Administrative wrangles as an impediment to research progress in India

There have been a number of articles providing reasons for lack of proper research output in India. While a few have highlighted the failure of the system and policies[1,2] as one of the reasons, others blame that mediocrity breeds mediocrity, and hence talented researchers should be selected for research and teaching[3]. A few others have claimed the administrative wrangles and the associated bureaucracy as one of the reasons that is curtailing Indian research[2]. The administrative staff mainly provide a supporting role. However, most of the time they fail to understand this and put all sorts of hurdles and impediments to scientific pursuits. Instead they should extend full cooperation and be an asset to any institution. Scientists can do the routine clerical and other secretarial work such as typing reports and publications, purchasing a few items themselves anticipating delays from administrative departments. Several articles have raised this issue[2]. A chemical or any other item which could be purchased in a few days normally take 3 to 4 months. The administrative staff quite often blame the various procedures and norms of the organizations for such delays. Basically it seems that the administrative staff have a different mindset. The delays in purchase of important chemicals, instruments, etc. would irritate the research staff and make them demoralized. Few can overcome this irritation and still work patiently and carry on with their research pursuits. In addition, quite often the JRFs, SRFs and other temporary staff do not get their salaries on time, etc. In my opinion we should undertake a survey and gather opinions from researchers in India, and see to what extent the administrative wrangles are a factor derailing the progress of research output in the country. And at the end of such a survey, if it is found that they are indeed a liability for research institutions, we need a redressal for the benefit of the country, society and researchers. Alternatively, if it is the 'system' that is an impediment then it has to be overhauled as suggested by Lakhotia[2].

1. Ramanamurthy, M. V., *Curr. Sci.*, 2008, **95**, 830–831.
2. Lakhotia, S. C., *Curr. Sci.*, 2005, **88**, 1731–1732.
3. Sharma, O. P., *Curr. Sci.*, 2008, **95**, 448–449.

V. VENKATESWARA SARMA

G1, Ganpath Villa, 67,
Padmavathy Nagar,
Virugambakkam,
Chennai 600 092, India
e-mail: sarmavv@yahoo.com

Who coined the terms 'biotechnology' and 'genetic engineering', and when?

History of science is an important part of education to provide an insight into the complexities of logical development of thought, concepts and experimental protocols, which often inspire young minds. Information about scientists and dates of coining of conceptual terms, an important component of history of science, signifies crystallization of ideas and the development of protocols needed to translate ideas into applications.

Biotechnology and genetic engineering were conceptualized long before the elucidation of the structure of the DNA by Watson and Crick in 1953, which is so essential to take the two concepts into the realm of practice. I have noticed that the issue of coining the two terms, 'biotechnology' and 'genetic engineering', which are widely used and misused in a variety of contexts, is affected by ambiguities, inaccuracies and at least one extravagant and spurious claim from India perpetuated in the Indian media[1]. This situation needs to be set right in the interest of science.

Karl Erkey is widely credited[2] to have coined the term 'biotechnology' in 1919. While there is no disagreement that Erkey coined the term, the year appears to be incorrect.

Philippe Goujon, a science historian, comments that by the year 1917, Erkey was convinced of the urgent need to replace in Europe the 'archaic peasant economy' with a 'capitalist agricultural industry based on science'[3]. In two publications in 1917, one on 'Food production and agriculture'[4], and another on the 'Large scale development of pig fattening under normal conditions in Hungary'[5], Erkey had elaborated 'biotechnologie' and visualized pigs as processing machines ('Biotechnologische Arbeitsmachine'), that could convert a calculated amount of input (food) to a certain quantity of output (meat)[4,5]. In the book *Biotechnology of Flesh, Fat and Milk Production in a Large-scale Agricultural Farm*, published in 1919, Erkey[6] proposed 'biotechnologie' as a process by which 'new materials are biologically validated'. The term 'biotechnologie' in the title of this book, and Berlin which was the academic epicentre of the time being the place of publication, have together contributed to the popular belief that Ekey coined the term 'biotechnologie' in 1919, and the two rather obscure earlier publications[4,5] of 1917 were largely missed.

It was believed for some time that the term 'genetic engineering' was 'probably first coined by Edward L. Tatum during his 1963 Nobel Lecture'[7]. In another speech in 1965, Tatum went beyond his previous call for 'biological engineering' by suggesting the advent of 'genetic engineering'[7]. He conceptualized biological engineering as composed of three natural primary categories of means to modify organisms, one of which is genetic engineering 'producing new genes by a process of directed mutation', and the other two being eugenics and control of gene expression[7]. In the same year Hotchkiss, cautioned not to move too quickly and to prevent the uncontrolled growth of genetic engineering[8], a sensible advice we

have ignored. Basing on these premises, it seems that the term 'genetic engineering' was fairly well known even by 1965.

In recent years several timelines and other publications on biotechnology have repeatedly credited the Danish microbiologist A. Justin (often referred to as A. Jost) as having coined the term 'genetic engineering' as far back as in 1941. It is now fairly certain that Justin used the term for the 'technique involving the transfer of a select piece of genetic material from one organism to another', in a lecture on sexual reproduction in yeast at the Technical Institute in Lwow, Poland[9].

1. Suresh, N., *Biospectrum*, 13 December 2007.
2. Murphy, A. and Parella, J., *A Further Look at Biotechnology*, The Woodrow Wilson National Fellowship Foundation, Princeton, NJ, 1993.
3. Goujon, P., *From Biotechnology to Genomes: The Meaning of Double Helix*, World Scientific, Singapore, 2001, pp. 18; 165–166.
4. *Ereky, K., *Nahrungsmittelproduktion und landwirtschaft*, Freidrich Kilians Nachfolger, Budapest, 1917.
5. *Ereky, K., *Mitt. Dtsch. Landwirtsch-Ges.*, 1917, **34**, 541–550.
6. *Ereky, K., *Biotechnologie der fleisch, fett und milcherzeugung im landwirtschaftlichen grossbetriebe*, Paul Arey, Berlin, 1919.
7. Tatum, E. L., In *Perspectives from Physiological Genetics: The Control of Human Heredity and Evolution* (ed. Sonneborn, T. M.), Macmillan, New York, 1965, p. 22.
8. Hotchkiss, D. R., *J. Hered.*, 1965, **56**, 197–202.
9. http://library.thinkquest.org/C0111983/timeline.htmllibrary.thinkquest.org/C0111983/timeline.html

*Not seen in original.

C. KAMESWARA RAO

Foundation for Biotechnology Awareness and Education,
No. 1, Gupta's Layout,
Southend Road,
Bangalore 560 004, India
e-mail: pbtkrao@gmail.com

Science communication: careers and courses in India

'It is suicidal to create a society dependent upon science and technology in which hardly anybody knows about science and technology.'

Carl Sagan

Knowledge about science and technology (S&T) is inevitable in this modern hi-tech world. There is a great demand for communicating or popularizing science among the masses.

The Constitution of India has a special provision 'to develop the scientific temper, humanism and spirit of enquiry'. The S&T Policy of India stresses on the dissemination of scientific knowledge and inculcation of scientific temper among the masses. Most of the S&T and related institutions or laboratories have a social mandate for science popularization and development of scientific temper among the masses.

Today, science communication is a fast-emerging field of scientific enterprise both in the developed and developing countries. But it is believed that scientists are generally unable or unwilling to communicate their knowledge and expertise to the masses, either directly or through any media. Also, the little coverage and poor presentation of S&T in different media is well recognized.

Therefore, trained science journalists, writers, reporters and communicators are in great demand in different media outlets, and the S&T and related institutions or laboratories. Recognizing this scenario, the National Council for Science and Technology Communication (NCSTC), Department of Science and Technology (DST), Government of India, has taken the initiative, to train science graduates as skilled science communicators and equip them to present science intelligibly and effectively to the masses. The NCSTC is promoting, financially supporting and sponsoring various short-term and long-term science communication courses in India. Presently, the following courses are available at select universities/institutions in the country.

The Centre of Science Communication (CSC), Devi Ahilya University, Indore offers a two-year full-time regular Master of Science programme in science communication. It is a fellowship-based programme funded by the NCSTC. The Centre admits 20 students each year and ten fellowships of Rs 700 per month each are given to meritorious students. The Centre has also started a one-year PG Diploma in Science Communication through correspondence mode. For more details, visit www.csc.dauniv.ac.in

The Institute of Mass Communication in Science and Technology, Lucknow University, is also running a similar course – M Sc Mass Communication in Science. It is also a two-year full-time regular programme funded by the NCSTC. The Institute admits 40 students each year.

The National Council for Science Museums (NCSM) in collaboration with BITS, Pilani, is offering a two-year regular MS degree programme in science communication at Kolkata. The NCSM gives five fellowships of Rs 5000 per month each to meritorious students admitted to the course. For more information, visit www.ncsm.gov.in or www.bits-pilani.ac.in

The Indian Science Communication Society (ISCOS), Lucknow is running a one-year 'Certificate in Science Journalism' programme. The programme is open to anyone with a basic degree in any branch of science. ISCOS admits 100 students each year. It is a distance course executable either on-line or through correspondence. For details, visit www.iscos.org

Recently, Makhanlal Chaturvedi National University of Journalism and Communication, Bhopal has also started a one-year PG Diploma in Science and Technology Journalism. Visit www.mcu.ac.in

The Department of Journalism and Science Communication, Madurai Kamaraj University, also offers an NCSTC-funded PG Diploma in Science Communication.

In addition, the National Institute of Science Communication and Information Resources (NISCAIR), CSIR, New Delhi also organizes short-term science-writing training workshops. Visit www.niscair.res.in

ABHAY S. D. RAJPUT

(*S. Ramaseshan Fellow*),
H. No. 59, L. No. 1, Munshi Chak,
Opp. Old Chungi,
Camp Road, Talab Tillo,
Jammu 180 002, India
e-mail: abhaysdr@yahoo.co.in