How to improve credibility of Indian journals

The standard of research in a country is judged by the standard of its research journals. During the early years of the 20th century, Germany, France and England were leaders in scientific research in the world. The rating of German research journals, viz. Zeitschrift fur Physik, Z. Physik and Annalen der Physik, was the highest in the world and all leading scientists published their research findings in these journals. After the Second World War, USA became the world leader in scientific research due to migration of top European scientists to America. The pedestal position occupied by German journals was snatched by Physical Review, the prestigious journal of physics from USA.

The academies of science in Europe took the lead in publishing their proceedings. In India, Asiatic Society of Bengal in Calcutta was set up in 1784. It published its own journal, but its concerns were more or less oriental studies rather than science. Indian Association for Cultivation of Science (IACS) was responsible for starting the IACS Bulletin. C. V. Raman set up Indian Academy of Sciences at Bangalore and published his papers, both in its Proceedings and Current Science, later on.

After India gained independence, the Scientific Policy Resolution was adopted by Indian Parliament in which it was envisaged to promote scientific research in India. A chain of national science laboratories was set up under CSIR and hence the need arose to publish Indian research journals also. Most of the Indian journals are published by National Institute of Science Communication (NISCOM) in New Delhi, under the patronage of CSIR. Indian Academy of Sciences also publishes about a dozen research journals, including Current Science. During recent years, some private individuals and publishers have also started publishing research journals but their rating is very low. Some of the Indian scientific societies and universities also publish their research journals. Guru Nanak Dev University, Amritsar may be the only university in India which started its research journals in almost all subjects of science and humanities.

India boasts of being the third largest scientific and technical manpower in the world. But the scientific research output of India is rated lower than most of the European countries, including Spain and The Netherlands. Bibliometric analysis of scientific research is an established technique to evaluate the quality of scientific research of an individual, institution or a country. Recent publications prove that the impact factor of Indian journals is falling and SCI listing includes only one dozen Indian journals amongst 5000 or more selected from all over the world. What are the reasons for this downhill slide of Indian journals on the global scenario?

The reasons are obvious: Indian scientists wish to publish their scientific results in foreign journals, due to their high impact factors and credibility. It helps them to reach out to their peers in the scientific field. Our institutions also rate these publications high, if they are published in foreign journals. There are only a few foreign scientists who prefer to publish their research work in Indian journals. How to increase the visibility and credibility of Indian journals on the global scale? Some of the remedial steps are suggested to improve the quality of Indian journals.

The fellows of Indian national science academies and the other leading scientists must publish their scientific research in Indian journals. We must raise the standard of publication of Indian journals by inviting review articles from Nobel Laureates and leaders in scientific research. The quality of printing must improve, keeping in view the global market and international standards. Industrial houses must be invited to sponsor research journals on science and technology. NISCOM must set its own house in order and cut down the delay in publication of research papers.

From my personal experience, I rate Current Science as the only Indian journal which has large-scale visibility and credibility in the international market. It is published regularly, twice a month, and is the only Indian letter journal which is a best match to Nature. Its special issues and reviews articles are of high calibre, publication of results fast and quality of printing excellent. It gives a lot of information on science-related issues, in addition to scientific findings reported in it. Of late, many foreign-based research scientists are reporting their findings in Current Science. Surprisingly, Journal of Scientific and Industrial Research published by CSIR had published more than 50% papers contributed by foreign authors. Two other journals which have attracted foreign authors are Journal of Astrophysics and Astronomy and Journal of Genetics, both published by Indian Academy of Sciences, Bangalore. The Indian journals lack professional touch. It is therefore suggested that CSIR or any other agency in India must promote scientific journals in various disciplines on a turn-key basis. Impact factor of Indian journals will also improve if all Indian scientists take a vow to publish in Indian journals only.


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Science journals

The editorial on ‘Journals’ (Curr. Sci., 2000, 79, 685–686) has raised some questions of vital importance about science journals in India. The editor finds the government grants to be responsible for their existence but fights shy of probing deeper into the malady affecting Indian science. The journals supported by partial government grants account for only a fraction of the total number. How do the remaining journals survive without government grants? Do the journals receiving government grants make better ‘impact’ even in Indian scientific circles? Does the mechanism for selecting the journals for a grant ensure that it promotes quality? If not, why? However, money alone cannot make a journal. Many journals started by well-known commercial publishers have failed to survive, but not for the paucity of funds. If funds alone were to decide the quality of a journal, the journals of various science academies in India should have made an impact on Indian science. Unfortunately, the senior scientists and Fellows of the Academies themselves do not find the journals, which they also edit, worth publishing their own work.

A journal is first what its editor wants it to be, and then what kind of papers the journal is able to attract. Over the past few years, there has been a growing emphasis on the number of publications, irrespective of the quality, in the evaluation of researchers at various levels. The number of edited books, the membership of editorial boards, and also the membership of professional societies, are also common criteria for appointments, promotions and awards. Many senior scientists take pride in the number of publications they add every year to their thick CVs. Under the circumstances, there is a mad rush to see oneself in print again and again, even if it means that the cost of printing has to be paid and hardly anyone ever reads the paper. The same data are published repeatedly in different forms, if not in the same form, in different journals or edited volumes. I know of many individuals who are willing to pay any amount for the publication of their paper, sometimes because they can get the money from their projects or institutions. In fact, the editors and journals are in demand. Many of these journals ask the authors to buy a minimum number of reprints at a price that generally meets the cost of printing. The annual subscription required from the authors brings in the amount to meet other costs. The editors of these hundreds of journals probably render a valuable service to the authors by providing them an outlet for their immense creative activity (!) and thereby enabling them to advance upwards. We should not forget that our senior scientists rarely fail to encourage these editors and lend credibility to the journals by allowing their names on the editorial boards in different capacities. The same senior professors are unable to find time to review papers or to offer advice on how to prepare a paper. Many editors probably even do not know what is published in their journals. The manuscripts are received from the authors, sent to the reviewers, and then the comments are returned to the authors, mechanically by their office staff. The editors’ role is limited to taking a decision on the manuscript based solely on the recommendation of the reviewer(s). Majority of the journals cannot afford the luxury of an office, and the editors simply accept every manuscript received by them and pass it to the printer. How grateful is an author to the editor who sends an acceptance letter in place of an acknowledgement!

Do we ever care to educate the researchers about how to prepare a research or review paper? Has any researcher ever been educated about editing and publishing a journal? Preparation of a paper and its publication are steps to be taken only after a research problem has been identified, the study has been designed, and data properly collected and analysed. Therefore, the poor quality of journals is largely due to the kind of research in this country. The root causes of deterioration of scientific research in India are too many, but none of the individuals (holding high academic positions) or institutions (e.g. UGC, CSIR, DST, MOEF and the Academies) cares for the rot. I doubt if anyone is willing to take action and bring the mushrooming of journals to halt. Is Current Science willing to take a lead and help weed out the journals? Is there any individual or institution willing to help improve the quality of scientific research in India?

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Suggestions for mapping fish research in India

In 1991, Aquasap et al.1 estimated that the whole of Asia, which has a long traditional history of fish culture for over 2000 years, contributes less than 2.7% scientific articles to aquatic biology, which includes fishery science. Neither Aquasap et al.’s article1 nor its subsequent focus in an Indian publica-

1 CURRENT SCIENCE, VOL. 79, NO. 10, 25 NOVEMBER 2000
Drug delivery – Today’s scenario and opportunities for Indian pharmaceutical industry

In India, apart from the software industry, the pharmaceutical sector is the only one showing a constant growth of 15%, one of the highest in the world, in the last several years. At US$ 3.1 billion, the Indian pharmaceutical market is the fourth largest in the developing world and is expected to increase its annual growth from 15 to 18%, i.e. more than twice the expected growth of the world pharmaceutical industry. Surprisingly, Indian per capita annual consumption of drugs of Rs 125 is one of the lowest in the world. With the implementation of TRIPS agreement which will allow the protection of product patents in India, the total scenario is going to change soon. This would demand the Indian pharmaceutical industry to spend more on R&D and to compete with the international market. Worldwide the pharmaceutical industry spends between 15 and 20% of its revenue on research compared to 1.8% by the Indian industry. Research in the development of drugs has generally two major aspects, viz. (i) discovery of a new drug molecule (new chemical entity, NCE), and (ii) invention of new formulations of drugs with higher therapeutic index. The latter would minimize the unnecessary drug loss and unwanted side effects. In a recent editorial in Current Science it has been mentioned that discovery of new drugs involves huge expenditure to the tune of about Rs 2000 crores. As a matter of fact, in the last twenty years no breakthrough drug molecule has been discovered anywhere in the world. What people have done is to synthesize a molecule by altering its structure to have enhanced therapeutic value. In India during 1956 to 1995, a period of nearly forty years, only 14 drugs have been developed indigenously. There is an increasing gap in drug research in the Indian pharmaceutical industry from the world scenario.

In the world scenario, drug delivery is an expanding industry based on hundreds of companies providing expertise and innovative technologies for improved delivery systems. Enhanced delivery leads to superior performance characteristics of the products. The blockbuster drugs whose life span in the market has been exhausted, can be resurrected by reformulating the drugs through novel delivery systems. At the same time the effective patent protection can also be enhanced. In India, pharmaceutical companies are facing a new challenge of generic competition for a particular drug whose patent life span has expired. The difficulty would increase enormously in the near future.


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because the patent life span of many drugs is going to expire and in India product patent is going to be effective from the year 2005. This is a major issue the pharmaceutical companies have to take into account as more than 35 billion US dollars worth products will be facing generic substitution over the next fifteen years. This is a key restraint in terms of revenue generation for the pharmaceutical companies. According to the Financial Times management report, the size of the worldwide drug delivery market in 1999 was about 24 billion US dollars, which is expected to rise up to 78 billion US dollars in the year 2005. Surprisingly the share of India is less than 0.1% (ref. 6).

It seems, therefore, clear that drug delivery sector of the Indian pharmaceutical industry has not yet taken off. There is no lack of innovative research capability in the country. However, in recent years there have been signs that the academia–industry chasm has been growing.

Why is the drug delivery technology important to the Indian pharmaceutical industry? Some of the most important reasons are: (i) drug delivery formulations involve low cost research compared to that for the discovery of a new molecule, (ii) minimizing drug use would significantly reduce the effective cost of the drug, which would give financial relief to the patients, (iii) delivery systems increase commercial opportunity by distinguishing a drug from competitive threats posed by ‘me too’ drugs, and (iv) novel means of delivery can allow branded drugs to be rescued from the abyss of generic competition. Moreover, delivery systems maximize therapeutic benefits through targeted and controlled release of drugs and offer alternative routes of delivery, which protect the drug from enzymatic degradation and unnecessary toxic hazards.

It terms of route of delivery of a large number of biotechnology products, a large number of these are delivered via injection. This presents an opportunity for various emerging routes of drug delivery to gain acceptance in the market place.

There is another element, namely the ‘life cycle management’ of the drug. The global market for pharmaceuticals is currently valued at approximately 295 billion US dollars and is expected to be doubled by the year 2002. In Europe and America this has driven the industry to repackgate the same drug with novel delivery technologies in order to extend the patent life. An example is Amphotericin B, which is a water-insoluble antifungal drug with poor absorption and poor tissue distribution. Fungizone is a mixture of this drug with sodium cholate and this mixture is water-soluble. This preparation is available in the Indian market as generic drug. Nexter in USA has developed a liposomal formulation with less toxicity and with better therapeutic efficacy as a non-generic drug. Because of certain limitations of liposomal formulations, a better formulation with much lower toxicity and higher fungal uptake has recently been formulated by our laboratory and Indian product and process patents (WTO patents) have been filed. Similarly, several non-steroidal anti-inflammatory drugs like ketorolac, indomethacin and nimesulide are all generic drugs and have free competition in the market. Recently, we have developed improved ocular delivery system formulations using mucoadhesive, temperature-sensitive nanoparticles of size less than 50 nm diameter and encapsulating these drugs which have much higher bioavailability of drugs on the cornea surface. The patent for taxol, expired in December 1997. An Indian company has recently filed a patent in several countries on improved formulation of taxol encapsulated in nanoparticles (developed by our group), which has much higher therapeutic index than taxol dissolved in lipidol oil. There are many such examples. These improved formulations help one to have enhanced patent life of the drugs and thereby enhanced market penetration.

Liposomal and nanoparticles formulation technologies are coming up in a big way in the drug delivery market. These particles can be tailored-made so far as their size and surface properties are concerned. Both liposomes and nanoparticles of extremely small size (< 100 nm diameter and comparable to those of viruses) can be prepared. Their surface hydrophobicity/hydrophilicity can be modulated as per requirements. Targetable ligands and antibodies can be chemically and physically attached to these particles. The core of these particles can be made hydrophobic as well as hydrophilic according to the nature of the drug to be entrapped. Nanoparticles of intelligent polymers can also be made. These particles are now being used in highly specialized areas like gene delivery, delivery in brain, tumour targeting, oral vaccine formulations and other areas. These formulations would result in a barrier for generic competition by ‘raising the technology barrier’ to levels with which generic cannot compete. It is time that our pharmaceutical industry realizes the potential of this expanding area of drug research and development.

1. 32nd Annual Report ’97–’98, Org. of Pharmaceutical Producers of India.

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