

Ensuring credit for original thought

There are various organizations concerned with ethics in research, and preventing/punishing perpetrators of fabrication, falsification or plagiarism. Of these three blots on research, plagiarism is special in that if there are perpetrators, then there must also be victims of plagiarism.

While economically relevant ideas and technical innovations are patented, the creators of original thought do not want to be deprived of credit even when no economic potential is envisaged. Victims of plagiarism are deprived of their claim to creativity; can they be helped? I submit below a few small steps that can protect us from becoming victims. I shall then talk of help for those who have become victims.

Every researcher attempts to answer some question posed by existing knowledge, and other groups may be independently addressing the same question. We therefore work hard to claim priority in providing an answer, hesitate to publicize interim results, and worry about unauthorized access to our submitted manuscripts. E-print archives provide an attractive medium for releasing the manuscript in public domain almost immediately and put in a claim for priority with minimal human interference. Most journals do not object to such a release prior to submission to the journal. There are some hang-ups amongst authors about releasing a manuscript prior to peer review that we need to debate the pros and cons of. The advantage of

having staked one's claim to priority is an overriding benefit for potential victims of plagiarism that bypasses refereeing or editorial delays (do we often find papers submitted later than ours appearing earlier?).

We must educate our students on how to properly assess the importance of their research, and not to unnecessarily publish in 'a lesser journal'. Uploading on the e-print archive ensures priority while allowing the student time to convince referees and editors of a journal of appropriate visibility.

India should create an e-print archive site similar to arXiv.org run by the Cornell University Library, but covering all disciplines in which research is done in Indian universities. It is essential that software be installed to check for possible text plagiarism. If an overlap is found, the authors should be informed and provided a preventive remedial opportunity before release.

'Idea plagiarism' is a matter that I feel we need to worry deeply about. India is expanding higher education and research through universities in smaller cities. We are encouraging a large number of young minds to think originally. In addition to the sheer numbers, the minds of students in smaller cities are unregimented and therefore fertile for producing out-of-the-box ideas. We should emphasize to them the need to upload the work into public domain in minimal time, and to bring into sharp focus (rather than make

ambiguously interpretable statements) what the author considers to be new. Students should be taught that not all new ideas stand the test of time, but lack of focus in the presentation in their initial paper can result in lack of credit if their idea does stand the test of time.

Finally, I feel that our ethics bodies are taking action only when Indians are perpetrators of plagiarism. They need to also advertise their support to victims of plagiarism, when the perpetrators are from abroad. Any proposed national ethics body must necessarily provide a 'will-take-up-cudgels' support when the perpetrators are from outside India, and also deal with special empathy when the victims are researchers from emerging bylines. Corrections presently offered by various journals are not prominent, and there has recently been a call for a better system linking papers to their ethical corrections^{1,2}. An important suggestion is that a national ethics body must post on its website all journal errata that add new references to Indian work.

1. Van Noorden, R., *Nature*, 2011, **478**, 26.
2. Chaddah, P., *Curr. Sci.*, 2011, **101**, 1261.

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Need for radical changes in cancer biology research

In essence, cancer biology is one of the most sought after and challenging fields of research. Over a century, researchers have put forward various hypotheses and theories of mutations in cancer predisposition genes, environmental factors, nutritional status, age and lifestyle as the probable factors responsible for the genesis and progression of cancer. Broadly, basic research in this area tries to unravel what kind of alterations or modifications in genetic, metabolic or nutritional level may eventually lead to cancer. Though many a strategies were

enacted in the form of research and development, especially in the last four decades, to combat and unravel the mystery of this disease, the outcome left much to be desired^{1,2}. It naturally throws up a question: 'what ails cancer biology research?' Such questions will immediately put quality of research under the scanner.

For obvious reasons, the main agenda of majority of investigators is publication of articles rather than paving the way to success in understanding cancer biology. Under pressure to publish or perish, majority of the researchers generally pin-

point one of the cancer predisposition genes, regulate or silent such genes via various advanced technologies and study one of the pathways within intricate pathways. In the eventual publication, it is postulated that translation product of such genes under experimental conditions, in many a cases using cell lines, is involved in the development or progression of cancer and such molecules could be therapeutic targets. The folly of certain studies is evident wherein the proposed product of the genes may be involved in developmental pathways.

The results obtained are justified by selecting the articles that support the finding and ignoring those which do not fall in the line of thinking. It is also sad to note that the pathways proposed by various researchers and research groups under similar experimental set-up vary widely. In this context, mushrooming of journals has also contributed to deterioration in the quality of research.

As far as applied research in cancer biology is concerned, use of inappropriate cellular and animal models that do not replicate cancer in humans has been the major reason for drug failure in clinical trials. A combination of innovative and pragmatic experimental designs, appropriate preclinical models addressing heterogeneity and microenvironment of tumour, nutritional challenges to normal cells and drug targets in real spectrum, though difficult but achievable, is a realistic approach in anticancer drug discovery. Such studies can, perhaps, turn

around many an unprecedented setback of clinical trials in terms of efficacy and safety. To achieve this, investigators have to balance between academic requirement of publications and conscience. In this context, research-funding agencies, research institutes, medical research organizations and universities should encourage research proposals that address intriguing questions with technical feasibility that can crack the so far indomitable fort of cancer.

Cancer as a disease itself is so complicated and sensitive that only a trained and qualified medical practitioner is permitted to treat or administer medicines to a cancer patient. However, under the prevailing scenario, the number of trained and qualified medical practitioners involved in cancer research is too low. This has hindered progress in cancer biology research. Significant milestones in the 'war on cancer' have been achieved mostly by distinguished scientists having

a degree in medicine. Glancing through the list of Nobel Prize winners who have contributed to cancer biology research gives one a clearer picture. Otto Warburg, Harold Varmus and Harald zur Hausen are the few to mention. Unless issues related to cancer biology research are addressed pragmatically, the war against cancer would never lead to enduring freedom from it.

1. Jemal, A., Bray, F., Center, M. M., Ferlay, J., Ward, E. and Forman, D., *CA Cancer J. Clin.*, 2011, **61**, 69–90.
2. Kiberstis, P. and Marshall, E., *Science*, 2011, **331**, 1539–1540.

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The decline of the West – II

China and India continue to rise, while the West remains in decline¹ according to the fresh scientometric and economic data that has just come in from the 2012 report of *Science and Engineering Indicators*².

Appendix table 5-27 of *Science and Engineering Indicators*² compiles science and engineering (S&E) articles from all fields, by region/country/economy for the period 1995–2009 using a fractional count basis³. Appendix table 6-2 arranges the nominal gross domestic product (GDP), again by region/country/economy for the period 1992–2009 in terms of billions of dollars⁴. This data can be represented as shown in Figure 1 so that the world share of publications can be plotted against the world share of nominal GDP. There is good correlation between these two indicators – the higher the share of GDP, the higher the S&E output and this is captured in Figure 1.

Figure 1 shows the trajectories of the various regions and countries over the period 1995 to 2009. USA, EU and Japan continue to be in decline. In contrast, China, India and the rest of the world show steady progress, as reported earlier^{5,6}.

A better understanding of the rise and fall of various regions is offered if a second-order indicator of performance is introduced. One can think of GDP as a

zeroth-order performance indicator. Then the ratio of papers/GDP is an indicator or proxy for the quality of academic research performance in the country or

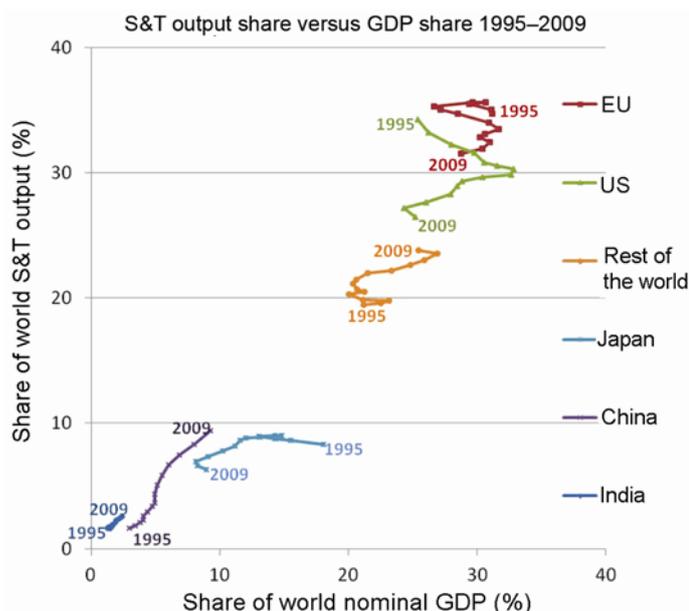


Figure 1. Trajectories of various regions and countries from 1995 to 2009 as world share of publications is plotted against the world share of nominal GDP – the higher the share of GDP, the higher the S&E output.