ECRONICON OPEN ACCESS

CANCER
Editorial

The Future of Publishing Scientific Data: Is it Time to Accept the Wider Publication of Null Data?

Barbara Guinn*

Reader in Biochemistry and Cell Biology, University of Bedfordshire, United Kingdom

***Corresponding Author:** Barbara Guinn, Reader in Biochemistry and Cell Biology, University of Bedfordshire, United Kingdom.

Received: December 17, 2014; **Published:** December 22, 2014

One of the most self-limiting dogmas' which scientists submit themselves to is the avoidance of publishing negative data. This is well represented by a recent study in the social sciences [1] which examined 250 peer-reviewed survey based proposals on nationally representative adult samples. They found that 56 of 91 studies with strongly significant results were published while only 10 out of 48 null results were published. This reflected the fact that authors do not write up and submit null data. We know that bioscience undergraduate students often worry that if their lab practical doesn't work they will be marked down on their assignment-indicating that the belief that negative data is less valuable than positive data is instilled in young scientists from an early stage in their careers, prior even to going to University. Perhaps our Universities need to demonstrate that negative data can be just as valuable as positive data, just as informative, just as well presented, just as easy to assess in peer-reviewed publications and that negative data needs to be represented in the Life Sciences following the same high standard of controlled, reproducible experiments as positive data.

The avoidance of publishing negative data (by authors and journals) ensures we only show experiments that worked and represent a clear story of success. Some unsuccessful experiments can be sneaked into publications as "(data not shown)" but predominantly they are never mentioned and the research community remains ignorant of their existence. However the publication of biologically relevant negative data could save researchers and funders a lot of time and money. Only publishing the best figure or indeed not showing what we tried and know doesn't work, means only a small handful of people know that the work described in a graduate students proposal, in a grant application or which some poor soul in the lab is about to embark on as a project is likely to be fruitless. Work that then wastes the limited money currently available for research from the government and charities, and time which could be spent more productively, moving the field forward more rapidly. In my mind one of the worst effects caused of our failure to share our experiences of negative data generating experiments is that it can lead to unnecessary roll-of-the-dice career failures.

But how should the science community publish negative data-in *"Journals of Negative Data",* short reports or where possible added in with positive data? Perhaps journals could accept well-presented and clearly described negative data and judge it in the same way reviewer's judge positive data. One option would be to include negative data in manuscripts, through a section on experimental plan development in which experiments which failed are included with the materials and methods or as a separate section before the results. Methodological journals could include methods that don't work perhaps in the format of mini-reports with independent spaces for comments and feedback from other scientists. That way members of the science community can comment whether they had the same experience or state if they know why positive data generation had failed in this set of experiments-perhaps due to use of the wrong (combination of) reagents or a little known feature of the model chosen. This would be an opportunity for the science community to produce a teaching forum aimed at lab-based early career scientists.

Citation: Barbara Guinn. "The Future of Publishing Scientific Data: Is it Time to Accept the Wider Publication of Null Data?" *EC Cancer* 1.1 (2014): 1-2.

But do we run the risk of advertising that some products on the market work and others do not? This type of information could save scientists time and money but could it be viewed as slander or indeed take a more sinister turn if scientists vent their frustration with a company or product? The information would only be as good as the person writing it, and trolls could be an issue, but one option would be to allow reports of negative data and subsequent comments to be rated. The down side is the lesser known methods and niche work would be rated less often-something we see already with journal impact factors and citations of studies on less frequently occurring diseases. But such information on negative data could save the research community a lot of time and effort currently wasted repeating experiments which other groups have already tried and failed.

The Open Access *Journal of Negative Results in BioMedicine* offers one such avenue in which negative results can be published. But how does the scientific community embrace such public displays of what might be seen as "failure" and do we really find it acceptable? *The Journal of Negative Results in BioMedicine* started in 2002 and offers an opportunity to publish clinical trials that fall short of showing a benefit to patients or controversial results which refute a current model and because of its online nature offers an opportunity, like many online journals, to publish large analysable datasets.

But what should be the rules on publishing negative data. Tried by at least two different people in the lab? Positive controls that work and tests that only differ by one condition? Reproducible in the same way as experiments which generate positive data must be? Previously unpublished? Or should the negative data be more than just an experiment that doesn't work because of its design or reagents but the results of an experiment showing the absence of a biological effect in specific conditions?

And should there be dedicated journals for negative results and would they remain on the periphery of specialised journals which have traditionally published positive data or should every journal publish negative results showing experiments that were conducted in a sound way, using appropriate controls and results that forward our understanding of the biological world.

So what is the answer? Open access is becoming common place and allows a wider breadth of science to be assessed by the community. Citations of articles will soon supersede journal impact factors and papers will be judged by the science community and not just by two or three reviewers on their value to the field. But this again disadvantages publications in the less popular fields, publications of rarer diseases and niche topics and perhaps this would also apply to negative data-how often would we cite someone else's work that was based entirely on negative data?

Science can undertake seismic change and theories can evolve slowly as well as rapidly in leaps. The central role of the internet in our lives [2], the demonstration of the likely existence of the Higgs Boson particle [3], our acceptance of The Danger Theory [4] into common parlance by immunologists, and non-scientists accepting Life on Mars [5] all supersede decades if not centuries of quite different beliefs of what was possible and is now probable. The Life Sciences arena is changing more rapidly than ever before as technology facilitates our ability to investigate and understand our world. Perhaps it's time to change the way we publish and speed us up a little bit more.

Bibliography

1. Franco A., *et al.* "Publication bias in the social sciences: Unlocking the file drawer". *Science* 345.6203 (2014): 1502-1505.
2. http://www.internetsociety.org/internet/what-internet/history-internet/brief-history-internet
3. ATLAS Collaboration. "A particle consistent with the Higgs boson observed with the ATLAS detector at the Large Hadron Collider". *Science* 338.6114 (2012): 1576-1582.
4. Matzinger P. "Tolerance, danger, and the extended family". *Annual Review of Immunology* 12 (1994): 991-1045.
5. Wang T., *et al.* "Separation and purification of amygdalin from thinned bayberry kernels by macroporous adsorption resins". *Journal of Chromatography B Analytical Technologies in the Biomedical and Life Sciences* 975 (2014): 52-58.

Volume 1 Issue 1 December 2014