPP has been very successful in infrastructure development sector in India. However, its potential in social sectors like health and education remains largely underutilized. Though by law, education in our country remains a not-for-profit entity, yet, a suitable model of PPP can be effectively evolved at least in the area of infrastructure creation for new NIPERs, in consonance with the strategy proposed in the Eleventh Five Year Plan. Nevertheless, a strong will of the government ensuring that the functioning of various regulatory mechanisms remains unaffected is definitely warranted. Thus the governments' vision in adapting to PPP mode in the creation of new NIPERs is praiseworthy, though largely experimental if not entirely speculative. Further, in view of the high costs involved in new drug research, the government has proposed to set-up a Rs. 10,000 crore interest-free venture capital fund in PPP mode.

To set-up all the six new NIPERs simultaneously is going to be a highly challenging task. As they say, money cannot buy everything, initially; it may be difficult to find the right kind of faculty, scientists and technicians to man these institutes. The selection process for the students must ensure that they have the desired knowledge base, discernment and communication skills, imagination and innovative potential. The syllabus and the curriculum has to be such that it covers all aspects of pharmaceutical sciences, ignites innovation and creativity, caters to national needs and is well-taken by the industry. The NIPERs must provide high quality education and undertake research based on the needs and strengths of the country. For example, *Plasmodium vivax* malaria is largely a problem of India only. Primaquine, the only available drug to cure it is fraught with severe problems. Rhesus monkeys, the most suitable animal model for this disease are commonly available in India. Thus for the discovery of new drugs to cure it, India must capitalize on its strength of having the availability of both the experimental model and the patient pool. Further, the NIPERs must stay connected with each other and the industry, compliment and not unnecessarily compete, and must remain centric to the local pharmaceutical strengths and weaknesses, while trying to achieve distinctiveness and global excellence. As science cannot survive and grow in isolation, the NIPERs must develop national and international academic and research collaborations of mutual interest. India is endowed with its unique strengths like availability of dedicated scientific and technical manpower, high quality infrastructure for research, low costs of education, R&D, services and manufacturing, a large population having diverse genetic make-up along with excellent medical facilities for clinical trials, strong protection of intellectual property and a vast expanding domestic market with increasing purchasing power. The NIPERs will definitely significantly add to these existing strengths.

By the end of this decade, with an average age of 29, India shall become the youngest nation in the world. And by then, the NIPERs shall be able to provide its youth the education to make them good citizens and seek gainful employment. Additionally, the NIPERs will also be instrumental in providing medicines at an "average prescription price", which, the 77% Indians living on Rs. 20 per day or 37% Indians living below the poverty line are unable to afford. India is the land of Sanjeevani booti and Ayurveda, and of great hermits like Charak and Bhardwaj. The dream of India producing a world-class drug now seems to be a hope waiting to be turned into a reality.