

Further doubts over stem-cell images

Peter Aldhous and Eugenie Samuel Reich

LIGHTNING never strikes again in the same place? Tell that to the University of Minnesota in Minneapolis, which has launched yet another inquiry into research at its Stem Cell Institute after *New Scientist* raised further concerns about papers that seem to contain duplicated and manipulated images.

Two previous inquiries have led to three papers being corrected, one being retracted, and a finding of misconduct against Morayma Reyes, formerly a PhD student at Minnesota. In October 2008, an expert panel ruled that Reyes falsified images in a 2001 paper in *Blood* (vol 98, p 2615), describing

a versatile type of stem cell from human bone marrow (*New Scientist*, 11 October 2008, p 8).

Reyes, who is now at the University of Washington in Seattle, protested her innocence, blaming “inexperience, poor training and lack of clear standards about digital image handling”. She also argued that she followed standards for image processing that were common at Minnesota at the time. So *New Scientist* decided to look more closely at other papers co-authored by the Stem Cell Institute’s former director, Catherine Verfaillie, in whose lab Reyes worked.

In doing so, we stumbled across problems in the lab of another researcher affiliated with the Stem Cell Institute, Jizhen Lin,

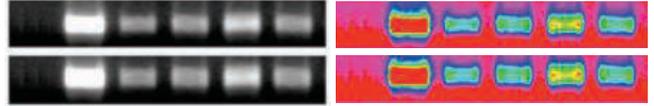
Spot the similarities

Each of these images shows a gel recording the activity of an individual gene in cells from the inner ears of mice

Individual bands on a gel should have subtly different shapes, yet in this gel the first three bands from the right appear identical



These two gels are described as recording the activity of different genes, yet they appear identical. Within each gel, the first and third bands from the right also appear identical



On the right, images are coloured to accentuate variation in their grey-scale using a software tool supplied by the US Office of Research Integrity

who published a paper including Verfaillie among the authors in December 2008 (*American Journal of Physiology – Cell Physiology*, DOI: 10.1152/ajpcell.00324.2008).

This paper explores how stem cells from the inner ears of lab

mice can give rise to neurons and specialised “hair cells” that detect sound waves. The question is whether images of gels documenting the activity of various genes have been spliced together, and whether some bands on the gels have been duplicated. In one case, an entire gel appears to have been used twice to describe results for different genes (see images, above).

After combing through more of Lin’s research, we found possible duplications within images in six further papers, published between 2001 and 2007. None involved Verfaillie.

In April, *New Scientist* told the university of our concerns about Lin’s work. The university took the decision to begin an inquiry in mid-July, but it has not clarified which papers will be covered. Lin declined to comment on the concerns about his work while the inquiry is under way.

Other stem cell biologists are disturbed that so many problems have been found in papers from a single institution. “It’s pretty discouraging,” says Arnold Kriegstein of the University of California, San Francisco. Given the pressure on scientists in such competitive fields, he wonders what might emerge at other research centres if their publications were subjected to similarly close scrutiny. “It raises serious issues about how widespread this could be,” he says. ■

“What might emerge at other research centres if their publications were given similar scrutiny?”

AN UNEXPLAINED RESEMBLANCE

The University of Minnesota’s decision to launch an inquiry into the research of Jizhen Lin (see main story) still leaves an earlier concern in limbo.

In November 2008, *New Scientist* raised concerns with the university about a 2000 paper in *Proceedings of the National Academy of Sciences* (vol 97, p 10538) about chronic myeloid leukaemia, a disease in which rogue stem cells cause white blood cells to proliferate uncontrollably. The paper, from

researchers led by Catherine Verfaillie, investigates the mechanisms involved in the proliferation.

The concern is that an image recording the presence of one of the proteins involved seems to have been reused in the same paper, rotated through 180 degrees and slightly altered, to describe results for a different protein and experimental conditions (see images, below).

The first author of this paper is Yuehua Jiang, who was also

responsible for duplicated and erroneous data in Verfaillie’s best-known publication, which claimed that certain cells from bone marrow can mimic the properties of embryonic stem cells (*Nature*, vol 418, p 41).

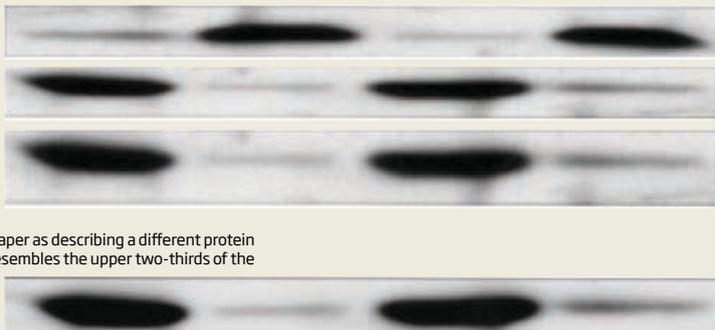
Verfaillie denies that the images in the leukaemia paper are duplicated. Jiang could not be reached for comment. It is unknown whether the university will launch an inquiry; it says the matter is “in process”.

● Image of a gel recording presence of a protein involved in cell proliferation

● Rotated through 180°

● Stretched vertically

● Another image, reported in the same paper as describing a different protein and experimental conditions, closely resembles the upper two-thirds of the rotated, stretched image



SOURCE: PNAS, VOL 97, P 10538

SOURCE: APJ - CELL PHYSIOLOGY, DOI: 10.1152/AJPCELL.00324.2008