Helping Biomedical Researchers Gain the Credit They Deserve

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INTRODUCTION

In the current era of large-scale biomedical research, generating and sharing datasets in an open manner is an important, but non-trivial task. However, sharing published data is often low on a researchers priority list for a number of reasons: e.g. journals place limits due to lack of space; making data accessible can be time-consuming/tedious and often this effort will not be formally recognised.

The lack of accessible scientific research data is increasingly of concern, not just to researchers, but also to funders, governments and patients[1-2]. Inaccessible data promotes wastage in funding[1]. Lack of publication of 'non-groundbreaking' but still valid research can promote bias with serious implications for healthcare[3].

On the other hand, open and accessible data can be beneficial to scientific progress in several ways; for example enabling data to be verified[4] or the testing of novel hypotheses that were unforeseen at the time of data generation[5].

F1000Research is working with funders and institutions to begin addressing some of the challenges and promote the publication of research data in an open and accessible way.

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ALL STUDY DATA IS ACCESSIBLE

All *F1000Research* articles include the underlying data. We use figshare to host data, and they provide a 'widget' within the article which displays the data. Figure 1 shows a typical figshare widget from an *F1000Research* paper[6].

The widget records altmetrics such as number of downloads and sharing on social media. The dataset has its own DOI and can be cited independently from the paper[7]. The data citation also includes the date of access, so as to facilitate study replication.

We are now developing an in-article data plotting tool to enable quick basic manipulation of raw spreadsheet data on-the-fly by referees and readers.

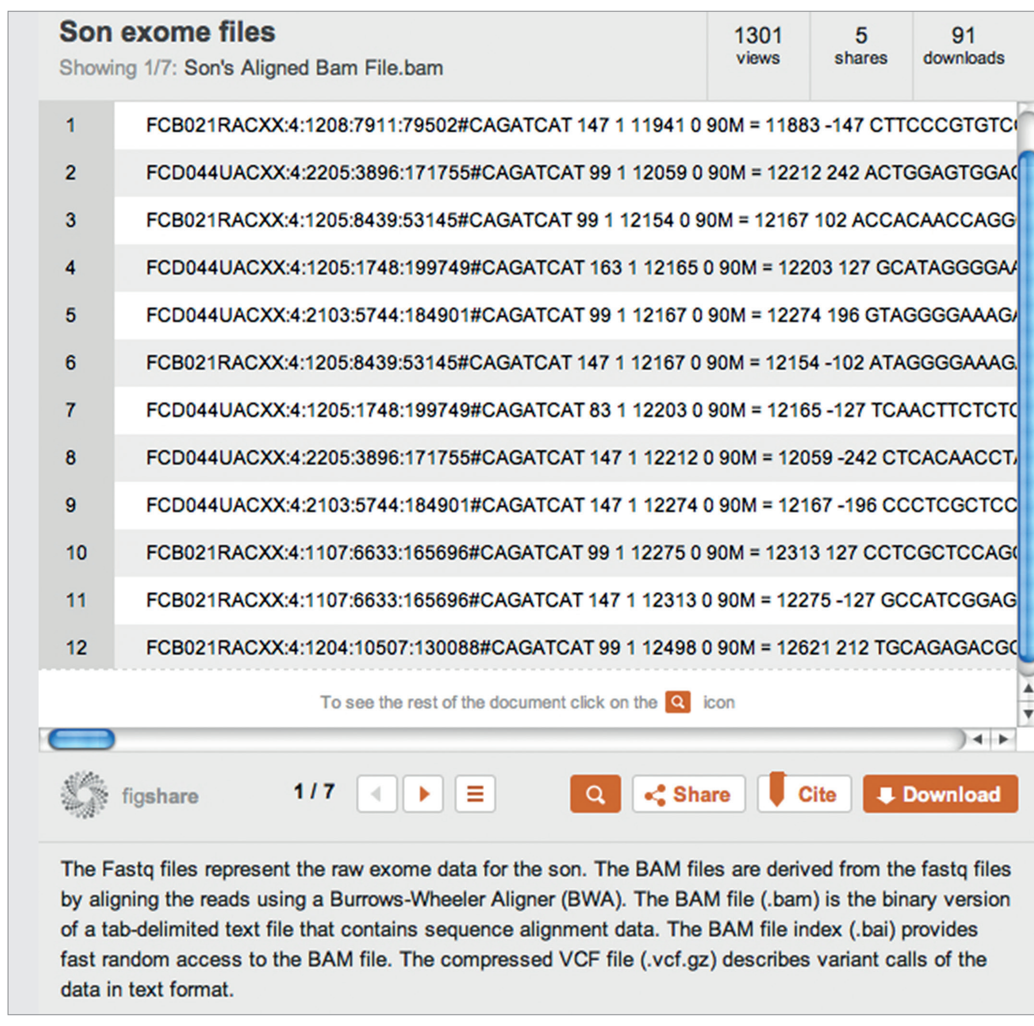

FIGURE 1
Screenshot of a typical figshare data widget with open and accessible raw research data

DATA ARTICLES

We offer authors the option to publish data-only papers, which present the data alongside a detailed description of the protocol used to generate it.
Data articles enable researchers involved in the non-trivial task of generating the dataset (and making it accessible) to gain priority and credit for their work.

TRANSPARENT PEER REVIEW

F1000Research is known for being the first life science journal to practice invited post-publication and transparent peer review.

Figure 2 illustrates how our peer review process differs from traditional peer review. Transparent peer reviews allow the provenance of each article to be followed, as well as enabling reviewers to claim credit for their work.

In collaboration with others, we are working to establish best practice for transparent peer review of the datasets and software accompanying published articles.

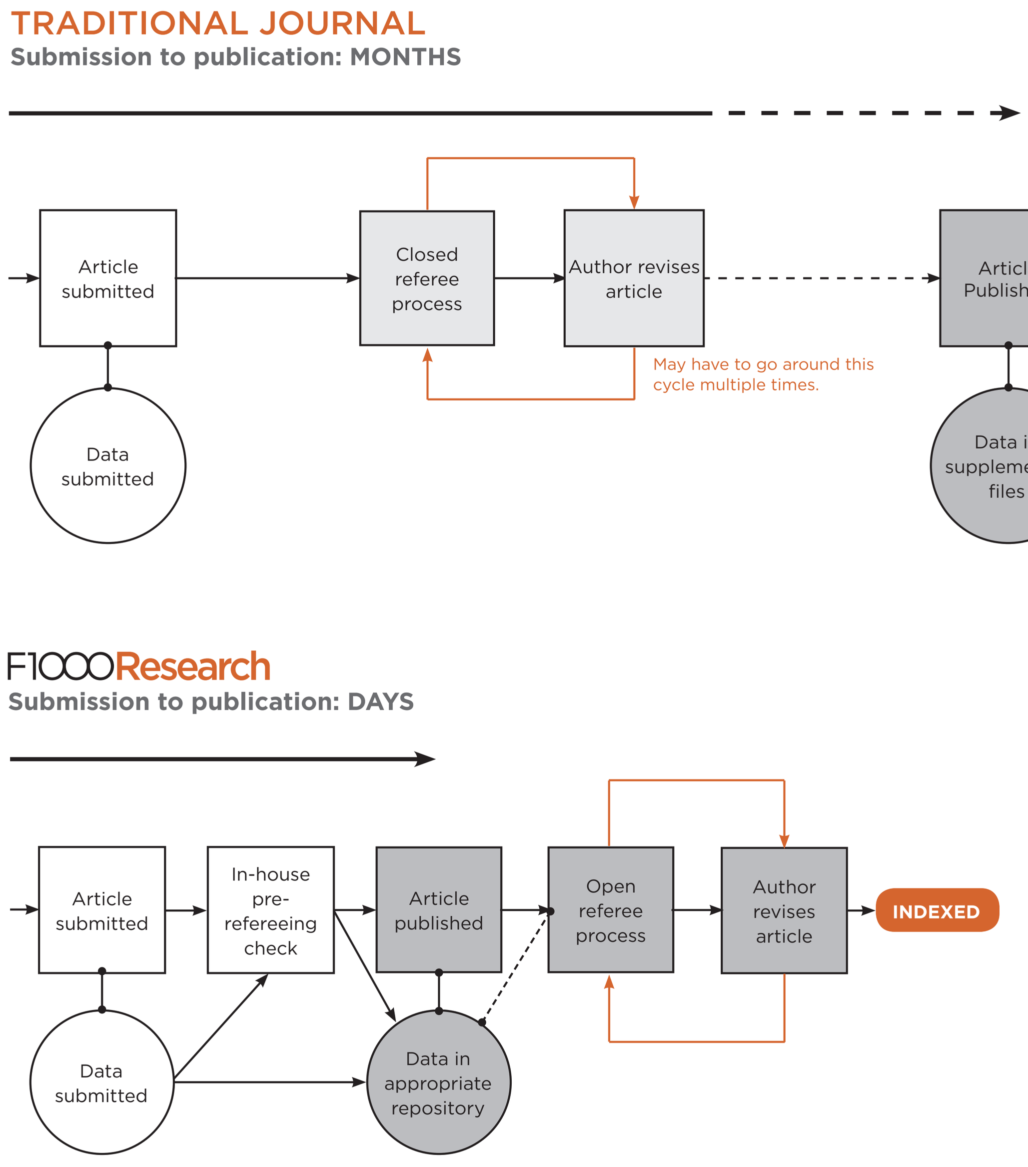

FIGURE 2
Comparison of traditional peer review with F1000Research's post-publication peer review

UPCOMING INITIATIVES

We work on several initiatives aimed at reducing technological barriers to data sharing. We are working with institutions to provide researchers with a quick and easy submission process for submitting data papers directly from institutional repositories. We are also involved in several projects as part of the *Research Data Alliance* (www.rd-alliance.org) to look at data workflows within articles, and bi-directional cross-linking of articles with datasets in repositories.

F1000Research is additionally involved in projects aiming to extend the types of scientific output that can be recognised for career progression purposes. For example, we are working with relevant stakeholders to discuss new metrics that can be used to assess data generation, data publication and data sharing, as formal contributions to a scientist's overall impact.