

Research integrity and technology

Tools for ethics and integrity

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Disclosure: CG works for Wiley. CG volunteers for COPE, Committee on Publication Ethics

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Integrity and ethics

We want to help researchers publish an accurate, honest, complete representation of how they did their work and what actually happened

We want to check that the work we publish was conducted responsibly, and in ways that minimize harm and that meet community and regulatory expectations

| We face problems and challenges

“58% of survey respondents are aware of scientists feeling tempted to compromise on research integrity

Ottoline Leyser, Deputy Chair Nuffield Council on Bioethics, and colleagues in “The Culture of Scientific Research in the UK”

<http://nuffieldbioethics.org/project/research-culture>

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What are the issues? Focus on image manipulation

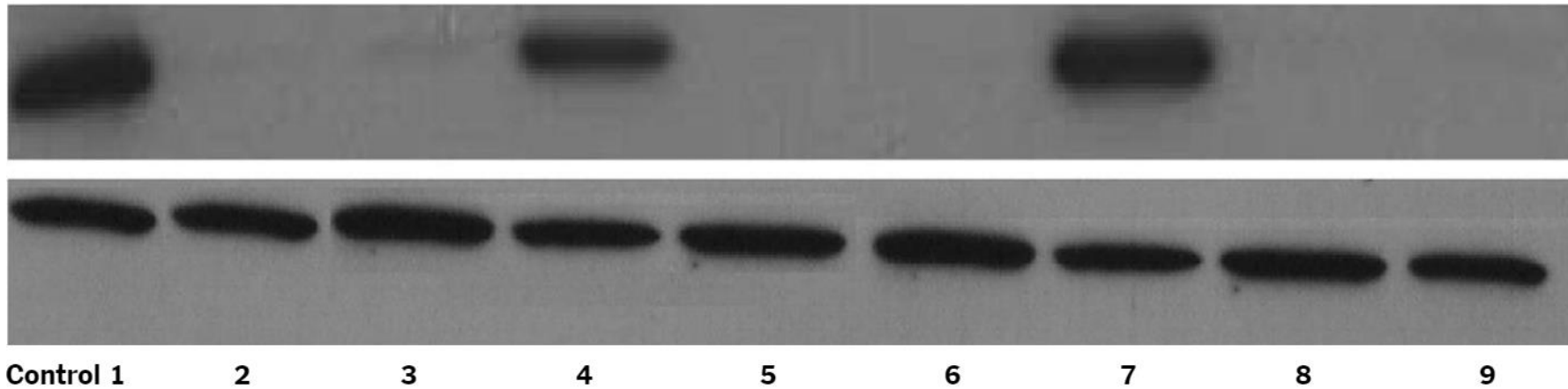


SCIENCE | Years of Ethics Charges, but Star Cancer Researcher Gets a Pass

Duplicated Blots Show Image Manipulation

David A. Sanders, a virologist at Purdue University, has concluded that the blots in at least three lanes in Figure 1B in a 2005 paper by Dr. Croce were improperly duplicated. The image purports to be a series of blots showing protein levels produced in cells under different experimental conditions, but duplications and anomalies are visible.

Experimental row



As Published

Show Duplication

High contrast

Images

New York Times illustrates image manipulation in its feature titled “Years of Ethics Charges, but Star Cancer Researcher Gets a Pass”

To the left is a figure from *NYT* with experimental data from of a western blot published as it appears in *PNAS*.

At first glance, all appears well. But the “high contrast” filter changes that.

What are the issues? Focus on image manipulation



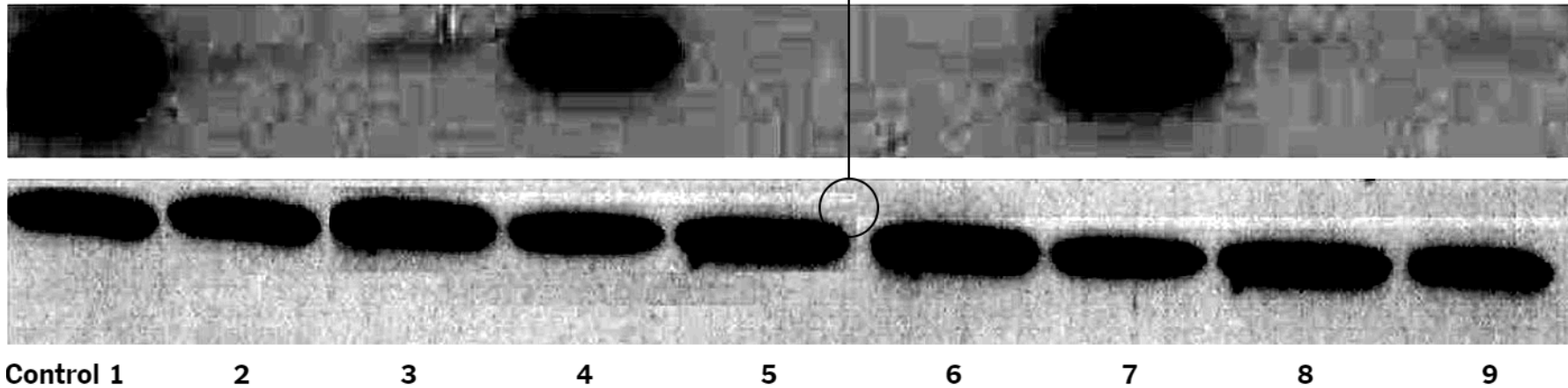
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Experimental row

Discontinuity in bright line



As Published

Show Duplication

High contrast

Images

The “high contrast” image within the same *NYT* article reveals straight lines and a 90 degree corner (marked as a discontinuity).

This is a typical example of a “fingerprint” left behind by image manipulation.

The “Show Duplication” button on the *NYT* page reveals more.

What are the issues? Focus on image manipulation

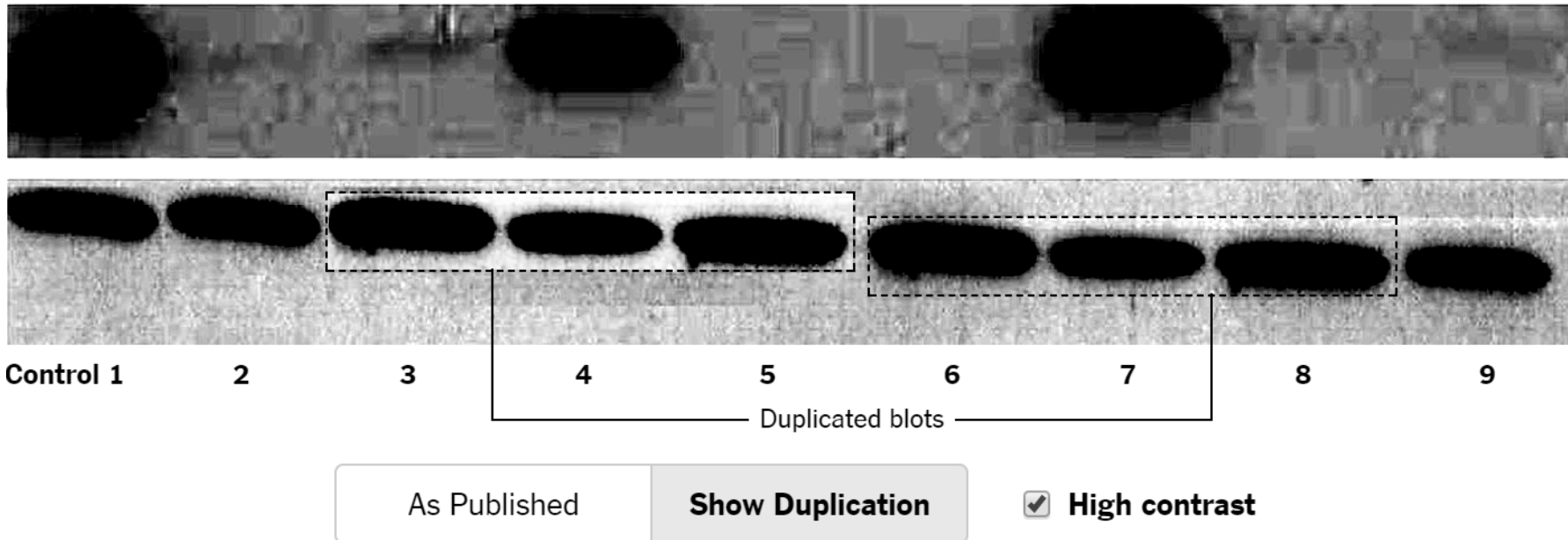


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Images

This panel also from *NYT* illustrates that lanes 3, 4, and 5 in the control contain the same image as lanes 6, 7, and 8. The researchers, it seems, copied and pasted parts of their image to create or enhance their control.

It's possible that this was an attempt by the authors to make their data look beautiful, thinking (wrongly) that this is what journal editors want.

| What are the issues?

Top 5 integrity issues identified by colleagues at Wiley



Image
Manipulation



Authorship,
Credit



Plagiarism



Reproducibility



Data Publication

A data problem

Perhaps 50% of published ^{13}C NMR datasets contain errors. Some are simple typos. Others are completely incorrect structures, where a chemist thinks they've made one structure but actually they've made something different.

A solution: Data validation

Wiley Smart Spectra Repository (SSR) is a tool for research validation. It helps researchers publish higher-quality, correct data.

SSR checks if a chemical structure and the submitted ^{13}C NMR data are consistent and shows where errors might be.

<https://www.wsslabs.com>

Carbon-NMR Spectroscopy Artifact Verification by Wiley SSR

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Spectrum ID: RQID-518
Valid from: 2017-09-28 12:46:52
Submitted by: Dave Flanagan

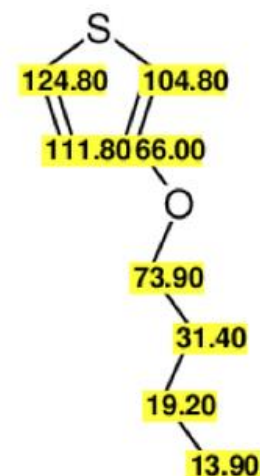
Overall Assessment

Poor

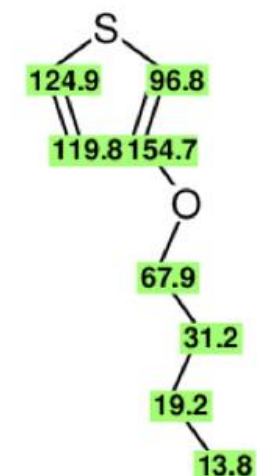


Good

Assignment using your shifts



Assignment using predicted shifts



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Reproducibility



Data Publication

Registered Reports: Methods validation

“Registered Reports will increase the transparency of our science and allow peer review of research before results are known... **improving the quality** of our research protocols, that will ultimately **improve the robustness** of our evidence base

Registered Reports



It's (still) really all about quality



“Quality”: Integrity first, then impact