

## **JBC Editorial**

### **Photoshop: Friend or Fraud?**

In the past several years, there has been increasing concern with inappropriate manipulation of digital images presented in scientific papers (1). While software for digital images has been an enormous technical advance, the boundary between appropriate and inappropriate manipulation has become “pixelated”.

While image manipulation is often desirable for clarity and/or brevity of presentation, manipulation for deceptive purposes either to unfairly enhance or eliminate or otherwise obscure data is misconduct.

Within the past year, we have, both during and after the review process, detected cases of fraud; re-use of figures from one paper to another for new purposes, re-use of control images within a single paper without explicitly noting the repetition, removal of “contaminating” bands from gel patterns, etc. After investigation of such cases, papers have been rejected or withdrawn and institutional officers notified of misconduct.

There are more subtle alterations that are also more difficult to detect but are also inappropriate; selective adjustment of backgrounds on gels, cropping of micrographs for field selection and altering resolution. Clearly, there are as many ways to alter data as there are those who might want to misrepresent their work and detecting all fraud is not possible.

In light of the increasing detection of fraud, however, we have adopted a policy taken from The Journal of Cell Biology <[http://www.jcb.org/misc/ifora.shtml#image\\_acquisition](http://www.jcb.org/misc/ifora.shtml#image_acquisition)>

“No specific feature within an image may be enhanced, obscured, moved, removed, or introduced. The groupings of images from different parts of the same gel, or from different gels, fields or exposures must be made explicit by the arrangement of the figure (e.g. using dividing lines) and in the text of the figure legend. Adjustments of brightness, contrast, or color balance are acceptable if and as long as they do not obscure or eliminate any information present in the original. Nonlinear adjustments (e.g. changes to gamma settings) must be disclosed in the figure legend”

In light of this policy and in an effort to meet our responsibilities to insure the scientific integrity of the work we publish, we have established the following procedures.

1. Reviewers will be reminded to carefully scrutinize images for any manipulation not explicitly reported in the paper and report them to us for investigation.
2. When suspect images are discovered, authors will be required to provide the original data. Failure to comply will result in rejection or withdrawal of the paper in question.
3. After due process involving the JBC editors, editorial staff and the ASBMB Publications Committee, papers found to contain inappropriately manipulated images will be rejected or withdrawn and the matter referred to institutional officers.

The integrity of science relies on a very high standard of conduct upon which the public trust and the progress of science depend.

(1) Rossner, M. and Yamada, K. The Journal of Cell Biology. 166, 11-15, 2004