

Investigating misconduct in science

Recently, the Society of Scientific Values (SSV) examined a few issues of national importance, and the scientific community should take cognizance of SSV's role in maintaining the scientific integrity in the country and applaud what SSV has done, and at the same time neither ignore what requires urgent action, nor regret what it could not achieve. But we must share the common concern and stand solidly behind SSV's actions to correct the floundering integrity and management of Indian science.

Some time ago, the SSV received the complaint that Gopal Kundu and his co-workers of the National Centre for Cell Science (NCCS), Pune, may have misrepresented data in a paper in the *Journal of Biological Chemistry*^{1,2}. The actual misdeed was first pointed out in an anonymous email to the Director of NCCS. As the co-founder of the National Facility for the Application of Tissue and Cell Culture (NFATCC, since renamed as NCCS) and as a former member of its Governing Council, I expressed my grief to the Director, NCCS, requesting him to investigate the possibility of misconduct. The Director appointed an internal committee, which found *prima facie* evidence that published data may have been inappropriately manipulated. Another external committee chaired by G. Padmanaban, with several expert members, was then appointed to re-investigate the matter. The Padmanaban committee fully exonerated Kundu and his collaborators.

Recently, the editors of *JBC* conducted an independent inquiry and not only found the charge of misconduct/fraud valid but withdrew the 2005 paper². SSV has also now completed its investigation and found that Kundu and his coauthors may be guilty of misconduct involving data misrepresentation of a far greater magnitude than that found by *JBC*, thereby casting doubt on the veracity of results published³ in ref. 1. Now, larger questions loom ahead. The SSV analysed Kundu's Western blot pictures by MATLAB software. Recently, Adobe has perfected a method to detect photo forgeries⁴. With the proliferation of digital cameras, the danger of such forgeries is great. In fact, the *Journal of Cell Biology* formally prohibits⁵ authors from submitting photographic evidence consisting of

manipulated/touched up images. Will all journals follow this rule?

As *JBC*'s findings have been independently confirmed in India by SSV³, we must take exemplary steps to deter such and other malpractices in future by making public, all records of proceedings of the first and second committee, as well as by taking appropriate deterrent action against the guilty.

In his editorial⁶, Balaram eloquently outlines the problem and process of scientific misconduct including the difficulties involved in verifying the pros and cons. In the final analysis, I feel, that the worth of the Indian scientific establishment depends on its own efforts. Cleaning the Aegean stables seems to be the need of the hour. A cursory examination would reveal that there exists a small society of mutual admiration whose members act as self-proclaimed peers and play musical chairs by sitting on every committee be it making national policy, judging grant requests, sanctioning grants and often sharing the pie of huge grants amongst themselves. It is the ire of quiet workers rather than the need of the science salesmen that will decide the value of Indian science. It is unfortunate that *JBC*'s decision has preceded our own as it reflects the lack of adequate surveillance and a shared sense of dignity. *JBC*'s actions will not harm honest Indian scientists unless our scientocrats resort to calling it India-bashing and whitewash the misdeeds exposed by *JBC* and SSV. A news report⁷ in *Science* states that 'A US journal and an Indian panel have lined up on opposite sides in case of alleged plagiarism involving a young Indian researcher whose degree hangs in balance'.

There have been well-proven cases of malpractice in scientific research in several countries such as USA, Switzerland, South Korea, China, etc. However, the discovery of malpractices was followed by the establishment of fraud-surveillance apparatuses in some of these countries. But in India, only SSV, a non-governmental organization (NGO), despite its meagre resources and lack of teeth, has shouldered that role and played it with fairness. SSV's findings³ should be formalized and SSV should be supported with technological capability, and the

funds to consult jurists and scientists to test the accusations of fraud/misconduct. SSV should be kept out of the sphere of influence and interference by the Indian 'scientocracy'. SSV should help frame appropriate legislation to deter further acts of fraud/misconduct in science. I hope that the vast silent majority of honest colleagues react and strengthen SSV's hands.

1. Rangaswami, H., Bulbule, A. and Kundu, G. C., *J. Biol. Chem.*, 2004, **279**, 38921–38935.
2. Rangaswami, H., Bulbule, A. and Kundu, G. C., *J. Biol. Chem.*, 2005, **280**, 19381–19392; see withdrawal: *J. Biol. Chem.*, 2007, **282**, 5968.
3. Case study and final proceedings of SSV on the Kundu–*JBC* case, 28 April 2007, <http://www.scientificvalues.org>
4. Dotinga, R., *WIRED NEWS*, <http://www.wired.com/gadgets/digitalcameras/news/2007/03/72883>
5. *Journal of Cell Biology*, Instructions to authors, 4 April 2007. <http://www.jcbs.org/misc/infora.shtml#conflict>
6. Balaram, P., *Curr. Sci.*, 2001, **81**, 1389.
7. Newsmakers, *Science*, 2007, **315**, 1775.

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Response (Kundu)

The two *JBC* papers represent two very similar pathways regulated by osteopontin upon binding to the integrin receptor. The experimental design and the methodology used to examine the two pathways are very similar; both sets of experiments were performed in B16F10 cells. Both the papers are highly cited (more than 24 and 14 times respectively)

Based on an anonymous/pseudonymous e-mail, Director NCCS, G. C. Mishra, constituted an internal committee to find the fact of the matter. However, the committee did not go through the original data, computer analysis and supportive data. The committee did not give a chance to Hema Rangaswami – the first author of both these papers who is doing

her post-doctoral work at UCSD, USA – to explain the data before the committee. After submitting the detailed report along with computer analysis to the internal committee, it was decided to further investigate the matter thoroughly by a national level enquiry committee. Accordingly, a national level committee under the chairmanship of G. Padmanaban along with six reputed scientists of the country, was constituted. We had submitted the detailed report to this committee. Hema Rangaswami came from USA along with all the original blots, record books, and supportive data and presented before the committee along with myself and Anuradha Bulbule. The committee examined all the presented data of the two papers extensively and found that there was no substance based on the allegation.

I received an e-mail from K. L. Chopra, President, Society for Scientific Values (SSV) on 11 October 2006. In that email, there were two sets of questions: one, based on scientific issues and the other, based on non-scientific issues. Although most of the scientific questions are not relevant to the data of *JBC* paper in question, I answered all the questions scientifically. The SSV decided to highlight only the non-scientific issues and posted them on its website, whereas the scientific explanations of all the blots did not appear on the website, which seems to me that SSV has deliberately suppressed the scientific facts.

I learnt from the SSV site later that Sohan Modak has made a written complaint to SSV on this issue. It is unfortunate that Modak (<http://www.scientificvalues.org/Modak-complaint.pdf>) had indicated that *JBC* has a *faulty peer-review system* and the paper has been published because of *genealogical relationship* between the reviewer and the authors of the papers. I cannot comment on this although it has been published on the SSV website.

In the meantime, *JBC* received the same anonymous/pseudonymous email and asked me for the clarifications. Although we submitted the original blots and the computer analysed data, *JBC* decided to withdraw the second paper (ref. 2 above) based on only two control blots. Later, the scientific editor of *Science* contacted Shelagh Ferguson-Miller, chair of ASBMB publication committee and confirmed that they have made the decision based on the computer analysis of two control blots (<http://www.scientificvalues.org/Science%2030%20March%202007.pdf>).

There were nine points in the allegation and seven of them are control data. The paper-2 has 53 and the paper-1 has 66 blots/data. It seems that *JBC* has taken the drastic/harsh decision without considering the scientific fact of the paper. After this decision, I contacted the *JBC* office but it has decided to remain silent. Even if one removes these two control blots, the fact of the scientific findings of the paper will remain unaffected.

Renate Pilz and two other UCSD professors (University of California, San Diego, USA) who examined all the data of both these papers felt that the data of the *JBC* paper (ref. 2 above) is valid. They also commented that these types of similar-looking control data can be obtained if one uses the same gel apparatus, combs, spacers, etc. It is unfortunate that although I have submitted all these letters of UCSD to SSV, the SSV did not make any efforts to post these reports on its website.

Although *JBC* and *Science* agreed that *JBC* paper (ref. 2 above) has been withdrawn based on only two control blots, SSV with a computer expert have shown the analysis of seven blots using MATLAB software. It is important to mention here that based on SSV's own analysis, there are distinct differences among the analysed blots of the two papers (ref. 3 above). Moreover, G. Padmanaban has provided one such set of original blots and has given a detailed explanation in his report. After considering all these facts, it is obvious that SSV has prepared the report in a biased way. Moreover, like the Padmanaban's committee, neither *JBC* nor SSV had directly investigated all the original data, computer analysis, raw data, supportive data, and note books along with all the three authors of both the papers.

On the basis of the SSV's report, the media have reported the case in a colourful manner; however nobody is ready to understand the scientific facts of these two *JBC* papers. I feel that SSV should stay out of the sphere of influence and interference and deal with the scientific matter in an unbiased way and keep the moral value of science high. Currently, I have 10 PhD students, two summer trainees and one senior technician in my laboratory. Four of my earlier students have completed their PhD and are continuing their postdoctoral research in USA. A large number of papers have been published from my laboratory in

high impact peer-reviewed international journals. I urge the scientific community to go through both these papers and find out the scientific facts and not allow the career of my students to be destroyed.

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Response (Rangaswami)

I feel that *JBC*'s decision to withdraw our 2005 paper was absolutely unfair and unwarranted. One can only hazard a guess about what motivated them to do so. The apparent similarity between two loading control blots out of the 100 or so blots in the papers did not affect the results or conclusions in any way. Our experiments were repeated several times prior to submission and there was no need for us to use the same figures. There were no issues with reproducibility whatsoever and our papers were highly cited. I also got to know that the University of Pune received extremely positive reports of my thesis that contain the same data from all three examiners.

Right after *JBC*'s withdrawal, the SSV and others readily pounced on Padmanaban's committee even questioning its integrity, but why could not some of that doubt and criticism be directed towards *JBC*? Is the *JBC* so infallible? Regarding SSV's 'investigation' and 'conclusion', I cannot help but feel that the final conclusion was decided a long time ago and the recent 'report' was a mere formality. They and other overzealous individuals found this to be a great opportunity to make a name for themselves and settle personal scores. SSV's charter on their own website says 'The SSV feels strongly that prominent scientists in the field best judge scientific unethical practices and thus their verdict should be taken seriously for taking an appropriate action', and yet they attacked Padmanaban's committee and conducted their own 'investigation' without involving a single recognized expert in the field, without examining original data and without contacting all the authors. Even in its own 'analysis', SSV has not found a single image that is an exact reproduction of another image. The 'investigation' also