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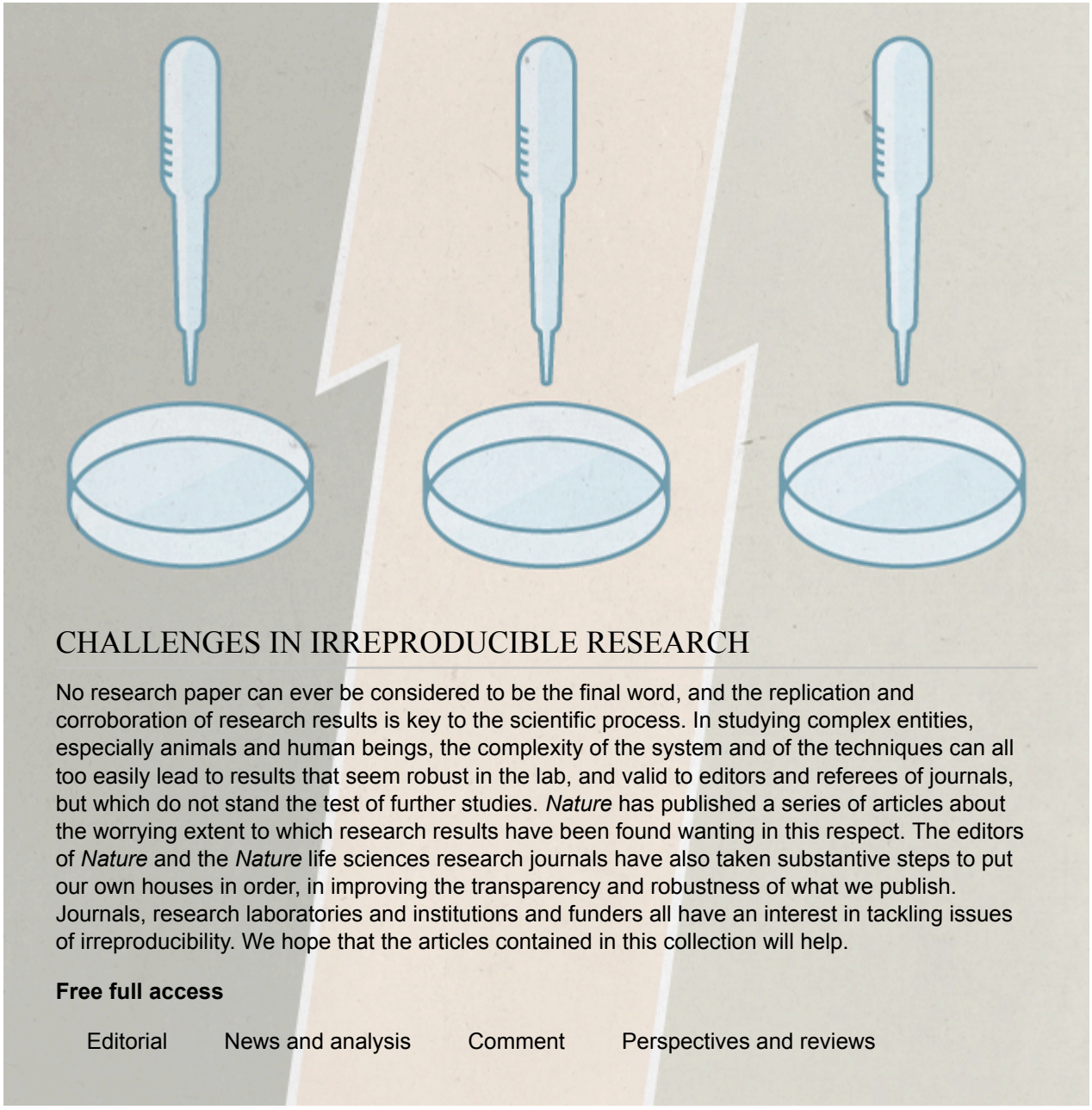

CHALLENGES IN IRREPRODUCIBLE RESEARCH

No research paper can ever be considered to be the final word, and the replication and corroboration of research results is key to the scientific process. In studying complex entities, especially animals and human beings, the complexity of the system and of the techniques can all too easily lead to results that seem robust in the lab, and valid to editors and referees of journals, but which do not stand the test of further studies. *Nature* has published a series of articles about the worrying extent to which research results have been found wanting in this respect. The editors of *Nature* and the *Nature* life sciences research journals have also taken substantive steps to put our own houses in order, in improving the transparency and robustness of what we publish. Journals, research laboratories and institutions and funders all have an interest in tackling issues of irreproducibility. We hope that the articles contained in this collection will help.

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EDITORIAL

Reducing our irreproducibility
Nature **496**, 398 (25 April 2013)

Further confirmation needed
A new mechanism for independently replicating research findings is one of several changes required to improve the quality of the biomedical literature.
Nature Biotechnology **30**, 806 (10 September 2012)

Error prone
Biologists must realize the pitfalls of work on massive amounts of data.
Nature **487**, 406 (26 July 2012)

Must try harder
Too many sloppy mistakes are creeping into scientific papers. Lab heads must look more rigorously at the data — and at themselves.
Nature **483**, 509 (29 March 2012)

NEWS AND ANALYSIS

Independent labs to verify high-profile papers
Monya Baker
Nature News (14 August 2012)

Power failure: why small sample size undermines the reliability of neuroscience
Katherine S. Button, John P. A. Ioannidis *et al.*
Nature Reviews Neuroscience **14**, 365-376 (15 April 2013)

Replication studies: Bad copy
Ed Yong
Nature **485**, 298-300 (17 May 2012)

Why animal research needs to improve
Malcolm Macleod
Nature **477**, 511 (29 September 2011)

Reliability of 'new drug target' claims called into question
Asher Mullard
Nature Reviews Drug Discovery **10**, 643-644 (September 2011)

COMMENT

If a job is worth doing, it is worth doing twice
Jonathan F. Russell
Nature **496**, 7 (04 April 2013)

Methods: Face up to false positives
Daniel MacArthur
Nature **487**, 427-429 (26 July 2012)

Drug development: Raise standards for preclinical cancer research
C. Glenn Begley & Lee M. Ellis
Nature **483**, 531-533 (29 March 2012)

Believe it or not: how much can we rely on published data on potential drug targets?
Florian Prinz, Thomas Schlange & Khusru Asadullah
Nature Reviews Drug Discovery **10**, 712 (September 2011)

Tackling the widespread and critical impact of batch effects in high-throughput data
Jeffrey T. Leek, Robert B. Scharpf *et al.*
Nature Reviews Genetics **11**, 733-739 (October 2010)

PERSPECTIVES AND REVIEWS

Research methods: Know when your numbers are significant
David L. Vaux
Nature **492**, 180-181 (13 December 2012)

A call for transparent reporting to optimize the predictive value of preclinical research
Story C. Landis, Susan G. Amara *et al.*
Nature **490**, 187-191 (11 October 2012)

Next-generation sequencing data interpretation: enhancing reproducibility and accessibility
Anton Nekrutenko & James Taylor
Nature Reviews Genetics **13**, 667-672 (September 2012)

The case for open computer programs
Darrel C. Ince, Leslie Hatton & John Graham-Cumming
Nature **482**, 485-488 (23 February 2012)

Reuse of public genome-wide gene expression data
Johan Rung & Alvis Brazma
Nature Reviews Genetics **14**, 89-99 (February 2013)

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