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To the Editor:

Numerous health research funding institutions have recently expressed their strong will to promote data sharing[1] (http://www.wellcome.ac.uk/publichealthdata). As underlined in a recent editorial in *Nature Medicine*, an operational approach is needed to achieve this goal[2]. Bioresources such as biobanks, databases and bioinformatics tools are important elements in this landscape. Bioresources need to be easily accessible to facilitate advancement of research. Besides technical and ethical aspects, a major obstacle for sharing them is the absence of recognition of the effort behind establishing and maintaining such resources. The main objective of proposing a Bioresource Research Impact Factor (BRIF) is to promote the sharing of bioresources by creating a link between their initiators or implementers and the impact of the scientific research using them[3]. A BRIF would make it possible to trace the quantitative use of a bioresource, the kind of research using it and the efforts of the people and institutions that construct it and make it available.

In the context of EU projects, a BRIF working group has been set up, including 101 participants so far (http://www.gen2phen.org/groups/brif-bio-resource-impact-factor). The work involves several steps: creating a unique identifier, standardizing bioresource acknowledgment in papers, cataloging bioresource data access and sharing policies, identifying other parameters to take into account, and prototype testing with the help of volunteer bioresources and journal editors.

The first BRIF workshop was held in Toulouse, France (January 17–18, 2011), gathering 34 people from ten countries and representing various domains: biobanks, genome databases, epidemiological longitudinal cohorts, bioinformatics, scientific publishing, bibliometry, health law and bioethics (http://precedings.nature.com/collections/brif-workshop-january-2011). The lack of objective measures for the use of bioresources was recognized by all; we focused on shared aims but underlined that each community had specific aspects to consider and resolve.

Bioresources need to be identified by a unique digital identifier (ID), ideally through existing mechanisms[4]. Digital object identifiers (DOIs) may be interesting (http://www.doi.org/). Several issues must be considered, including what to identify (biobank, collection, database, dataset, subset and version), identifier requirements (persistent over time, globally unique, citable) and which international and independent body should be responsible for assigning bioresource IDs. Working subgroups were created to address those questions. Attribution of credit to scientists for different kinds of work (in addition to publications) using researcher IDs was also discussed. The ORCID initiative (http://www.orcid.org/) is building a new contributor ID framework which should, in principle, enable credit to be given to both bioresources and individuals involved in their creation and maintenance.

Standardization of citation is necessary but could be combined with existing referencing standards and conventions[5], such as citing marker papers, standardized sentences in the materials and methods or acknowledgments sections of papers, co-authorship when justified and including the resource name in the paper title. Specific requirements for citing bioresources are lacking in the *Uniform Requirements for Manuscripts Submitted to Biomedical Journals* (http://www.icmje.org/urm_main.html, version April 2010) and should be added. In order to enable automated tracking of bioresource use, the bioresource ID should ideally appear in or under the abstract section in order to be visible even without access to the full text of articles.

BRIF should not be a citation index only. Factors such as time and domain of bioresources need to be considered in the calculation process and its weighting. Although the BRIF scope could be extended to measure many different aspects of bioresource utilization, including economic implications, it was decided to concentrate first on use and impact in research settings.

Access and sharing policies have been developed over the years[6]. However, the incentivization of bioresources to promote access needs to be balanced with appropriate provisions compatible with all stakeholder interests, that is, proper recognition of scientific contribution and sustainability supported by the capacity for measuring their own resource use and impact. There are no mechanisms in place to measure this impact. Empowering bioresources with tools such as BRIF is therefore urgent.

The full impact of bioresources is wider than BRIF, but unique bioresource identifiers and metrics must be established as the first operational step. The present proliferation of ideas, statements and proposals around data sharing from different perspectives and stakeholders[1–3,7] favors the implementation of tools such as BRIF in order to make data sharing principles operational. Workshop participants and members of the working group urge concerned stakeholders to join our efforts in developing such an instrument.

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AUTHOR CONTRIBUTIONS

A.C.-T. has been directing the BRIF initiative from the birth of concept. L.M. has been involved in organizing the working group and the workshop

and has participated in the writing of this correspondence. G.A.T. has been very active in commenting and amending this correspondence and proposing references and relevant URLs. The workshop group participants have actively fueled the whole debate, part of which is reported in the present correspondence.

COMPETING FINANCIAL INTERESTS
The authors declare no competing financial interests.

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