

ETHICS

**Against abuse of digital photography techniques in morphology –
Ethical Code of Slovak Anatomical Society**

Mraz P

*Department of Anatomy, Comenius University, Faculty of Medicine, Bratislava, Slovakia.
mraz.peter@fmed.uniba.sk*

Abstract

Digital graphical methods allow extensive manipulation of pictures literally beyond any limits. By such methods, it is possible to change original information obtained by morphological observation, even to fraudulently produce distorted results or forgeries. For this reason, basic rules were proposed defining what is allowed and what is not accepted during picture processing. These rules were discussed and approved by a plenary meeting of Slovak Anatomical Society on September 9th, 2007 under the name Ethical Code of Slovak Anatomical Society. We call on all potential authors of publications and dissertation works to obey the rules of Ethical Code of Slovak Anatomical Society and thus to prevent any doubts which may arise about the faithfulness of published materials in morphological or other disciplines, which use a picture as an evidence or illustration means (*Fig. 3*). Full Text (Free, PDF) www.bmj.sk.

Key words: digital photography techniques, morphology, Ethical Code of Slovak Anatomical Society.

Results of research work in morphological disciplines are usually presented as pictures – photographs of observed structures, illustrating morphological findings. Before public demonstration, a picture, as a rule, is processed – its contrast, brightness, size (crop) are revised and adjusted, structures are designated by letters, magnification is indicated by a line showing an appropriate length unit, a.s.o. This processing is most often accomplished by using methods of digital photography, which allow to handle all kinds of pictures, whether they were obtained by “classical” methods from a sensitive emulsion (photography, micrograph, electron micrograph) and which was later scanned by a scanner, or obtained directly by a digital camera attached to research instrument. Then, the digital picture may be processed using a suitable software such as widely popular Adobe Photoshop (Adobe Systems Inc., USA).

Digital graphical methods, however, allow not only a simple processing, but also such a sophisticated handling of a picture, which could completely change the content and appearance of structures shown in a picture. This may lead to complete distortion or transformation of results of morphological observation (*Fig. 1*). If such a transformation of results is intentional, it may be described as forgery (*Figs 2 and 3*). Simply – digital graphical methods enable to produce anything, what you wish to see on a picture, in case you are willing, and are not in hesitance, to cheat.

I am convinced, that most of my colleagues will never choose the way of producing desired results by forgery, but to strengthen this conviction I proposed some basic rules, which were presented to a plenary meeting of Slovak Anatomical Society on September 9th, 2007. After a discussion the rules were formally approved and adopted under the name **Ethical Code of Slovak Anatomical Society**. Originality and “sinfulness” of published pictures have to be declared by the author of publication, who will attach to his/her publication a short statement, that published pictures were produced in consistence with the rules set by Ethical Code of Slovak Anatomical Society. Editor or publisher, and in case of a dissertation work the responsible authority (Dean of a Faculty or Rector of University) will then be assured, that the author takes over the responsibility in case of doubts about the faithfulness of presented morphological findings.

It would be desirable, if the willingness to observe the rules of Ethical Code of Slovak Anatomical Society would be expres-

Department of Anatomy, Comenius University, Faculty of Medicine, Bratislava, Slovakia

Address for correspondence: P. Mraz, MD, DSc, Dept of Anatomy, Comenius University, Faculty of Medicine, Sasinkova 2, SK-813 72 Bratislava 1, Slovakia.
Phone: +421.2.59357346

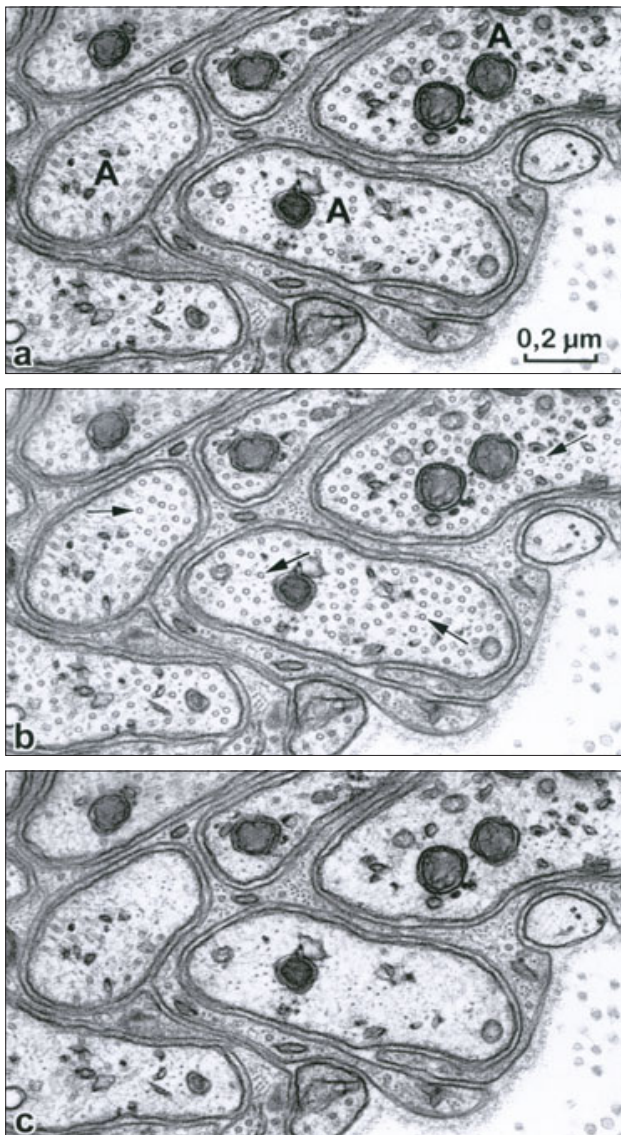


Fig. 1. a – Electron micrograph showing nonmyelinated axons (A) in cross section. Axoplasm contains various kinds of axonal organelles, b – by means of digital photography software, the axoplasm was artificially “enriched” by adding many other superfluous microtubuli (arrows), so that their total count will substantially exceed that in axons under normal condition, c – almost all microtubules from axoplasm were arteficially removed.

sed also by other research workers and non members of Slovak Anatomical Society, to whom I address this call.

Please see below the wording of the code in full.

Ethical Code of Slovak Anatomical Society

Preamble

Ethical Code of Slovak Anatomical Society defines basic technical conditions of production of pictorial materials, which have to be published in a scientific, professional or popular publica-

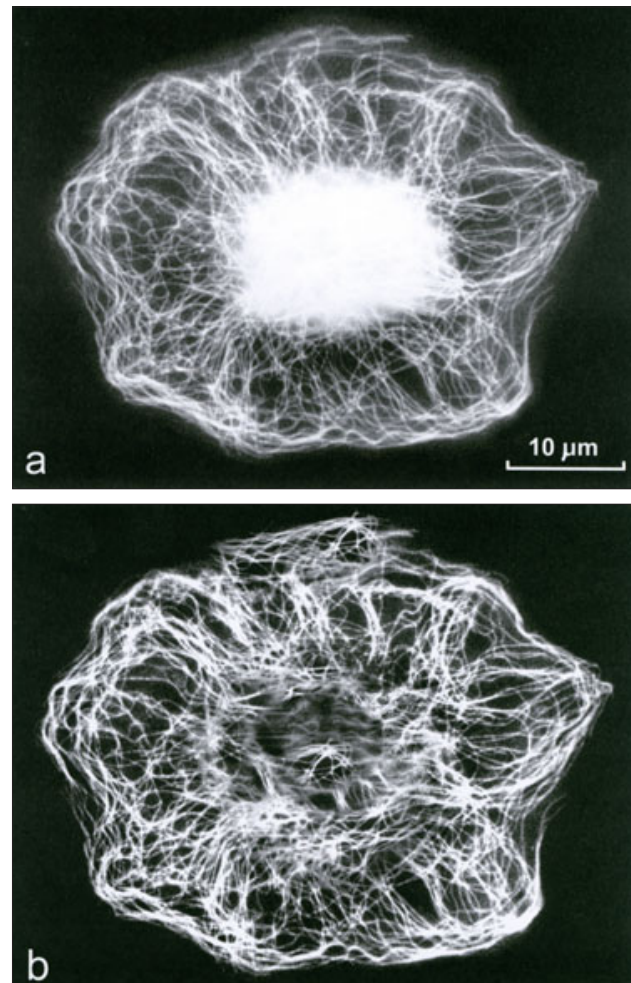


Fig. 2. a – Fibroblast cytoskeleton microtubules, visualized by indirect immunofluorescence method with monoclonal antibody TU-01. Confluent fluorescence in the central region of cytoskeleton concealing the cell nucleus, b – the same picture “improved” with digital photography software. Confluent fluorescence was corrected and now the nucleus can be recognized. Moreover, over the centre as well as to the cytoskeleton periphery, two microtubule-organizing centres (the same MTOC, but twice, to make it clear) were imported from another cytoskeleton by cloning instrument of the software.

tion, in a dissertation work, in a professional or case report study, by an oral presentation, or published in a different way.

§ 1

The author of the published work declares, that the structures or their parts, shown in published pictures illustrating scientific, professional or popular publication, dissertation work, professional or case report study, oral presentation or other kind of publication, were not changed nor altered in any way.

§ 2

As “publication of pictures” is understood digital or digitalized depictions of observed structures produced by action of photons or other kinds of radiation and recorded by sensitized materials

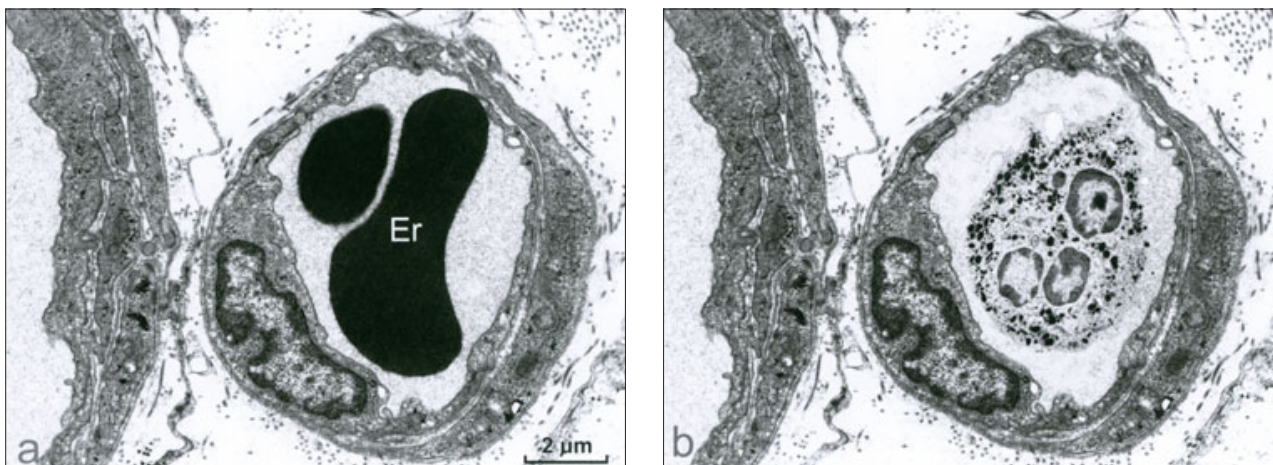


Fig. 3. a – Blood capillary in the centre contains red blood cells (Er), b – red blood cells were removed and replaced by a small (not proportionally correct) leukocyte, transferred from another specimen.

(photographic, radiographic or similar emulsion), or captured by electronic equipment on a memory medium.

§ 3

As “pictures publication” is understood any kind of public presentation of depictions, either by press, by electronic media, by public performance or by any other kind of presentation.

§ 4

In the course of preparation of pictures for the sake of publication, it is not allowed by any means to affect the presence or absence, the size, shape, colour or density, position, arrangement or any other morphological characteristics of visualized structures nor their parts. It is not allowed to change or alter present artefacts, either (deposits or contaminates, vacuoles, and similar), although they could be introduced unintentionally during specimen preparation. Only such processing of the picture can be accomplished, which alters the brightness, contrast, or sharp-

ness of depicted structures in whole or in their parts, or the size and shape of the whole picture.

§ 5

It is permitted to add letters, numbers, lines and other graphical symbols necessary for designating the structures on, or indicating magnification of the picture.

Final provisions

It is a voluntary decision of any person to obey the rules set by this Ethical Code of Slovak Anatomical Society. The consent with the Ethical Code and decision to observe its rules can be declared by a written statement, delivered to the Office of Slovak Anatomical Society. Author of a publication then attaches a short footnote to his/her publication explaining, that published pictures were produced in accordance with the rules of Ethical Code of Slovak Anatomical Society.