

The role of a bioresource research impact factor as an incentive to share human bioresources

Anne Cambon-Thomsen^{1,2}, Gudmundur A. Thorisson³ and Laurence Mabile^{1,2} on behalf of the BRIF workshop group*.

1. Inserm, UMR1027, Epidemiology and analyses in Public Health, Toulouse, F-31073, France

2. Université de Toulouse - Université Paul Sabatier -Toulouse III, UMR 1027, Toulouse, F-31073, France

3. Department of Genetics, University of Leicester, University Road, LE1 7RH Leicester, United Kingdom

*Participants listed at the end of the correspondence

Numerous health research funding institutions have recently expressed their strong will to promote data sharing¹ (<http://www.wellcome.ac.uk/publichealthdata>). As underlined in a recent editorial in *Nature Medicine*, an operational approach is needed to achieve this goal². 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/implementers and the impact of scientific research using them³. A BRIF would make it possible to trace the quantitative use of a bioresource, the kind of research utilizing it, and the efforts of 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 so far 97 participants (<http://www.gen2phen.org/groups/brif-bio-resource-impact-factor>). The work involves several steps: creating a unique identifier, standardizing bioresource acknowledgement 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 (17-18 January 2011), gathering 34 people from 10 countries, 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 of use of bioresources was recognized by all; we focused on shared aims, but underlined that each community had specific aspects to consider and resolve.

Main avenues explored and further steps

Bioresources need to be **identified** by a unique digital identifier (ID), ideally via existing mechanisms⁴. 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 conventions⁵, such as: citing marker papers, standardized sentences in Materials & Methods or acknowledgements section of papers, co-authorship when justified, and including resource name in 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 years⁶. However, the incentivisation 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 of measuring their own resource use and impact. There are actually 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^{1,2,3,7} 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.

Authors' Email addresses

A. Cambon-Thomsen: cambon@cict.fr

G.A. Thorisson: gt50@leicester.ac.uk

L. Mabile: mabile@cict.fr

Corresponding author

Dr Anne Cambon-Thomsen, Inserm, UMR1027, Université de Toulouse - Université Paul Sabatier - Toulouse III, Epidémiologie et analyses en santé publique
Faculté de médecine. Equipe 4: "Génomique, biothérapies et santé publique : approche interdisciplinaire"
37 allées Jules Guesde F-31073 Toulouse Cedex 7 France
Tel : +33 (0)5 61 14 59 59
Fax : +33 (0)5 61 14 56 23
E-mail : cambon@cict.fr

Named Collaborators

The BRIF workshop group

Sandrine Andrieu^{1,2}, Gabrielle Bertier³, Martin Boeckhout⁴, Anne Cambon-Thomsen^{1,2}, Jane Carpenter⁵, Georges Dagher⁶, Raymond, Dagleish⁷, Mylène Deschênes⁸, Jeanne Hélène di Donato⁹, Mirella Filocamo¹⁰, Marcel Goldberg^{11,12}, Robert Hewitt¹³, Paul Hofman¹⁴, Francine Kauffmann^{11,15}, Liis Leitsalu¹⁶, Irene Lomba¹⁷, Laurence Mabile^{1,2}, Bela Melegh¹⁸, Andres Metspalu^{16,19,20}, Lisa Miranda²¹, Federica Napolitani²², Mikkel Z. Oestergaard²³, Barbara Parodi²⁴, Markus Pasterk²⁵, Acacia Reiche²⁶, Emmanuelle Rial-Sebbag^{1,2}, Guillaume Rivalle²⁷, Philippe Rochaix²⁸, Guillaume Susbielle²⁹, Linda Tarasova³⁰, Mogens Thomsen^{1,2}, Gudmundur A. Thorisson⁷, Ma'n H. Zawati³¹, Marie Zins^{11,12}.

¹ Inserm, UMR1027, Epidemiology and analyses in Public Health, Toulouse, France

² Université de Toulouse - Université Paul Sabatier -Toulouse III, UMR 1027, Toulouse, France

³ Center for Genomic Regulation, Barcelona, Spain

⁴ University of Amsterdam, Department of Philosophy, Amsterdam, The Netherlands

⁵ Australian Breast Cancer Tissue Bank, University of Sydney, NSW, Australia

⁶ Inserm, Public Health Institute, Paris, France

⁷ Department of Genetics, University of Leicester, Leicester, United Kingdom

⁸ P3G, Montreal, Quebec, Canada

⁹ 3C-R, Toulouse, France

¹⁰ Laboratory of Pre-Postnatal Diagnosis and Metabolic Diseases, G. Gaslini Institute, Genova, Italy

¹¹ Inserm U1018, Centre for Research in Epidemiology and Population Health, Villejuif, France

¹² Versailles-Saint Quentin University, UMRS 1018, France

¹³ European, Middle Eastern and African Society for Biopreservation and Biobanking (ESBB), Aix en Provence, France

¹⁴ Laboratory of Clinical and Experimental Pathology & Human Biobank, Pasteur Hospital, University of Nice Sophia, Nice, France

¹⁵ Epidemiology and Population Health Research Centre, Villejuif, France

¹⁶ Estonian Genome Center, University of Tartu, Tartu, Estonia

¹⁷ HIV HGM Spanish BioBank, Madrid, Spain

¹⁸ Department of Medical Genetics, University of Pécs, Pécs, Hungary

¹⁹ Estonian Genome Center, Institute of Molecular and Cell Biology, University of Tartu, Tartu, Estonia

²⁰ Estonian Biocentre, Tartu, Estonia

²¹ Biobusiness Consulting, Inc., Massachusetts, USA

²² Higher Institute of Health Research, Rome, Italy

²³ World Health Organization, Department of Health Statistics & Informatics, Geneva, Switzerland

²⁴ National institute for Cancer Research, Genoa, Italy

²⁵ International Prevention Research Institute, Lyon, France

²⁶ IMIM Foundation, Barcelona, Spain

²⁷ Thomson Reuters, France

²⁸ Claudius Régaud Institute, Toulouse, France

²⁹ Biomed central, UK

³⁰ Latvian Biomedical Research and Study Center, Latvian Genome Center, Latvia

³¹ McGill University, Centre of Genomics and Policy, Montreal, Quebec, Canada

Competing Financial Interests Statement

None for the authors; XXX to be completed for the collaborators...

Acknowledgements

The BRIF workshop was funded by the European Community's Seventh Framework project " Biobanking and Biomolecular Resources Research Infrastructure" (BBMRI), Grant agreement 212111. The BRIF research also received funds from FP7 collaborative projects GEN2PHEN (Genotype-to-Phenotype Databases: A Holistic Solution), grant agreement 200754, and BioSHaRE-EU (Biobank Standardisation and Harmonisation for Research Excellence in the European Union), grant agreement 261433.

In addition to thanking all the BRIF workshop participants for their active contribution, we wish to thank Elena Bravo, Andres Garcia-Montero, Manuel Morente, Cameron Neylon, Christina Schröder, Val Tate, Susan Wallace and Martin Yuille for having provided input in the global debate through the BRIF online forum and for discussion.

Author Contribution

A. Cambon-Thomsen has been directing the BRIF initiative from the birth of concept. L. Mabile has been involved in organizing the working group and the workshop and has participated in the writing of this correspondence. G.A. Thorisson has been very active in commenting and amending this correspondence, and proposing references and relevant URLs. The workshop group participants have actively fuelled the whole debate, part of which is reported in the present correspondence.

REFERENCES

1. Walport, M. and Brest, P. *Lancet*. **377**: 2011–2018 (2011).
2. Editors. *Nat. Med.* **17**: 137 (2011).
3. Cambon-Thomsen, A. *Nat. Genet.* **34**: 25–26 (2003).
4. Kauffmann, F., and Cambon-Thomsen, A. *JAMA*. **299**: 2316–2318 (2008).
5. Peterson, J., and Campbell, J. *Nat. Genet.* **42**: 919 (2010).
6. Kaye, J., Heeney, C., Hawkins, N., de Vries, J., and Boddington, P. *Nat. Rev. Genet.* **10**: 331–335 (2009).
7. Toronto International Data Release Workshop Authors. *Nature*. **461**:168-170 (2009).