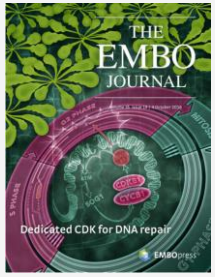
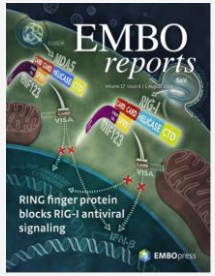
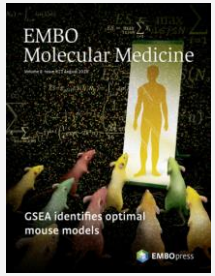
How can institutions help researchers?

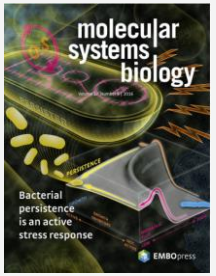
Transparent Publishing, Preprints & Open Science: the EMBO Press paradigm

Bernd Pulverer
Chief Editor | *The EMBO Journal*
Head | Scientific Publications, EMBO









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What can Journals do?

Research Integrity & Reproducibility

- Prepublication checks
- Optimized process
- Enhanced papers

What can Journals do?

- **Efficient Process**
  - Single round revision
  - Manuscript transfers
- **Reproducible Science**
  - Open source data
  - Open references (*i4OS*)
  - Open methods/protocols; e-labbooks
  - Self-correction & Versioning
- **Enhanced Quality Control**
  - Prepublication Integrity checks
  - Data Curation
  - Technical Review
- **Discoverability**
  - Forward-Linking to confirmatory / refuting data
  - Data-directed Search (*SourceData*)
- **Community engagement**
  - Reforming Research Assessment (*DORA*)
  - Journal < > Institutional dialogue (CLUE)
  - Training

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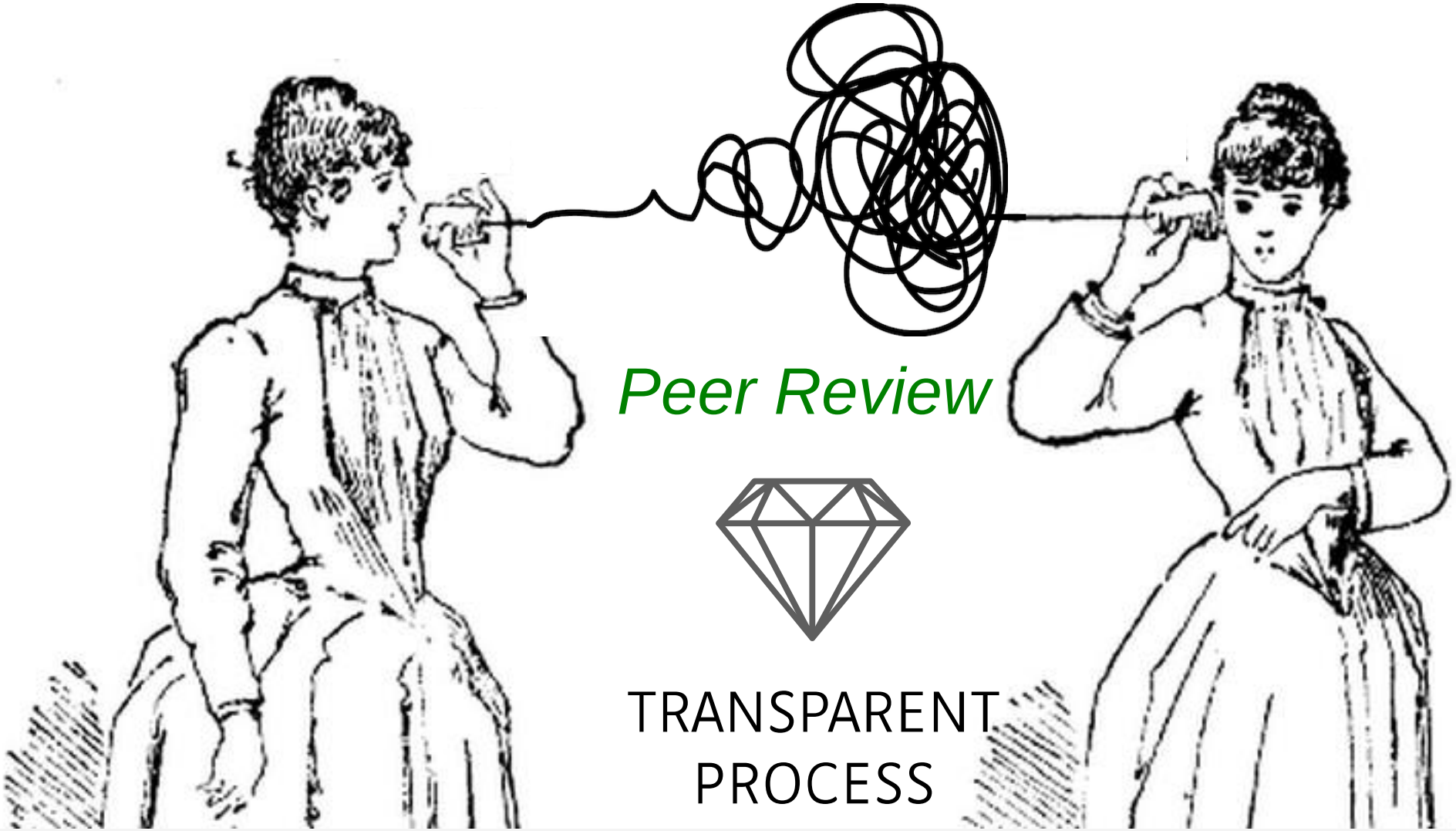
Journals



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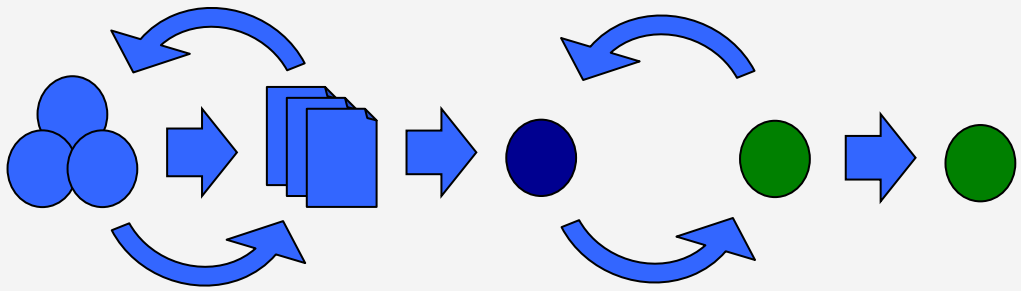
- **Transparent Process:**

  Open editorial process to authors and readers
- **Referee Cross-Commenting & Author Preconsultation**
- **'Scooping Protection'**



referees **editor** **author**

TRANSPARENT PROCESS

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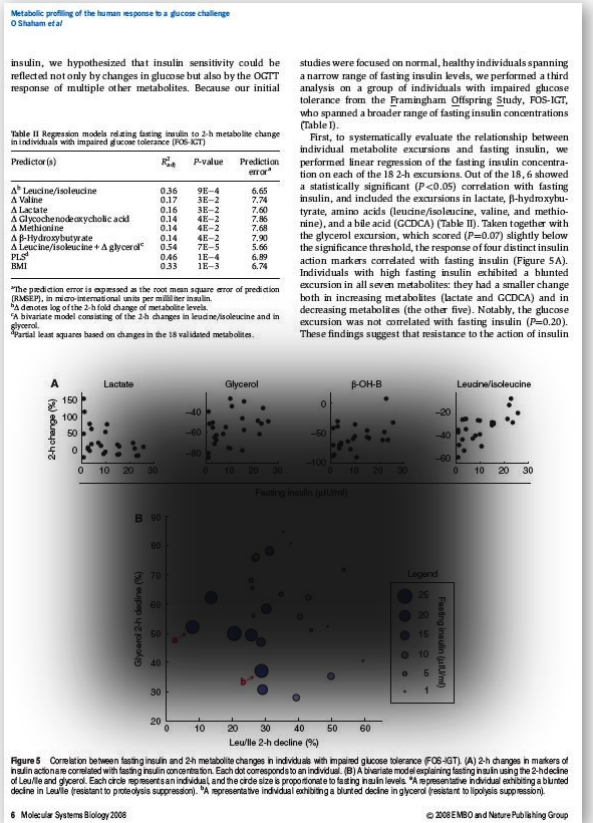
Data Transparency

SOURCE DATA

Published data should be accessible, reproducible and re-usable by others



Metabolic profiling of the human response to a glucose challenge
O Shaham *et al*

insulin, we hypothesized that insulin sensitivity could be reflected not only by changes in glucose but also by the OGTT response of multiple other metabolites. Because our initial studies were focused on normal, healthy individuals spanning a narrow range of fasting insulin levels, we performed a third analysis on a group of individuals with impaired glucose tolerance from the Framingham Offspring Study, FOS-IGT, who spanned a broader range of fasting insulin concentrations (Table I).

Table II Regression models relating fasting insulin to 2-h metabolite change in individuals with impaired glucose tolerance (FOS-IGT)

Predictor(s)	R^2_{adj}	*P*-value	Prediction error[a]
Δ[b] Leucine/isoleucine	0.36	9E−4	6.65
Δ Valine	0.17	3E−2	7.74
Δ Lactate	0.16	3E−2	7.60
Δ Glycochenodeoxycholic acid	0.14	4E−2	7.86
Δ Methionine	0.14	4E−2	7.68
Δ β-Hydroxybutyrate	0.14	4E−2	7.90
Δ Leucine/isoleucine + Δ glycerol[c]	0.54	7E−5	5.66
PLS[d]	0.46	1E−4	6.89
BMI	0.33	1E−3	6.74

[a]The prediction error is expressed as the root mean square error of prediction (RMSEP), in micro-international units per milliliter insulin.
[b]Δ denotes log of the 2-h fold change of metabolite levels.
[c]A bivariate model consisting of the 2-h changes in leucine/isoleucine and in glycerol.
[d]Partial least squares based on changes in the 18 validated metabolites.

First, to systematically evaluate the relationship between individual metabolite excursions and fasting insulin, we performed linear regression of the fasting insulin concentration on each of the 18 2-h excursions. Out of the 18, 6 showed a statistically significant ($P<0.05$) correlation with fasting insulin, and included the excursions in lactate, β-hydroxybutyrate, amino acids (leucine/isoleucine, valine, and methionine), and a bile acid (GCDCA) (Table II). Taken together with the glycerol excursion, which scored ($P=0.07$) slightly below the significance threshold, the response of four distinct insulin action markers correlated with fasting insulin (Figure 5A). Individuals with high fasting insulin exhibited a blunted excursion in all seven metabolites: they had a smaller change both in increasing metabolites (lactate and GCDCA) and in decreasing metabolites (the other five). Notably, the glucose excursion was not correlated with fasting insulin ($P=0.20$). These findings suggest that resistance to the action of insulin

Figure 5 Correlation between fasting insulin and 2-h metabolite changes in individuals with impaired glucose tolerance (FOS-IGT). (**A**) 2-h changes in markers of insulin action are correlated with fasting insulin concentration. Each dot corresponds to an individual. (**B**) A bivariate model explaining fasting insulin using the 2-h decline of Leu/Ile and glycerol. Each circle represents an individual, and the circle size is proportionate to fasting insulin levels. [a]A representative individual exhibiting a blunted decline in Leu/Ile (resistant to proteolysis suppression). [b]A representative individual exhibiting a blunted decline in glycerol (resistant to lipolysis suppression).

‘The two vital components of the scientific endeavor – the idea and the evidence – are too frequently separated’

Science as an open enterprise, Royal Society, 2012

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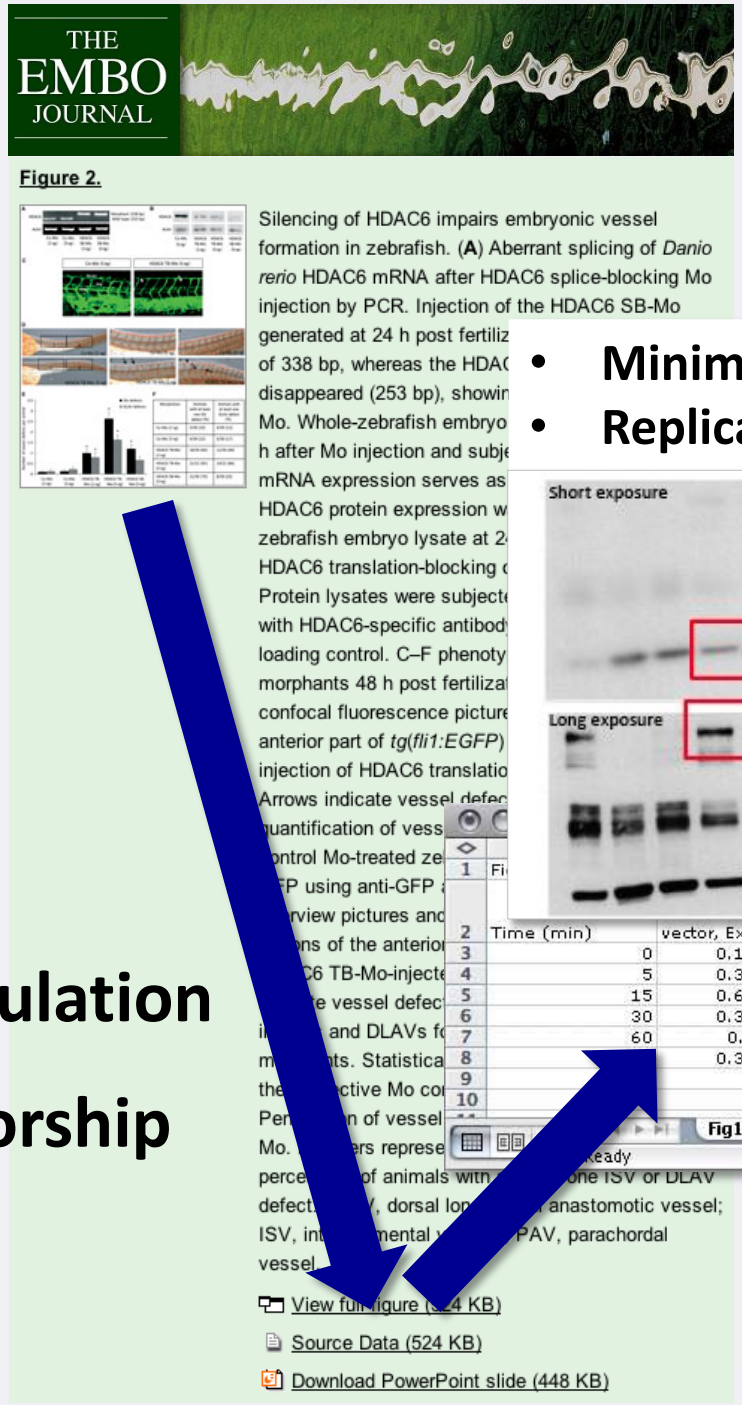
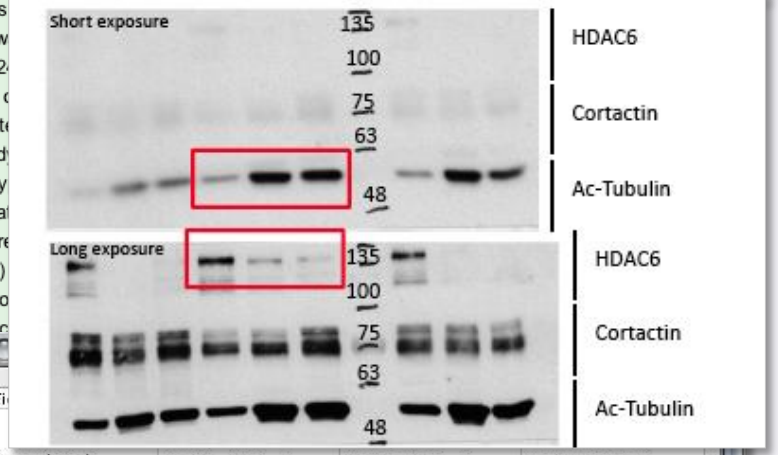
Source Data

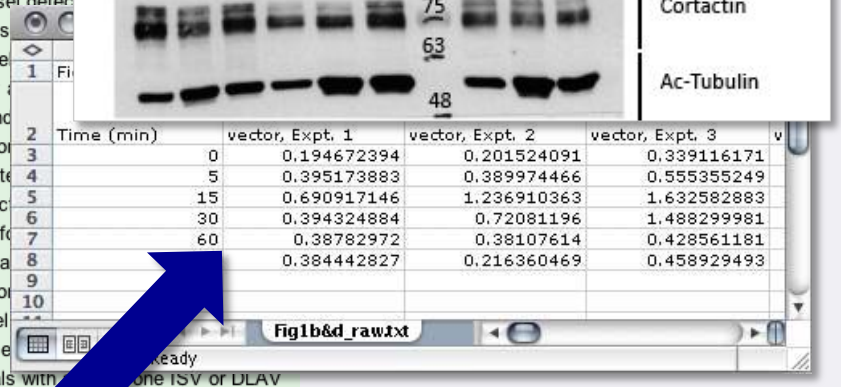
- Archive
- Transparency
- Replicates
- Reanalysis
- Reuse
- Discourage manipulation
- Figure Level Authorship



SOURCE DATA

- Minimally Processed Data
- Replicates





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2				
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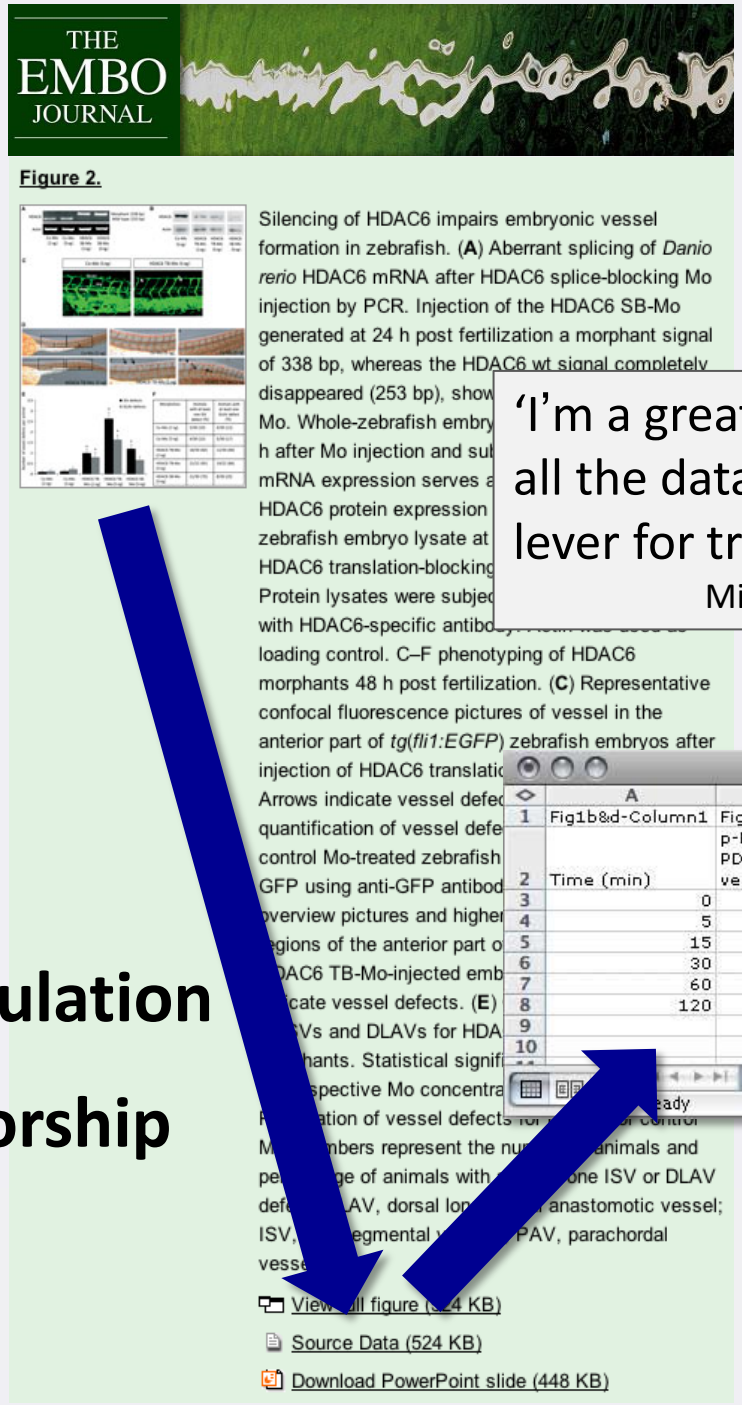
4	5	0.395173883	0.389974466	0.555355249
5	15	0.690917146	1.236910363	1.632582883
6	30	0.394324884	0.72081196	1.488299981
7	60	0.38782972	0.38107614	0.428561181
8		0.384442827	0.216360469	0.458929493
9				
10				

Source Data

- **Archive**
- **Transparency**
- **Replicates**
- **Reanalysis**
- **Reuse**
- **Discourage manipulation**
- **Figure Level Authorship**



SOURCE DATA

‘I’m a great believer in seeing all the data – this is an important lever for transparency‘

Michael Farthing, founder COPE

Fig1b&d_raw.txt

	A	B	C	D
1	Fig1b&d-Column1	Fig1b&d-Column2A	Fig1b&d-Column2B	Fig1b&d-Column2C
2	Time (min)	p-Erk/t-Erk, 30 pM PDGF, control vector, Expt. 1	p-Erk/t-Erk, 30 pM PDGF, control vector, Expt. 2	p-Erk/t-Erk, 30 pM PDGF, control vector, Expt. 3
3	0	0.194672394	0.201524091	0.339116171
4	5	0.395173883	0.389974466	0.555355249
5	15	0.690917146	1.236910363	1.632582883
6	30	0.394324884	0.72081196	1.488299981
7	60	0.38782972	0.38107614	0.428561181
8	120	0.384442827	0.216360469	0.458929493
9				
10				

Fig1b&d_raw.txt

PUBLIC DOMAIN

Peer Review, Quality Control & Data Curation

What	Who
• Editorial Preselection	Scientific Editors
• Peer Review	Senior Investigators
• Technical Review	Postdocs
• Data Curation	Data Editors – Authoring tools
• Quality Control	Data Editors – Semi-automation
• Ethics (incl. referees)	Editors

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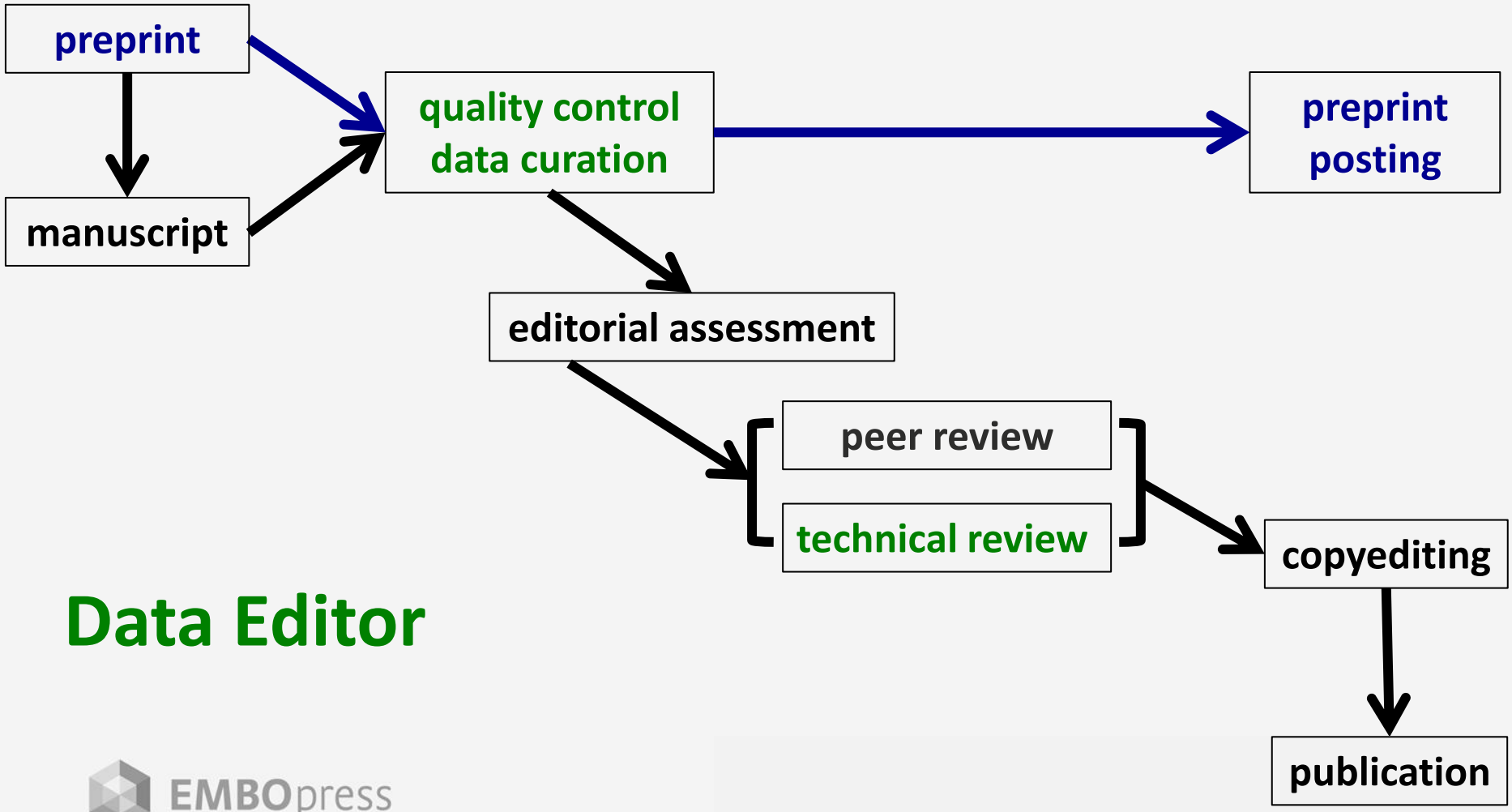
Prepublication Quality Control @ Journals: the final checkpoint



Data Editor

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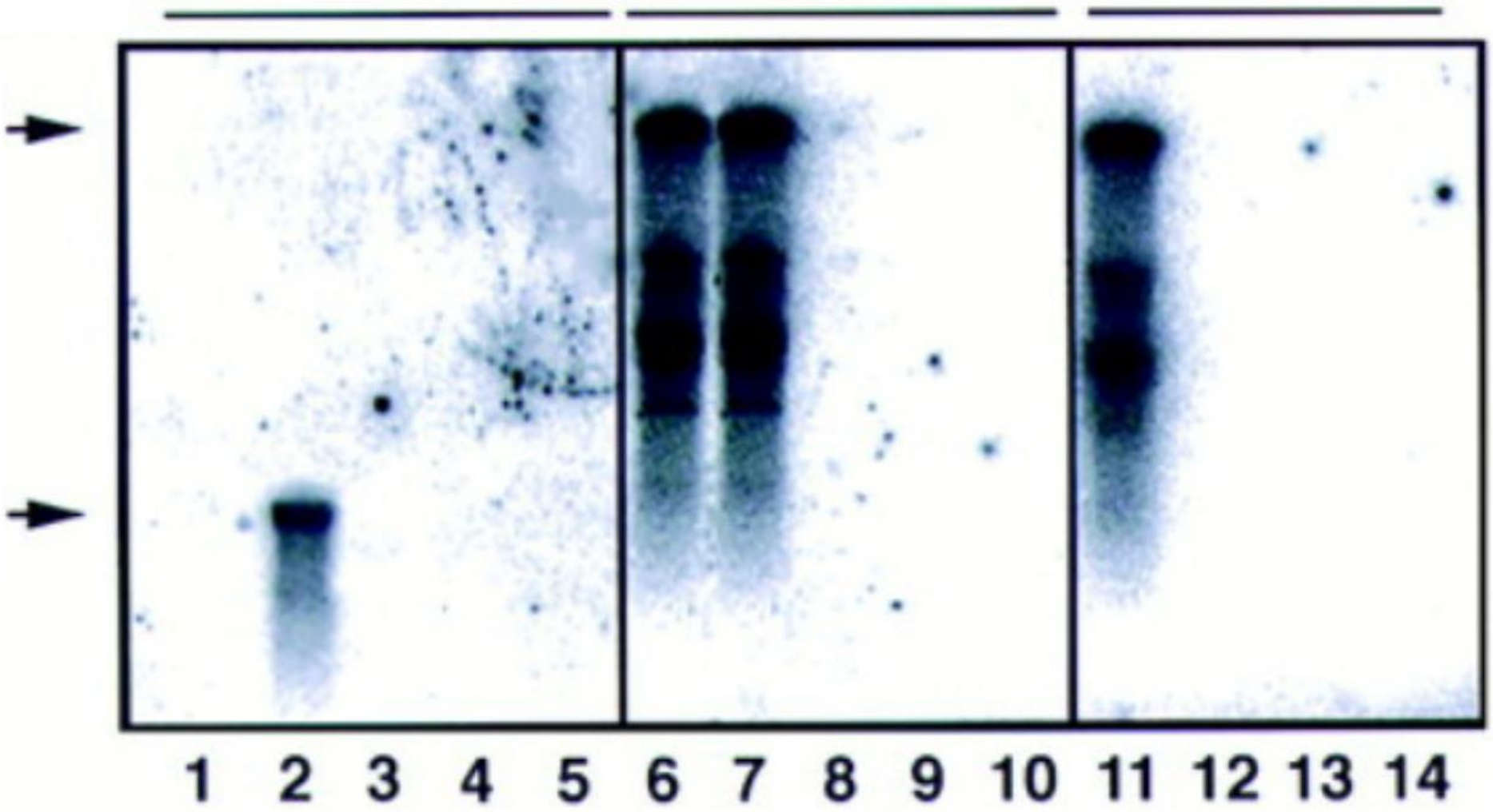
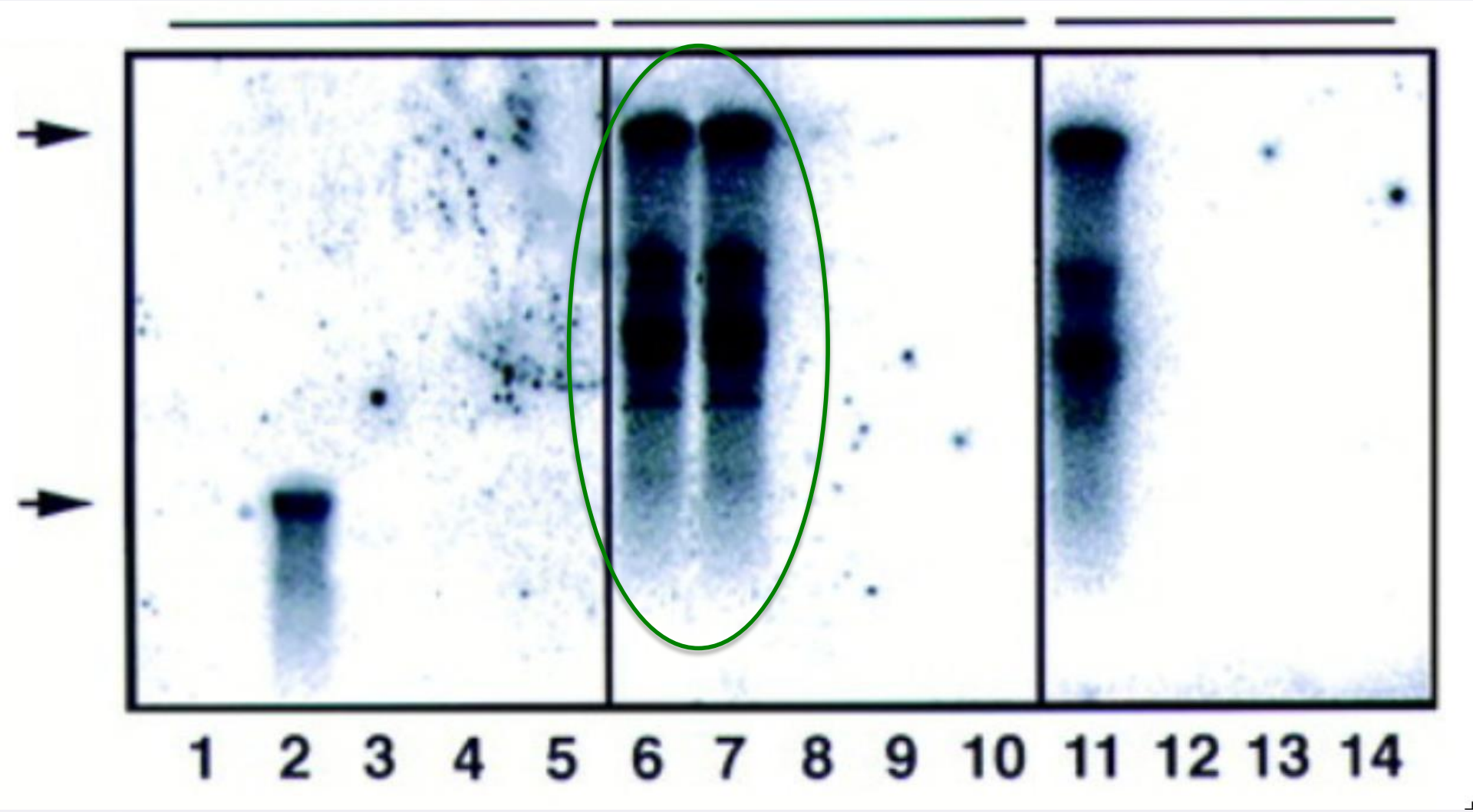
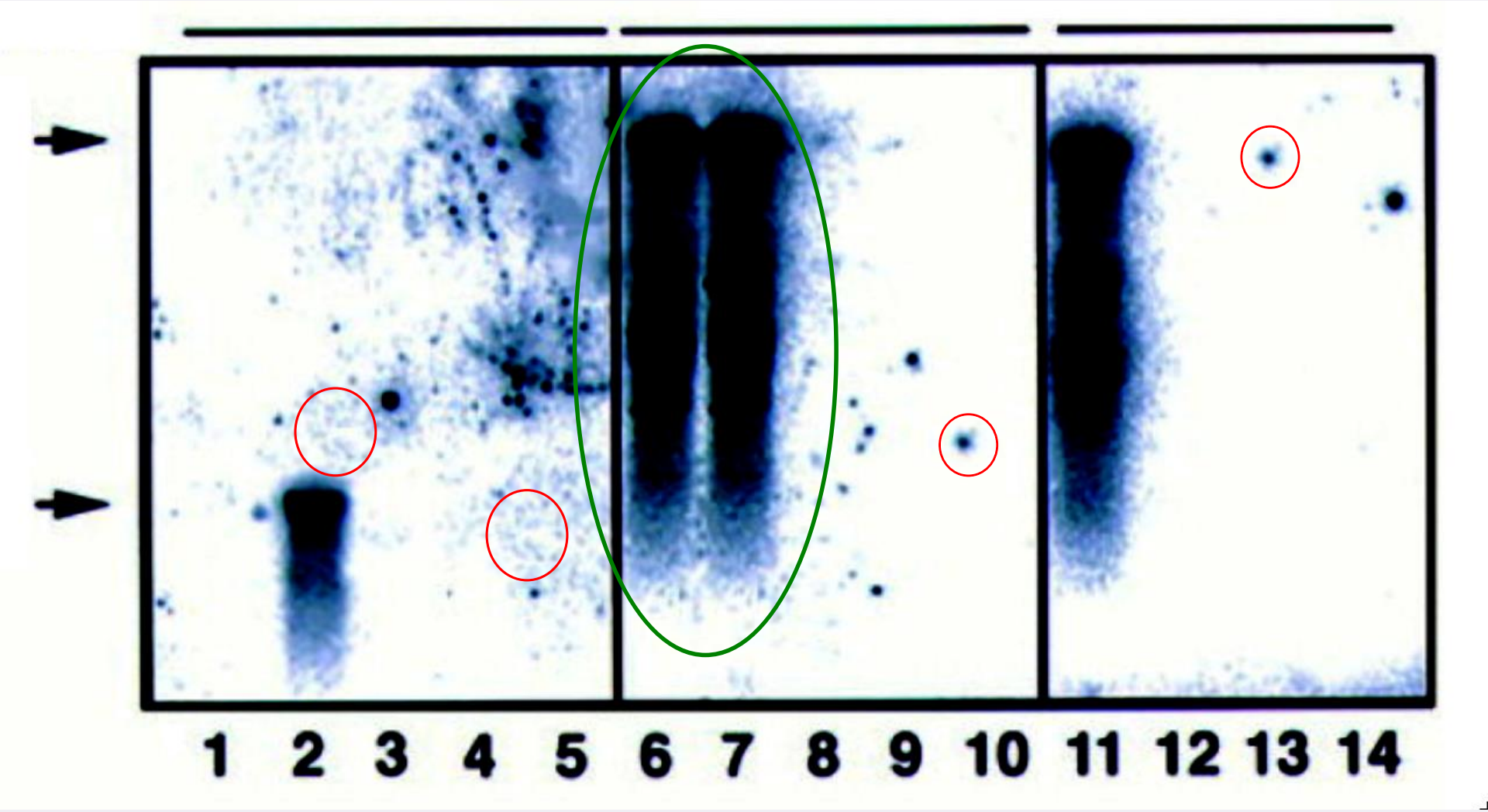
Beautification or Fraud?



Beautification or Fraud?



Fraud with intent



Standardization

Intra-Journal

EMBO classification	Image Manipulation	Action	%
I	cosmetic & mistakes; source data & convincing author explanation	Revision No report	12
II	beautification & undeclared manipulation that changes conclusions; source data or new data	May allow revision May report	8
III	Undeclared manipulation with obfuscation & intent; no explanation; no source data	Reject and Report	< 0.5%
Total			20.5

Standardization

- Intra-Journal
- **Cross-Journal**
- **Journal & Research Institution**

Responsibilities	Res. Institution	Funder	Journal
Quality Control	Yes	Yes	Yes
Reporting	Yes	Yes	Yes
Sanctions	Yes	Yes	No

EMBO CLUE workshop, 7-2016 http://biorxiv.org/content/early/2017/05/19/139170

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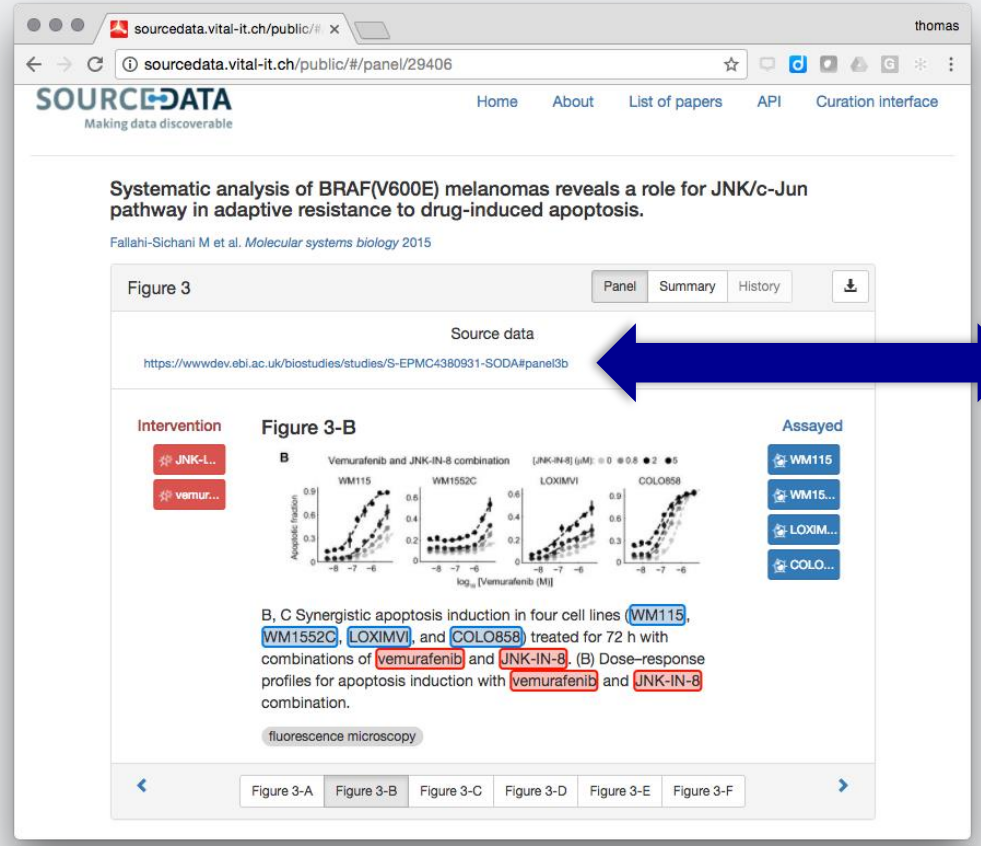
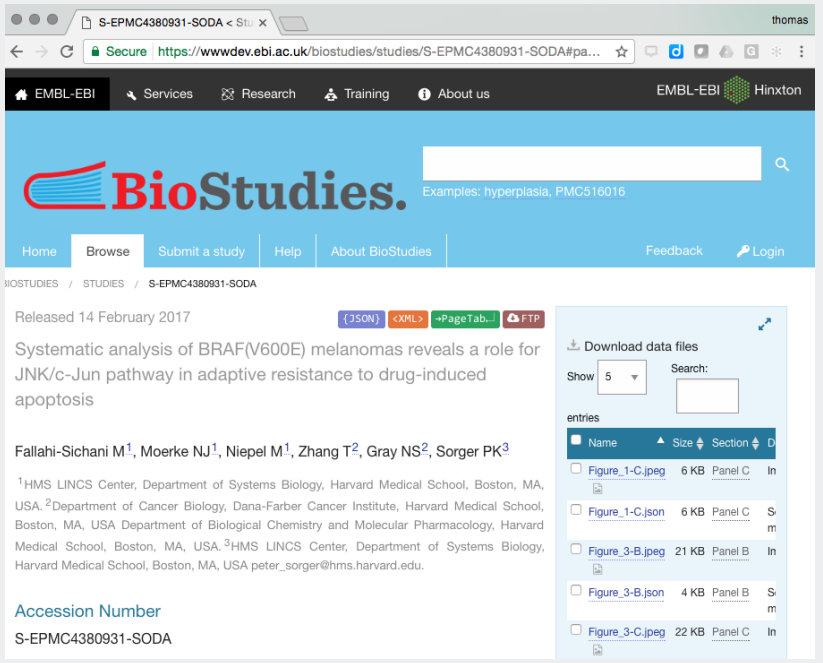
SourceData | Repositories





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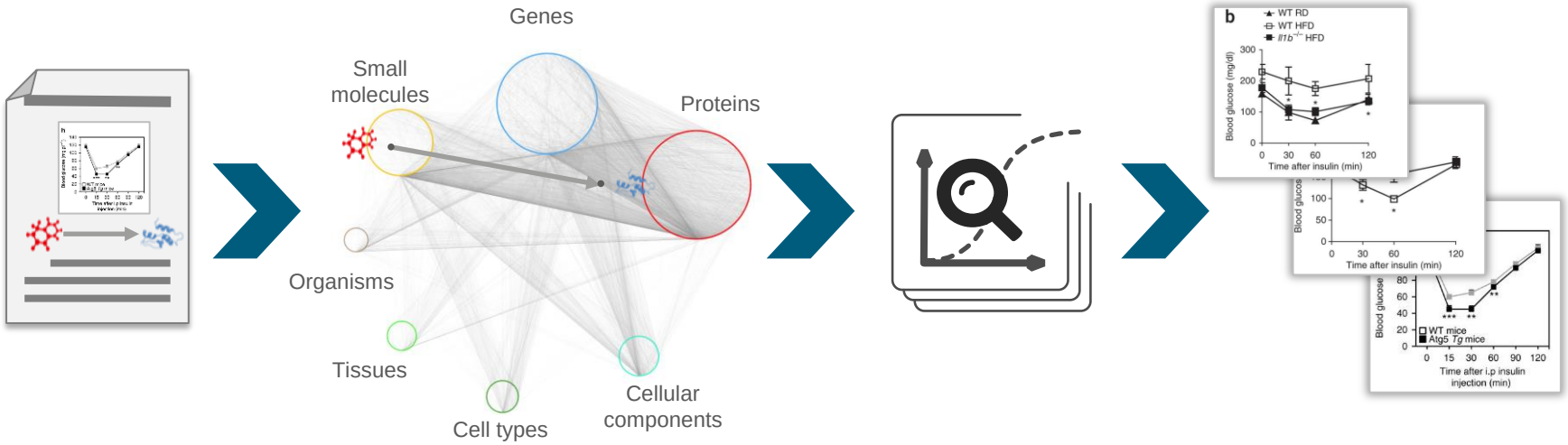
SOURCEDATA
Making data discoverable

EMBO

SOURCEDATA

sourcedata.embo.org: an open platform that makes papers discoverable based on the data shown in figures.



Data published in articles

Knowledge graph

Data-oriented search

Specific data

Connectivity to related findings = reliability

SOURCEDATA
Making data discoverable

EMBO

Enhanced Protocols

bio-protocol

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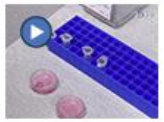
1585 Video Articles

1 2 3 4 5 6 7 8 9 ... 159 ›

JoVE Biology

JoVE Biology welcomes all general biology research methodologies. Content in this section canvases all fields of cell, molecular, and organismal biology, ranging from new applications of standard techniques to novel approaches aimed at understanding the functions of life and living organisms. This diverse section includes, but is not limited to, techniques in physical biology, cellular biochemistry, genetics, physiology, systems biology and a combination of eukaryotic and prokaryotic model systems.

Imaging the Intracellular Trafficking of APP with Photoactivatable GFP



Joshua H. K. Tam[1], Stephen H. Pasternak[1,2]

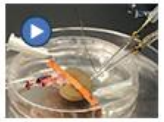
[1]Department of Physiology and Pharmacology, Robarts Research Institute, **Western University**, [2]Department of Clinical Neurological Sciences, **Western University**

A Screenable *In Vivo* Assay for Mitochondrial Modulators Using Transgenic Bioluminescent *Caenorhabditis elegans*

Cristina Lagido[1], Debbie McLaggan[1], L. Anne Glover[1]

[1]Institute of Medical Sciences, **University of Aberdeen**

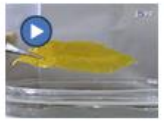
Use of Enzymatic Biosensors to Quantify Endogenous ATP or H_2O_2 in the Kidney



Oleg Palygin[1], Vladislav Levchenko[1], Louise C. Evans[1], Gregory Blass[1], Allen W. Cowley Jr.[1], Alexander Staruschenko[1]

[1]Department of Physiology, **Medical College of Wisconsin**

Relating Stomatal Conductance to Leaf Functional Traits



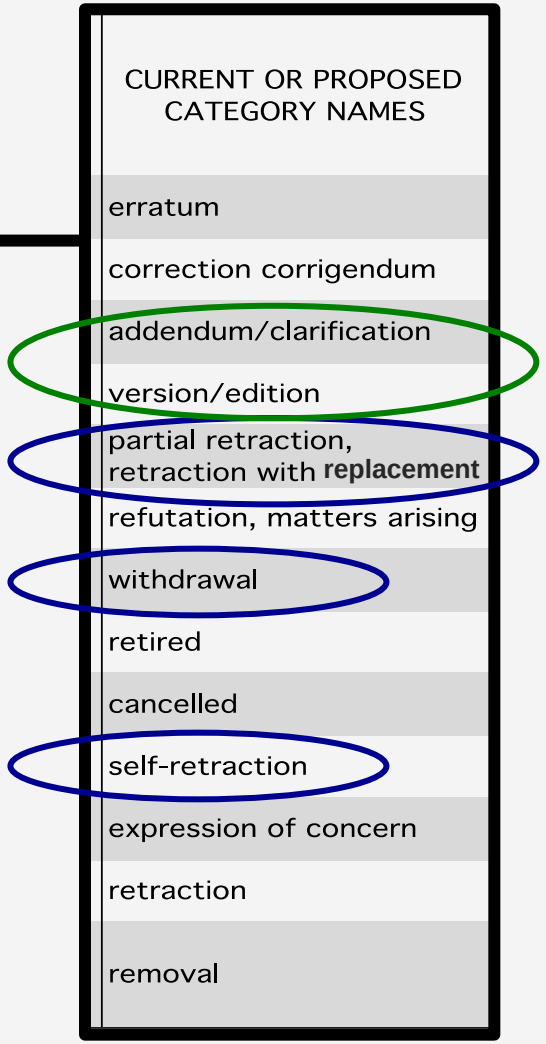
Wenzel Kröber[1], Isa Plath[1], Heike Heklau[1], Helge Bruelheide[1,2]

[1]Institute of Biology / Geobotany and Botanical Garden, **Martin-Luther-University Halle-Wittenberg**, [2]**German Centre for Integrative Biodiversity Research**

Beyond retractions:

Self correction

- **Stanford METRICS workshop, 12-2016**
- **Versioning**



Fanelli D. et al.,

Research Assessment: Beyond high impact papers

- *High quality*, *important* data beyond JIF & journal name
- Other contributions: peer review, research support, training

San Francisco DORA
Declaration on Research Assessment

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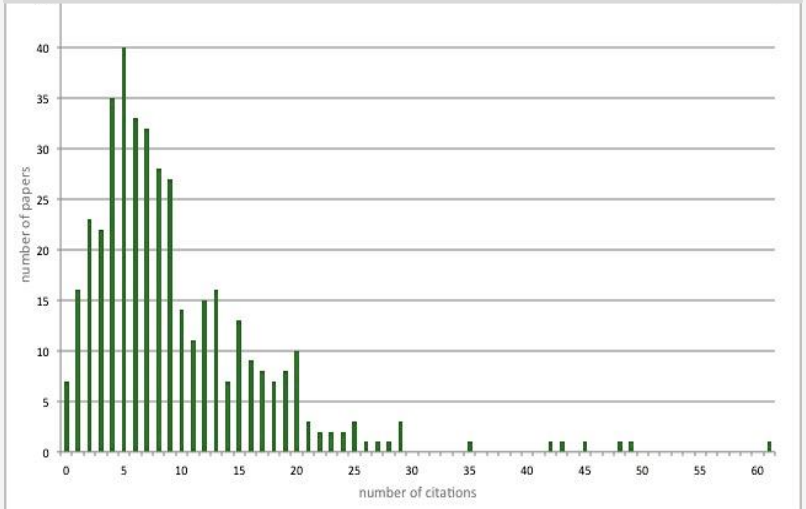
Depressurizing Publishing

- ‘Wean off’ Journal Impact Factor; use any metrics with care
- Manuscript transfers
- Preprints
- ‘Scooping Protection’ starting @ preprint posting

2015 Citation Distribution The EMBO Journal



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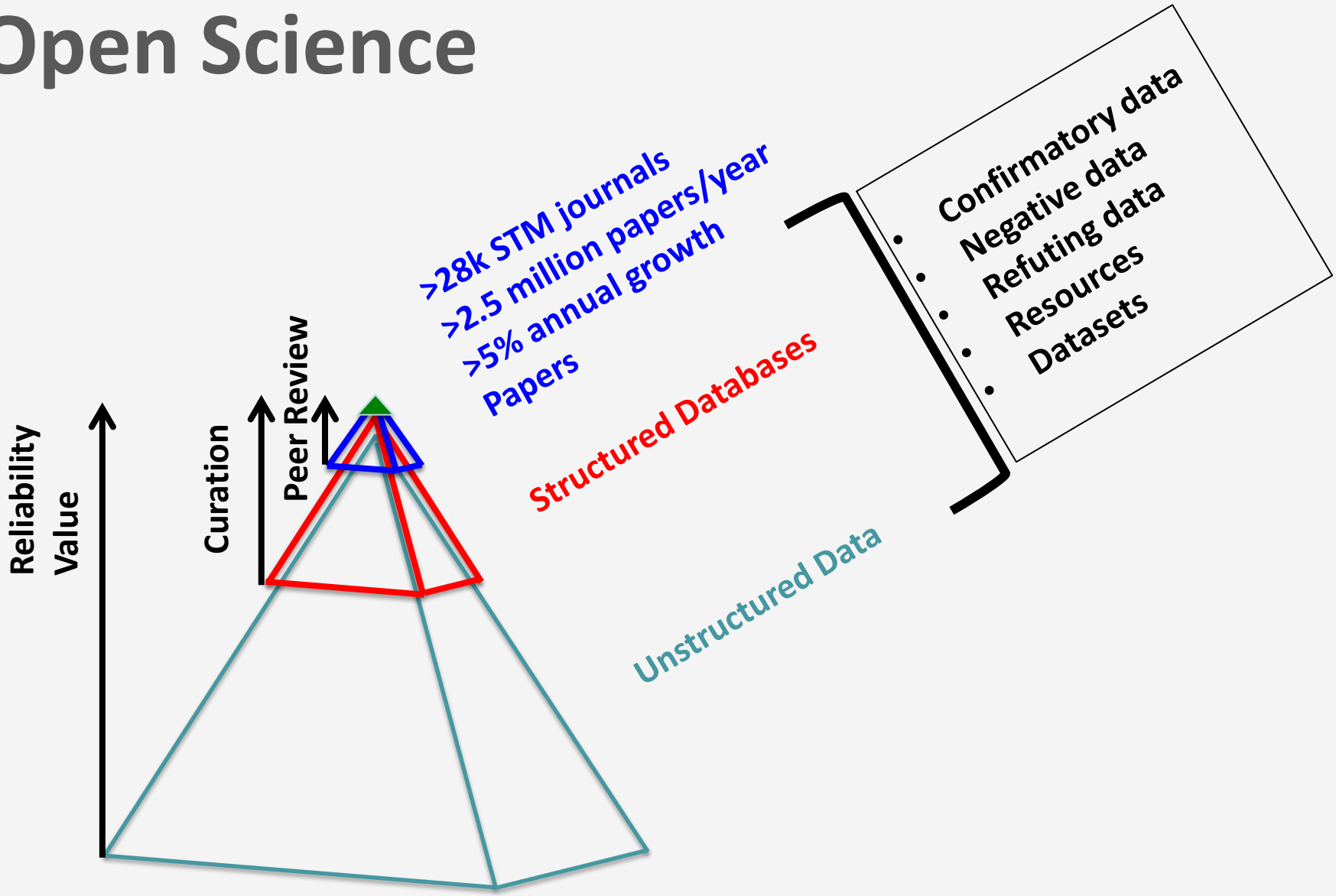
Open Science



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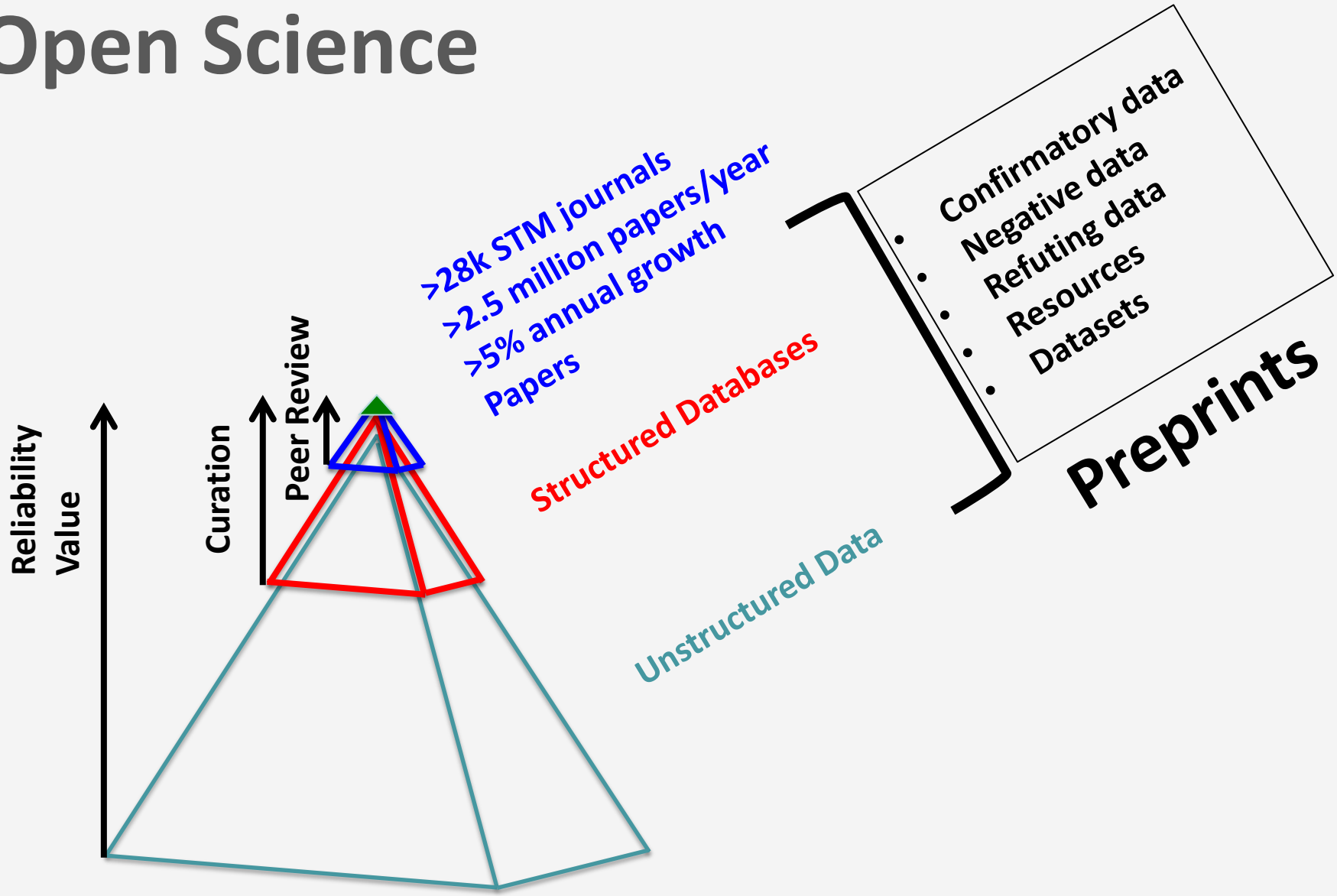
Open Science



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Journals  Preprints

bioRxiv Submission

* Post a preprint to bioRxiv

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- ○ Yes, please post a preprint of this submission to bioRxiv on my behalf
- ◉ No, I do not want to post a preprint to bioRxiv at this time.

Preprint & Data citation

- Huang J, Brown AF, Lei M (2012). Crystal structure of the TRBD domain of TERT and the CR4/5 of TR. Protein Data Bank 4O26 **[DATASET]** **Datalink**
- Smith et al (2017). This is interesting. BioRxiv doi:12345786/12773.00 **[PREPRINT]** **CrossRef PubMed Google Scholar**

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Training (authors & referees)

EDITORIAL

nature cell biology

Appreciating data: warts, wrinkles and all

In the glitzy world of Hollywood and Bollywood, each year sees the development of more extravagant digital special effects. Many productions have long since broken the constraints imposed by physics and biology and although the superhuman feats of modern

We hope these guidelines will aid the publication of more informative datasets. Importantly, we reemphasize that neither the referees nor the editors are the data-police (see also *Nature Cell Biology*, **8,** 101 (2006)). Senior investigators and corresponding authors are responsible for assuring that data submitted for publication represents the experimental results accurately and fairly. We suggest that they are also responsible for ensuring that their students are educated in appropriate scientific conduct.

2006; doi:10.1038/ncb0306-203a

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Journals are not Data Police

http://undsci.berkeley.edu/article/socialsideofscience_06

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