

# Launching PLoS Biology – six months in the open

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The Public Library of Science (PLoS) was formed in 2000 as an advocacy organization to encourage publishers to deposit articles in the newly formed biomedical archive PubMed Central. Frustrated with its lack of success in this aim, the organization has since become an open access (OA) publisher.

The article reviews the history of PLoS and how it came to become a publisher. It then considers some of the objections to OA publishing and how PLoS's publishing efforts are aimed at challenging those objections and demonstrating that OA is a viable and credible alternative to the existing subscription-based publishing model.



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## A potted history of Public Library of Science (PLoS)

The origins of PLoS lie back in 1999 when Harold Varmus, as President of the National Institutes of Health (NIH) in the USA, proposed E-biomed<sup>1</sup> as a central archive for biomedical literature. The literature in the archive, coming from both refereed journals and author-submitted preprints, would be freely available to all to read. The original proposal evolved into PubMed Central (PMC), a central repository of published articles which came into being in February 2000.<sup>2</sup>

When PMC was originally launched it had content from the *Proceedings of the National Academy of Sciences (PNAS)* and from *Molecular Biology of the Cell (MBC)*. However, most of the leading publishers, both for- and not-for-profit, were reluctant to deposit their content, even many months after the original publication date.

One of the consequences of this reluctance was the formation of PLoS which was founded in October 2000 by Harold Varmus, Pat Brown of Stanford University (a significant contributor to the original E-biomed proposal) and Mike Eisen, a computational biologist frustrated in his attempts to extract information from the existing literature. PLoS was founded as an advocacy organization to encourage publishers to participate in PMC and similar archives, hence the name – advocates for a public library of science.

After attempts to contact publishers directly had little effect, PLoS circulated an open letter amongst scientists encouraging publishers to increase access to the research literature.<sup>3</sup> Signatories of the letter not only urged publishers to change their practice, but also pledged that as authors they would boycott any journal which did not make its content available in an unrestricted form within six months of publication. Over 30,000 people signed the letter and there was some movement towards opening up access to older archives, but generally the response from publishers fell far short of demands. A few journals beyond *PNAS* and *MBC* joined PubMed Central but, by and large, publishers were not interested in participating, and said so. Also worth noting is that scientists who had signed the letter in good faith had a hard time keeping to their commitment to only publish in open access (OA) journals. There was a lack of credible OA alternatives to mainstream journals and the need to publish or perish is ever present in the academic world.

As a consequence of this, born of the frustrations of not being able to get publishers interested in putting the literature into an e-print archive, PLoS looked around for more concrete ways to advance the OA cause. In December 2002, PLoS received a grant of \$9m seed capital from the

Moore Foundation to finance the launch of OA publishing operations and last October (2003) the first of those, *PLoS Biology*, was launched.

### Why publish?

I believe that the essential reason that PLoS made this move into publishing is to answer, by example, objections to OA publishing and the resulting reluctance of existing publishers to participate in archives like PMC. We hope that by building compelling OA alternatives to existing subscription-based publishing, PLoS will fulfil its original aim of persuading the majority of the publishing industry to follow suit.

The objections to an OA model seem to fall into three broad categories:

1. *No need.* The existing subscription-based model works fine – enough people have access to the literature. By this argument, anything which destabilizes or challenges the status quo is a net-negative.
2. *Not possible.* Even if you concede that the existing system is not ideal, OA cannot be made to work. Financially it is not possible and editorially OA introduces issues which the existing system does not have.
3. *Cannot get there from here.* Even if it is desirable and theoretically possible, the transition to OA from the existing system would put so many of the existing – particularly smaller – publishers out of business that the end benefits are not worth the disruption.

#### *Objection 1: "There is no need for open access"*

The assumption that the existing system works fine is perhaps the least convincing argument against OA and at the same time the hardest to address in a practical fashion.

As the UK Office of Fair Trading pointed out in 2002,<sup>4</sup> market forces do not work effectively in the publishing world. Each paper is unique and once a subscription-based publisher has a paper, they have a monopoly on the information. Consumers cannot go elsewhere to get at that research. Equally, the researcher has no direct motivation to pay any attention to how their local consumers (primarily librarians) are feeling the pricing effects of where they publish. Researchers are concerned more directly about the other aspects of their

journal selection – such as how it affects their tenure – than they are about how that research may be priced to future readers.

That said, there is a growing sense that the people actually producing and consuming the research, the academic community, do not believe they are being well served by the existing system. Based on the 30,000+ people who signed the PLoS open letter and the growing discussion about the 'serials crisis', it appears that all is not well in the state of publishing. One should also consider what OA might offer above and beyond the value returned by the existing publishing system.

The technical possibilities enabled by having the full text of all published articles available are quite compelling. We only have to look at the change Google (and others) have made to the way we search for everyday information. And how, within the biological sciences for example, the way common databases of genetic sequences have enabled new ways of doing biological research. It is clear that, given access to a large body of information, tools to mine that information will quickly appear and will often allow us to do things we might not otherwise have imagined doing.

Google is mentioned here, not to suggest that OA would enable better Google searches (although it would) but as an example of the way technology can change the way we use information. Until Google really began to take off and those search tools came along, ways of indexing information on the Internet were typically based on the paper directories that had come beforehand. Typically, in a hierarchical directory such as *Yellow Pages*, a user searches by subject and then drills down. It is only because all the information on the Internet is available and readable, that Google was able to start indexing it and present the service that they do. By having the information out there, it was suddenly possible to do new things with it. Most people who are impressed with Google's Initial Public Offering (IPO) would, a few years ago, have said there is nothing wrong with the way in which information is organized – it can be found fairly easily using directories. An assumption that the search tools and ways of searching the literature in the subscription world are 'good enough' basically ignores the possibility for much more. OA opens up the possibility to do much more with the literature.

Finally, the most important thing that OA offers over the subscription-based model is access. As a

wide community of people involved in publishing – authors, librarians, publishers – we do seem to believe that it is a good idea to make the literature available to people: initiatives like HINARI,<sup>5</sup> for example, recognize that there are large groups of people who do not have access to the existing literature, usually for financial reasons. OA offers a very simple solution to this problem – do not compensate for restricted access, open it up.

As noted earlier, these points are the hardest to back up by pointing to specific actions on the part of PLoS; they will only be really tested once OA publishing exists in realistic competition with any subscription-based alternatives. Everything that PLoS does is aimed at answering this point.

*Objection 2: “Open access can’t be made to work”*

Those who say that OA, even if it is desirable, is unworkable, tend to base this on either financial or editorial grounds.

Financially, OA represents a significant change in the structure of the serials publishing industry and it moves the onus of paying for the *essential* publishing services on to the author, author’s funding body, or institution. Here it is worth distinguishing between the *essential* publishing services – the process of getting the literature out of an academic’s head, onto a screen or piece of paper that somebody else can see, search and locate – and the *secondary* services publishers currently provide to add value beyond that. Giving OA access to the essential publishing, and depositing that into the archive, does nothing to reduce the publisher’s ability to charge for secondary services.

Payment for essential publishing under an OA model typically moves from subscription to publication charges. The level of these publication charges is hotly disputed and often focuses on a single magical figure that will work for all journals, whereas no one seems to expect there to be a single subscription rate for all journals. PLoS charge \$1500 per article, which – in the subject disciplines we are working in – represents about 1% of the average grant.

At PLoS we assume that this money will come largely from the funding agencies. Grants from these agencies are existing sources of the money going into the academic community. Some of this money currently goes to pay for the actual research; some of it goes to the libraries to pay the journal subscription costs. PLoS advocates moving

the channels through which a large quantity of that money passes so that money that is currently earmarked for subscription charges moves directly into the research grant, with line items for publication charges. The funding agencies we have talked to and worked with seem to support doing this. The Wellcome Trust and the Howard Hughes Medical Institute have each issued statements saying that they will cover publication charges for their authors; they will pay for their researchers to publish in OA journals. So when people talk about ‘author charges’ in the context of OA, this should not mean asking researchers to find the money out of their existing grants to pay for essential publishing services.

To re-emphasize the distinction between essential and secondary publishing services, to realize what a publication charge is expected to fund, we need to look at examples of secondary publishing services. BioMed Central is a great example of a commercial OA publisher charging for additional services built on top of the literature. Their ‘Faculty of 1000’,<sup>6</sup> for example, is a subscription-based, restricted access service that provides an ‘online research tool that highlights the most interesting papers in biology, based on the recommendations of over 1000 leading scientists’.

A simple example, closer to home, is the fact that PLoS itself charges for print copies of *PLoS Biology*. OA does not preclude any number of opportunities to bring in revenue through obvious things like advertising and print copies, or less obvious secondary services like the ‘Faculty of 1000’. The challenge for PLoS is to show, by example, that our \$1500 publication charge is sufficient to support the essential publishing services of a typical journal.

Another perceived obstacle to the viability of OA is editorial integrity. There seems to be an assumption that a move to OA means loss of peer review and consequently the quality of the literature will be compromised. There is nothing intrinsic in OA which changes the peer-review process. Journals are, by and large, judged not by what they cost but by the quality of the literature that they produce. To be a successful OA publisher there is a need to publish journals that people want to use and where the quality of the material published is assured.

Because PLoS was started by scientists, one of the first things the organization did (once funded)

was to go out and hire a professional editorial staff from existing journals like *Cell* and *Nature* and recruit academic editors who are leading scientists within their own disciplines. It is this staff that drives our planning and ensures that journals of great editorial integrity are published. Another thing we have been very careful to do is to decouple the ability to pay from the editorial process. There is a suspicion among some people that once money is coming in predominantly from authors, it may be possible for them to ‘buy’ their way into publication. To avoid any such suggestion, PLoS ensures that the editorial staff overseeing the peer-review process cannot tell who has, or has not, paid publication charges.

**PLoS Journals.** Before moving on to the third type of objection to OA, I would like to highlight how PLoS’s publication plans for its initial and subsequent journals are intended to be practical refutations of these first two types of objection.

Because one of the other assumptions that OA suffers from is that ‘something you get for nothing is not worth anything’, initially we intend to publish two high quality OA journals. These journals are of the very highest quality, both in terms of the science published and the production values of the journals. *PLoS Biology*<sup>7</sup> was launched last October. This will be followed by *PLoS Medicine*<sup>8</sup> later this year.

*PLoS Biology* provides an OA home for top quality papers across the range of biological sciences. As mentioned above, publication charges are \$1500, with a print subscription available as an example of a value-added service. This is charged out at cost and does not make a profit; others might choose to act differently.

For me as IT Director, the actual launch was the best and the worst of times. Traffic was far higher than had been anticipated and it managed to crash the servers. It was good that so many people wanted access, but unfortunate that demand exceeded capacity and potential users could not see the journal for a couple of days. Incidentally, because we are an OA publisher, immediately depositing content in PMC, we were able to redirect traffic to the copies of the papers in the PMC archive while working on upgrading the servers. Traffic continues to grow steadily, indicating that if OA journals exist, then people will use them.

The biggest challenge we face with the journal is nothing to do with OA, but with the fact that it is

a new journal; it is persuading authors, and often more importantly their post-doc students, to submit their high quality papers to a relatively new journal.

As *PLoS Biology* and *PLoS Medicine* get underway, our next task is to demonstrate that it is possible to produce a financially viable OA journal. It is important to recognize that the majority of journals being published are not the high profile journals from the big publishing houses, but journals from relatively small, often not-for-profit, publishers. A further task is to develop what we are calling ‘community journals’. These are journals that address a particular branch of either biology or medicine. They will be much closer in scope and scale to many of the learned society journals that currently publish a significant proportion of the scientific literature. It should be emphasized that PLoS’s purpose in publishing these ‘community journals’ is not to go head-to-head with learned societies, but to demonstrate that there is an opportunity to produce an OA journal on that scale, with high editorial and production qualities, and still be financially viable.

That said, we are not going to be, nor would ever want to be, the only OA publisher. PLoS started off as an advocacy group which now finds itself in the business of publishing because other publishers were not willing to do it in the way we thought it ought to happen. In order for the scale of change we hope for – and intend to facilitate – we are never going to produce enough new community journals ourselves. PLoS will publish exemplar journals where there is an opportunity, or where existing journals prove particularly reluctant to embrace OA. In the end though, much of what PLoS will need to do is to work with other people and organizations who are interested in making the transition to OA.

*Objection 3: “You can’t get there from here”*

As mentioned above, the biggest challenge in launching new journals is the fact that they are new. However, it is also a great advantage. PLoS does not have an existing business and associated cash flow to maintain and can legitimately approach organizations such as the Moore Foundation and ask for start-up grants to launch the business.

Existing journals face a more complex situation where, if they choose to become OA and start charging publication fees, the subscription revenue

suddenly disappears. There are a number of ways publishers are addressing this. PLoS, for example, will be looking at partnering with existing journals – rather than launching our own journals – to reduce the risk to both parties.

### The long-term goals for PLoS

The first and foremost goal is economic sustainability. We are funded like any other start-up business by some seed capital – in our case it is a grant from the Moore Foundation. But in order to be successful, in order for it to be worthwhile, the publishing has to be self-sustaining. PLoS has recently undertaken a review of both its economic model and its two-year business plan and are confident that this can be made to happen.

As the publishing side of the business grows, either directly or through partnership, and OA journals come to represent a significant part of the publishing landscape, tools and resources for researchers are going to become increasingly important. The interesting questions become not: “Can I get access to the literature?” but: “How do I find *relevant* literature?”... and having found it: “How can I use it?”.

Finally, coming back to the roots of the PLoS, and its remit to make scientific research a publicly valuable resource, we will work on ways to make the literature accessible to a broader section of the public than just the academic community. Although this is not a necessary part of OA publishing, it is one of the things that argues most firmly in its favour.

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