eLife – Towards open communication in science

Open Access Ambassadors
Harnack House, Berlin
December 11, 2019

Mark Patterson
Executive Director, eLife
Genomics circa 1985

• 6 months to generate the data
• A train journey to the database
Economic Impact of the Human Genome Project

How a $3.8 billion investment drove $796 billion in economic impact, created 310,000 jobs and launched the genomic revolution

Prepared by Battelle Technology Partnership Practice
May 2011
What journal?
What journal?

What impact factor?
What journal?

What impact factor?
“Not only are we failing to provide the right incentives, we are actually providing perverse incentives.”
The origins of eLife
Publish great research
Run by scientists
Innovate and experiment
Creativity, imagination, and doing the experiments. That’s what eLife is all about.

Sir Mark Walport, eLife board of directors
Helping scientists accelerate discovery by operating a platform for research communication that encourages and recognises the most responsible behaviours in science.
Our work is divided into 3 complementary areas, supported by the necessary financial and operational infrastructure.
Publishing
Editorial process

Full submission

Assign to Reviewing Editor

Peer review

Consultation amongst reviewers

Decision after peer review

Single set of instructions

Revision assessed by BRE

Limit rounds of revision

Randy Schekman
Founding Editor-in-Chief
Decision letter

K VijayRaghavan
Reviewing Editor; National Centre for Biological Sciences, Tata Institute of Fundamental Research, India

In the interests of transparency, eLife includes the editorial decision letter and accompanying author responses. A lightly edited version of the letter sent to the authors after peer review is shown, indicating the most substantial changes are not usually included.

Thank you for submitting your article "Ubiquitination-independent signalling by Delta" for consideration by eLife. Your article was discussed by peer reviewers, and the evaluation has been overseen by an Editor and Reviewing Editor. The following individual has agreed to reveal his identity: Alfonso Montilla, Reviewing Editor.

The reviewers have discussed the reviews with one another, and the Senior Editor drafted this decision to help you prepare a revised submission. The reviewers are very positive about your paper and are sure you will be able to address their comments speedily.

Summary:

The mechanism of Notch signalling, specifically the mechanism by which it is activated, is a matter of debate. One of the reasons for this is a lack of understanding of how Delta is translocated to the membrane and how it interacts with Notch. Genetic studies suggest that Delta is not ubiquitination-dependent, which is contradictory. We suggest that Delta is ubiquitination-dependent on the plasma membrane, and we observe in vitro that Delta is ubiquitinated, which is also contradictory. We have, therefore, conducted various experiments to determine whether Delta is ubiquitination-dependent or not.

Essential revisions:

1) It should be made clear in the Abstract and in the Discussion that there are two modes of ubi-independent Notch activation ((1) and (2) above). The first part of the manuscript (Figure 1–5) deals with mode (1), and the second part of the manuscript (Figures 7–9) deals with the second mode.

We have re-written the manuscript and made it clear that two modes operate.

2) The authors brought evidence that Neur-dependent, ubi-independent Notch signaling (mode 2) occurs in endogenous situations. Is there evidence for endogenous situations where Notch signaling occurs in the absence of both Neur and Mbi (mode 1)?

We found that SnIgS (S9) of the Notch reporter Cbe::SalI and the stripe-like expression domain of E(sp{l}) are induced in this mode. We have now added experiments that the S9 is independent of Neur by inducing Neur clones in mbi mutants! The results are described in the section termed "A domain of Di/Notch signalling that is independent of Mbi and Neur". Unfortunately we do not know what structure arises from this region or what process is running in this region.

3) The Neur dependent ubi-independent mode is quite intriguing. It suggests that the physical binding of Neur, and not its catalytic activity, is somehow sufficient for DSL activation. Can the author discuss/utilize potential mechanisms for that?

Yes, we have included some speculation in the Discussion that Neur might act as a adapter connecting DI to the endocytic machinery. Alternatively, but mutually exclusive, Neur might act as a negative regulator of DI as proposed by B{\textdegree}et{\textdegree}e et al.
eLife by numbers

• 700-800 submissions per month
• 120 publications per month
• 60 Senior Editors
• 450 Reviewing Editors
Open letter on the publication of peer review reports

On February 7-9, 2018, editors, publisher, funders, and researchers gathered at HHMI Headquarters in Chevy Chase, MD to discuss innovations in peer review. A clear majority of participants at the meeting agreed that publishing peer review reports (i.e., the contents of peer review, whether anonymized or not), would benefit the research community by increasing transparency of the assessment process. These benefits include 1) increased reviewer and editorial accountability; 2) training opportunities to educate students about the peer review process; 3) enhancing readers' understanding of the article in the context of the field; and 4) a pathway to providing credit for peer review. Evidence suggests that publishing peer review reports does not change the quality of reviewers' assessment. FAQ about publishing peer reviews can be found here.

Letter

We, the undersigned journals, recognize the benefits of transparency in the peer review process. Therefore, we enable or undertake to enable the publication of all of the content of peer review, but not necessarily the names of reviewers (this is also called open peer review reports) and author responses alongside final, published articles.

We recognize that implementations of published peer review reports may vary—with some journals mandating it for all published articles, while others may offer authors an opt-in or opt-out option—

#PublishPeerReview

Jeffrey Spies 26 Sep
But you should still #PublishPeerReview as @jessicapolka says. ;)

Jessica Polka 26 Sep
If you're worried about predatory publishing, just #PublishPeerReview.
Trialling a different approach to peer review

A proposal for the future of scientific publishing, PLOS Biology, 2019
Erin O’Shea, Bodo Stern
Motivations for the trial

- Remove the gatekeeping function of peer review
- Reduce wasted effort in resubmission and re-review
- Encourage evaluation of the article based on its merits (rather than the journal)
Key findings

- The appetite for experimentation
- Editors were more selective at the initial decision
- Unclear how to summarise the results of peer review (positive or more critical)
Next steps

- Summarise reasons for publication
- Preprint review

https://elifesciences.org/inside-elife/e9091cea-peer-review-new-initiatives-to-enhance-the-value-of-elife-s-process
Preprints

Data from: Sever et al, 2019, bioRxiv: the preprint server for biology
https://doi.org/10.1101/833400
Preprint review

Post preprint

Submit to eLife

Peer review

Publication in eLife

Bypass initial decision

Peer reviews posted on preprint

Subject to usual standards
Dear Colleagues:

I am continuing to think about more effective use of electronic methods for disseminating the results of biomedical research, and am actively seeking additional views and hoping to stimulate wider discourse on the matter. I hope you will read this latest draft of a proposal for a new system for electronic publishing and send me any comments at the e-mail address given above. We will be posting the responses for others to read as well. The draft below was written by me, with active assistance from David Lipman, Director of the National Center for Biotechnology Information (NLM/NIH) and Pat Brown, Stanford University, and with the assistance of several others. — Harold Varmus

May 5, 1999 (DRAFT)
and June 20, 1999 (ADDENDUM)

E-BIOMED:

A Proposal for Electronic Publications in the Biomedical Sciences

Contents

Prologue

A proposal for E-biomed
Inherent and prospective benefits of E-biomed
How do we guarantee equity in the new system?
How should E-biomed get started?
Summary
Addendum

Prologue

Electronic communication is making dramatic changes in the way information is exchanged among scientists, including biomedical scientists. Over the past decade, steadily increasing numbers of scientists on all continents have abandoned traditional mail and faxes in favor of electronic mail. Many log-on to GenBank and many other data repositories on a nearly daily basis. The titles and abstracts of papers published in most scientific journals are available "on line" from the date of publication and sometimes even before; some full texts can be accessed electronically and downloaded, with or without subscription fees; and convenient, freely accessible resources, such as PubMed (http://www.ncbi.nlm.nih.gov/PubMed), provide powerful engines for searching the biomedical literature. In at least one field, physics, preprints are made freely available electronically to interested readers, through a server called "e-print" (http://xxx.lanl.gov). In other fields, including biology, biotechnology, and chemistry, in the World Wide Web pages that offer their colleagues detailed...
Our Publishing Processes

For Articles

Article Submission → Publication & Data Deposition → Open Peer Review & User Commenting → Article Revision

7 days average time to publication
Funders and institutions are running channels on F1000 infrastructure.
Technology
“Everything we have gained by opening content and data will be under threat if we allow the enclosure of scholarly infrastructures.”

https://cameronneylon.net/blog/principles-for-open-scholarly-infrastructures/

Community-driven publishing technology.

The Collaborative Knowledge Foundation (Coko) builds modular, open source publishing software using collaborative development to ensure the technology underlying research communication enables innovation and rapid publishing.
Introducing the Libero publishing suite

Designed for academic publishing of the digital age, Libero is an open-source platform of services and tools available for hosted and self-hosted applications.

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NEWS

eLife introduces first demonstration of the open-source publishing platform Libero Publisher

Read more
Introduction

Replication Study: Transcriptional amplification in tumor cells with elevated c-Myc

L Michelle Lewis, Meredith C Edwards, Zachary R Meyers, C Conover Talbot Jr, Haiping Hao, David Blum, Reproducibility Project: Cancer Biology

As part of the Reproducibility Project: Cancer Biology, we published a Registered Report (Blum et al., 2015), that described how we intended to replicate selected experiments from the paper ‘Transcriptional amplification in tumor cells with elevated c-Myc’ (Lin et al., 2012). Here we report the results. We found overexpression of c-Myc increased total levels of RNA in P493-6 Burkitt’s lymphoma cells; however, the effect was in the same direction as the original study (Figure 3E; Lin et al., 2012), statistical significance and the size of the effect varied between the original study and the two different lots of serum tested in this replication. Digital gene expression analysis for a set of genes was also performed on P493-6 cells before and after c-Myc overexpression. Transcripts from genes that were active before c-Myc induction increased in expression following c-Myc overexpression, similar to the original study (Figure 3F; Lin et al., 2012). Transcripts from genes that were silent before c-Myc induction also increased in expression following c-Myc overexpression, while the original study concluded elevated c-Myc had no effect on silent genes (Figure 3F; Lin et al., 2012). Treating the data as paired, we found a statistically significant increase in gene expression for both active and silent genes upon c-Myc induction, with the change in gene expression greater for active genes compared to silent genes. Finally, we report meta-analyses for each result.

NOTE: This is a demonstration of a reproducible view of an existing eLife article. You can inspect the code that was used to generate the figures, make changes and re-run the code. For technical reasons the article differs slightly from the original article. The reference list is missing, references are external links and figure supplements are missing.

Introduction

The Reproducibility Project: Cancer Biology (RP:CB) is a collaboration between the Center for Open Science and Science Exchange that seeks to address concerns about reproducibility in scientific research by conducting replications of selected experiments from a number of
Total RNA levels following c-Myc overexpression

We sought to independently replicate whether increased levels of c-Myc resulted in increased absolute levels of RNA. This experiment is similar to what was reported in Figure 3E of Lin et al. (2012) and used the same extraction method for total RNA quantification, which was described in Protocol 2 in the Registered Report (Blum et al., 2013). Total RNA was isolated from P493-6 cells 0, 1, and 24 hr after tetracycline release and the amount of RNA per 1,000 cells was measured using a spectrophotometer.
**This is a Reproducible document. See the adapted article or course.**

### Introduction

Conditional expression of c-Myc in the B-cell line PA93-6

Total RNA levels following c-Myc overexpression

Digital gene expression following c-Myc overexpression

Meta-analysis of original and replicated experiments

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### Results and discussion

Planned contrast between 0 hr and 24 hr; (t6) = 1.02, p = 0.347 with a priori alpha level = 0.05.

For serum lot one, one-way ANOVA on total RNA levels of all groups: F(2, 6) = 1.25, p = 0.383. Planned contrast between 0 and 24 hr; (t6) = 5.03, p = 0.0024 with a priori alpha level = 0.05.

### Additional details

For this experiment, see [https://elifesci.org/Nf9](https://elifesci.org/Nf9).

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### B Script

```r
library(GenomicDatum)
library(ggplot2)
library(cowplot)

#names row data from protocol 2 from csv file
data2 <- read.csv("article/Study_4B_Protocol_2_Data.csv", header=T, sep=";")

#creates new column calculating RNA in 100uL
data2$RNA_100uL <- data2$Average_RNA.Concentration*100

#calculate total RNA per cell
data2$RNA_per_cell <- data2$RNA_100uL/data2$Total.Cells.Harvested

#calculate RNA per 1000 cells
data2$RNAvalue <- data2$RNA_per_cell*1000

#classifies time as character
data2$Time <- as.character(data2$Time)

#subsets and summarizes Data

subset_data on lot 1
subset1 <- data2[which(data2$Lot == "1"),]

subset_data on lot 2
subset2 <- data2[which(data2$Lot == "2"),]

#summarizes lot 1 data
lot1mean <- summary(data=subset1, measurevar = "value", groupvars = "Time")

#summarizes lot 2 data
lot2mean <- summary(data=subset2, measurevar = "value", groupvars = "Time")

plot.lot1 <- ggplot(lot1mean, aes(x=Time, y=lot1mean$value, fill=Time)) +
geom_bar(stat="identity", width=1, color="black") +
geom_errorbar(aes(x=Time, ymin=lot1mean$lower, ymax=lot1mean$upper),
width=0.2)

plot.lot2 <- ggplot(lot2mean, aes(x=Time, y=lot2mean$value, fill=Time)) +
geom_bar(stat="identity", width=1, color="black") +
geom_errorbar(aes(x=Time, ymin=lot2mean$lower, ymax=lot2mean$upper),
width=0.2)

plot.year <- plot.show(plot.lot1, plot.lot2)
```

---

### Download

For more details, see [https://elifesci.org/reprodoc](https://elifesci.org/reprodoc).
Pioneering ‘live-code’ article allows scientists to play with each other’s results

eLife’s prototype lets scientists modify the software underlying figures to validate, build on, or better understand the work.

Jeffrey M. Perkel

Introducing eLife’s first computationally reproducible article

Blending the traditional manuscript with live code, data and interactive figures, we showcase a new way for researchers to tell their full story.

repro.eelifesciences.org/example.html#

The new reproducible article by @eLife is an amazing advancement in scientific transparency! You can see the R code used to generate figures and play with them directly through the article. Should become the new gold standard. See for yourself here: repro.eelifesciences.org/example.html#

1:33 AM - 21 Feb 2019

Hopefully this new initiative will bring an end to statements like “XYZ was processed using an in-house Python/R/Matlab script”. #reproducibility is the key for good practice of science. Thank you @eLife
The digital medium could lead to a very different ecosystem
Research Culture
What journal?

What impact factor?
Time to get an ORCID

- ORCIDs are unique IDs for authors
- ORCID profiles are updated automatically
- Publishers like eLife deposit ORCIDs along with article metadata
• San Francisco Declaration on Research Assessment
• Recommendations for publishers, funders, institutions and researchers
• 14,000 individuals and 1300 organizations have signed the declaration
• Gathering examples of good practice
"The Department of Psychology puts a high value on transparent and replicable research and supports these goals through open data, open materials, and preregistration. Because of this, applicants are asked to describe in their application in which ways they have already achieved these goals and how they plan to do so in the future."

Thanks to Corina Logan Cambridge University, UK
Science Without Publication Paywalls
a Preamble to:

**cOAlition S for the Realisation of Full and Immediate Open Access**

We also understand that researchers may be driven to do so by a misdirected reward system which puts emphasis on the wrong indicators (e.g. journal impact factor). We therefore commit to fundamentally revise the incentive and reward system of science, using the San Francisco Declaration on Research Assessment (DORA)⁴ as a starting point.
“If you want to fix something you are first obliged to understand... the whole system.”

Lewis Thomas
Funding, jobs, promotion, colleagues

Succeed

Researcher with an established reputation

Struggle

Researcher (eg ECR) without reputation
Researcher with an established reputation

Funding, jobs, promotion, colleagues

Succeed

Struggle

Researcher (eg ECR) without reputation

A pattern in systems analysis known as “success to the successful”
Researcher with an established reputation

Funding, jobs, promotion, colleagues

Panels, committees, ed boards

Succeed

Struggle

Researcher (eg ECR) without reputation

A pattern in systems analysis known as “success to the successful”
A pattern in systems analysis known as “success to the successful”

- Funding, jobs, promotion, colleagues
- Panels, committees, ed boards
- Succeed
- Struggle
- Researcher with an established reputation
  - Succeed in publishing
  - High-prestige journals
- Researcher (eg ECR) without reputation
  - Intense pressure, but harder to publish

A pattern in systems analysis known as “success to the successful”

- Funding, jobs, promotion, colleagues
  - Panels, committees, ed boards
  - Researcher with an established reputation
    - No time, use prestige journals as proxy
  - Succeed
  - Struggle
  - Researcher (eg ECR) without reputation
    - Intense pressure, but harder to publish
    - Succeed in publishing
  - High-prestige journals
A pattern in systems analysis known as “success to the successful”

Researcher with an established reputation

- Panels, committees, ed boards
- No time, use prestige journals as proxy
- Succeed

High-prestige journals

- Successful business
- Promote brand, JIF

Researcher (eg ECR) without reputation

- Struggle
- Intense pressure, but harder to publish

Publisher

- Funding, jobs, promotion, colleagues

Succeed in publishing
A pattern in systems analysis known as “success to the successful”

Funding, jobs, promotion, colleagues

Panels, committees, ed boards
Succeed
Succeed in publishing
No time, use prestige journals as proxy

High-prestige journals
Successful business
Promote brand, JIF

Publishers

Researcher with an established reputation

Researcher (eg ECR) without reputation

Struggle
Intense pressure, but harder to publish
Early-Career Researchers: Governance

- The early-career advisory group appointed to provide input on policy and practice at eLife
- Prachee Avasthi appointed to eLife Board of Directors in 2018
Early-Career Researchers: Editorial Role

- Early-career reviewer pool – recommendations from editors
- Expanding the pool in specific areas
- Increasing ECR representation in the Board of Reviewing Editors

eLife latest: An opportunity to review papers in Genomics and Evolutionary Biology

eLife invites early-career researchers to join the Genomics and Evolutionary Biology reviewer pool.

The community behind eLife is keenly aware of the challenges faced by early-career researchers and we are committed to providing opportunities to address them. One issue that is frequently raised is the need for experience in the peer review process.

Choosing to involve early-career researchers in refereeing manuscripts has many advantages. They are often active in research or have only recently transitioned to a desk role. This means they can sometimes be better placed than some senior colleagues to comment on technical details of papers, with greater appreciation of the challenges involved, and the ability to provide valuable insights into the pitfalls of analyses.

In addition, with the growth in research output over the last couple of decades, the burden of reviewing is becoming a serious issue for established academics who are already stretched by the demands on their time. This can lead to difficulties in identifying suitable, willing reviewers to handle manuscripts. The result is delays for authors and occasionally reports which fall below the expected quality. Calling on more early-career researchers may ease pressure in the system.

In 2016 we introduced an early-career reviewer pool to provide increased opportunities for researchers in the earlier stages of their careers, and a means of
Early-Career Researchers: Other initiatives

- Publishing content about ECR issues (Scientist and Parent)
- Regular interviews with early-career researchers
- Ambassador programme
- #ECRwednesday webinars
Publish or perish
Share and shine
In summary...

- Understand the research enterprise as a system
- Reform of incentives is essential
- Expect more experimentation and change
- Increase early-career representation

**Actions**
- Get an ORCID
- Explore and experiment with open practices: preprints, data, protocols
- Advocate for change

Thank you

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