

Open Data Sharing in the Context of Bioresources

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Review

ABSTRACT

Recently many international initiatives have been developed to improve access to scientific information and to promote open data sharing. In the complex field of bioresources, the BRIF (Bioresource Research Impact Fac-

tor) project aims to create suitable methods to recognise and measure the use and impact of biological resources in scientific/academic work, in order to maximize access by researchers to collections of biological materials and attached databases, and to recognize efforts involved in their maintenance.

The lack of a proper recognition of scientific contribution is in fact a major obstacle which impedes bioresource sharing. In this context, the BRIF initiative can be considered as a tool to facilitate research resource sharing, **Key words:** Bioresources, citations, data sharing, editors, open access, open research data.

1. INTRODUCTION

Many initiatives have been developed in different research areas in support of open access to scientific publications and data. Such initiatives were intended to create awareness on the benefits of sharing information and data among different stakeholders – such as researchers, policy makers, the general public – and to develop policies and infrastructures to host and manage research data. All together these initiatives contribute to a general cultural change shifting from traditional information dissemination patterns, mainly based on proprietary data, to new models of data sharing, dissemination and use.

In this framework, significant investment has been made to develop research infrastructures for an easy and free access to shared data and to empower researchers with communication and technological skills.

There is no doubt that research activity and its results dissemination need a global and multidisciplinary approach to maximize investments and increase the benefits to the entire society.

In this note, the authors illustrate a multi-sectorial collaboration in the field of bioresources involving both researchers and journal editors, de-

veloped within the international BRIF project (Bioresource Research Impact Factor, www.gen2phen.org/groups/brif-bio-resource-impact-factor). Within this project, the BRIF and journal editors subgroup mainly focused on the application of a standardized citation format for bioresources in journal articles. This effort towards the standardization of bioresources citation is in line with the different initiatives in support of open access to research results. As a matter of fact, the first step towards openness is the recognition of the value and impact of the resources used to perform research, which need to be openly defined and shared in a standardized and interoperable format (1, 2, 3).

2. THE BRIF INITIATIVE

Bioresources are collections of biological samples (biobanks) with associated data (medical/epidemiological, social etc.) but also databases without samples, or other biomolecular and bioinformatics research tools (2). Much of our present-day medical knowledge is acquired with the aid of such collections. The main objective of the BRIF project is to promote the sharing of bioresources by creating a link between their initiators/implementers and the impact

of scientific research using them.

The BRIF international working group aims to develop suitable tools to assess the impact of bioresources and facilitate their traceability (4, 5).

At publication level the effort of recognition of stakeholders in establishing and maintaining such resources is often neglected and/or highly heterogeneous and there is an urgent need to establishing guidelines for the citation of such contributions.

Within BRIF, the journal editors' subgroup is contributing to build a standardized system of identification and usage measure of bioresources on the basis of their citations in scientific literature. At present, the subgroup is working to sensitize journal editors and other relevant stakeholders in the scientific community to BRIF issues, with the ultimate goal of developing suitable standards to cite bioresources in journal articles.

The subgroup activity has increased awareness, especially among journal editors, on the importance of a common agreed schema of citation for articles involving the use of bioresources (2, 6, 7).

The discussion taken during the meeting organized by the BRIF and journal editors subgroup (Rome, Is-

tituto Superiore di Sanità, June 2013) led to a consensus agreement which is strictly related to the issue of open access to research data.'

3. BRIF JOURNAL EDITORS' SUBGROUP AND OPEN RESEARCH DATA

In the Rome meeting, the subgroup discussed the best strategies to promote standardization of citations of bioresources in journal articles with a number of selected experts mainly representing journal editors, researchers and librarians, coming from different European and non-European countries.

At the same time, the European Commission (EC) was launching a Public Consultation on Open Research Data in view of the new EU framework programme for research and innovation, Horizon 2020 (http://ec.europa.eu/research/horizon2020/index_en.cfm), that will be running from 2014 to implement the "Innovation Union" and secure Europe's global competitiveness. Horizon 2020 will tackle societal challenges by helping to bridge the gap between research and the market. In such a context, the issue of openness of research data is particularly relevant and its application in the field of bioresources is a good example of the complexity associated to data sharing, even when its benefits are fully recognized.

The main topics of the public consultation that EC addressed to different stakeholders are synthetically expressed by the following questions:

- How can we define research data and what types of research data should be open?
- When and how does openness need to be limited?
- How should the issue of data reuse be addressed?
- Where should research data be stored and made accessible?
- How can we enhance data awareness and a culture of sharing?

The meeting in Rome offered an opportunity to discuss the issues of open research data with regard to the EC proposal. The outcome of the discussion was orally reported in the EC consultation held in Brussels on July 2, 2013 in the form of a short oral presentation.

In particular, there was a general agreement that EC should attentively consider the bioresources as relevant sources of aggregated open research data with a strong impact on both science and society. Such data should be shared for many reasons: the progress of global research, the need to avoid research duplication and to maximize benefits from large investments, both in terms of financial and individual efforts, and also to fulfil the patients' expectations. These last include providers of biological samples who should be informed on the use of their gift and on the results which can be obtained thanks to their contribution. There was consensus that only aggregated results can be shared openly, with optimal respect of donors' privacy and confidentiality.

As regards the storage of research data, there was an interesting discussion about the present and future infrastructures, data clouding, maintenance and preservation involving collection and use of bioresources. All these issues should be carefully evaluated in the conception, design and development of new projects.

The EC and other research funding organizations should create mechanisms and incentives to facilitate the culture of sharing, for example they should include *ad hoc* recommendations and specific clauses on open research data in their funding schemes, research practices and evaluation. They should also take into consideration appropriate measures able to create and test new tools for this purpose.

4. Final considerations

Openness of research data is very important. However, in the present diversified global scenario where different research organizations, techniques and practices coexist, any agreement on the best way to implement open data practices and build up appropriate infrastructures and standards should be carefully considered. This shared approach should necessarily include top down and bottom up initiatives involving different stakeholders. It will require time and efforts, but the road towards data openness has already been traced for the benefit of us all.

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