

Scientific misconduct: Disciplinary action

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The Society for Scientific Values (SSV) recently brought out the proceedings of a seminar organized by it on 'Scientific Misconduct: Disciplinary Action'. The recommendations of the seminar, if implemented in the spirit in which they are made, should go a long way in introducing a uniform and a healthy code of ethics for the practice and management of science in India. P. N. Haksar in the postscript of his book *A Basket of Fallen Leaves* quoted Gandhiji: 'No cause can triumph unless there are faithful agents to carry it through'. There is an urgent need for faithful agents from among the senior scientific community to help propagate such a code.

We are not alone in not taking timely and corrective action in such matters. If timely action is not taken, the disease inevitably spreads. N. Vittal, presently the Chief of Central Vigilance Commission, in his presentation at the seminar referred to the editorial in *Current Science* (1995, 68, 981-982): 'Misconduct in science has been the subject of much debate, particularly in the United States. The enormous publicity attached to the Baltimore - Imanishi Kari and Gallo cases - was largely due to the extraordinarily high profile of some of the researchers involved. . . . The Himalayan geology scandal at the Punjab University, Chandigarh, has been extensively highlighted in the journal *Nature*. The decisions of the academic bodies involved have been pilloried in strongly worded editorials.' The editorial went on to state: 'The fact that misconduct investigations reveal many unpleasant facets of the practice of science and dispel common (and unjustified) myths about science as an exclusive pursuit of truth and its practitioners pure as the driven snow, does much to make the average scientist deny that transgressions are common'.

Not much is publicly known about the attitudes of our managers and leaders of science in such matters, because of lack of transparency of procedures. What little is known of the happenings, does not give much encouragement to the scientists who feel concerned about these matters. The tendency is not to get

involved by assuming that it is not a matter of concern for them. Scientists who raise such issues are considered a nuisance by the management for causing avoidable problems - never mind the merit of the case for an independent and transparent investigation. If ethical practices are to be nurtured, there is no alternative for the management but to investigate all practices claimed to be unethical and brought to its attention. If not, the guilty tend to escape or even get promoted to the next higher grade. If the heads of the institutions do not initiate disciplinary action in known cases of unethical scientific practices, there is an implicit license for others also to indulge in such practices. Eternal vigilance is the price the scientific community has to pay, if it wishes to protect the ethical foundations of science from the deviants and protect the image of scientific integrity of their own work.

The minutes of the meeting of the SSV held on 28 January expresses the regrets of the Council about the case of Bhushan Kumar of PGI, Chandigarh, against whom a case of misconduct was apparently established but who has been exonerated and promoted. Such instances highlight the importance of establishing an independent appellate authority to look into such violations, not only by the concerned scientists, but by the immediate heads of the institutions who are responsible in the first instance for conducting such investigations. Such decisions, if unchallenged at appropriate levels, can seriously damage the reputation of the institutions, not to speak of the reputation of the institutional heads, who take the initial decisions regarding the punishment. It is their decisions that will eventually determine the extent to which healthy traditions in the practice and management of science will permeate the Indian scientific community.

Vittal went on to ask: 'whether this code of conduct should be an informal code of conduct, like the Hippocratic oath among doctors or should be a regular legislation which can be agitated in a court of law. In the Indian context, perhaps having a formal legislation and rules which can be legally challenged

may provide teeth to the code of conduct rather than a mere guideline, even though the best code of conduct is one which is implicitly and universally obeyed without the need for a policeman or watch dog body to implement the same. Till such an ideal condition is achieved, perhaps a legislation is welcome'. The virtue of a legislation is that it will also act as a powerful deterrent to discourage such practices.

The US Federal Office of Research Integrity would seem to play such a role bringing impartiality and transparency in its investigations. It is to its credit that, it determined that the French scientist Luc Motagnier was in fact the first to identify the AIDS virus and not the American Robert Gallo. A refreshing example of transparency and impartiality is the action taken by the Director General of CSIR, in which two scientists from one of its laboratories were punished for plagiarism in a paper published by them in an international journal. After establishing that the two scientists did indulge in an unethical practice, DGSIR dismissed one and demoted the other. Currently DGSIR has appointed the Director of a CSIR lab as the Chairman to look into the alleged falsification of data in a paper presented at an international conference abroad by a divisional head in another CSIR lab. It was unequivocally established through repeat tests ordered by the Chairman, that the results reported in the paper could not be reproduced. Reproducibility is the hallmark of scientific research. Scientists at these levels should be role models for their juniors to emulate and not indulge in such unethical acts themselves. DGSIR's action to uphold scientific integrity in this case will be watched with interest by the scientific community.

Indications are that for every case where deterrent action was taken, there are tens that go unreported and unpunished even in institutions of repute, the most common being, taking credit as co-authors in papers to which they have made no tangible contributions. There is no substitute for transparent action and initiating the due process of formal

investigations in all known cases of code violations. If enduring traditions are to be evolved, establishing the image of impartiality is as essential as the impartial action itself.

Some of the recommendations resulting from the SSV seminar are worth noting:

'Since there are a large number of universities and research institutions in India, it was suggested that each and every organization must have an Ethics Committee of its own to look into any complaint. The inquiries conducted by them should not be secretive. It should follow transparent procedures. In case a *prima facie* case is established, the matter should be referred to a formal inquiry. The organization may form a committee of scientists well known for their integrity and independent views for making reliable and impartial inquiries. Their reports should be made public and proper and effective action must be taken on their recommendations'.

'Scientific academies/societies, organizations, and government establishments should take the following action against guilty scientists:

Science academies and societies should withdraw fellowships/memberships granted to such scientists; Academic degrees, awards and prizes based on fraudulent work should be withdrawn; Scientific journals should take note of such cases and take appropriate action such as refusal of publications of papers authored by such scientists; Such persons should not be invited to present papers or chair sessions in scientific seminars, symposia, and conferences; Scientific community should boycott an institution that does not take required action against its staff found guilty of misconduct of science; Various government funding agencies and university grants commission responsible for giving grants should ensure that the organization being given the grant has a transparent mechanism for investigating cases of scientific misconduct.'

If the Indian scientific community believes in the cause of science and establishing healthy foundations for its practice and management, it would find these recommendations of SSV unexceptional. The primary responsibility to assure that they are implemented in the spirit in which they are conceived rests

solely with them. This cause cannot triumph unless they become the faithful agents to carry the message through. It was precisely because they did not care enough as a body in the past, the cancer of unethical practices in science and its management has grown over the years. Like corruption in society, such practices too will spread with increasing frequency if not checked decisively.

The Academies among themselves represent the top senior scientific community of India. It will be appropriate, if they take the initiative to implement a uniform code of ethics for the practice and management of science, perhaps along the lines recommended by SSV, and monitor its implementation. In a sense, such a move by the Academies will be a measure of their own commitment to inculcate healthy practices in science. If they are not willing, perhaps a time has already come as suggested by Vittal, to have the government pass appropriate legislation.

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SCIENTIFIC CORRESPONDENCE

Identity of subsequences of some pregnancy-associated proteins with SERPIN signature sites of some serine protease inhibitors and a carcinoma antigen

The foetus is an allograft in the uterus. Yet it is not rejected by the immunocompetent mother. Understanding of the exact mechanism of foetal survival is limited and the unequivocal evidence still seems elusive. It is proposed that one of the possible reasons for evasion of maternal lymphocyte-mediated lysis by the foetus could be local inactivation of serine proteases, secreted on the target trophoblast cells by cytotoxic lymphocytes during lethal hit, by some pregnancy-associated proteins which contain amino acid subsequences (and presumably function) identical to those of some serine protease inhibitors (SERPINs).

In this study, the amino acid subsequences of three pregnancy-associated

proteins – human pregnancy zone protein (H. PZP), sheep uterine milk protein (S. UTMP) and pig uteroferrin-associated protein (P. UFAP), were found to be identical to tri-, tetra-, penta-, hexa- and heptapeptide sequences of SERPINs like human plasma serine protease (Protein C) inhibitor, and Rat SERPINs 1, 2.1 and 3, respectively. The overall identity of sequences of pregnancy-associated proteins with SERPINs ranged from 15.27% to 28.97%.

Interestingly, among the identical sequences, one tripeptide (RPF) and one hexapeptide stretch (FNRPF) of human plasma SERPIN, two tripeptide subsequences (FNR and RPF) of rat SERPIN 1 and a tetrapeptide (RPFL) and a pentapeptide subsequence (FDRPF) of rat

SERPIN 3 were found to be parts of SERPIN signature sites of the respective inhibitors.

Human squamous cell carcinoma antigen (H. SCCA) is a tumour marker. The amino acid sequences of S. UTMP and H. SCCA, H. PZP and H. SCCA as well as P. UFAP and H. PZP available in the Protein Sequence Database were aligned using the PC GENE software.

Interestingly, the sequence of a pregnancy-associated protein, S. UTMP was found to have an identity of 20.51% with that of carcinoma antigen, H. SCCA whereas, the sequences of H. PZP and H. SCCA were only 9.74% identical to each other. Five tripeptides (Leu-Asp-Ala, Leu-Val-Asn, Phe-Lys-Gly, Met-Met-Arg and Pro-Phe-Lcu) were found