



Newsletter No. 24

Recommendations and requirements for reporting on electroporation and PEF-based treatments and therapies

Newsletter by: Justin Teissié, IPBS & Université de Toulouse, Toulouse, France

justin.teissie@ipbs.fr

There is now a common agreement that recommendations are needed to improve the consistency and quality of reporting in the life-sciences articles. To facilitate the interpretation and improve the reliability of published results, there is a need to more systematically report key protocols details, examine the statistics more closely, and offer more ways for authors to be transparent in these matters. Working with irreproducible data and/or results was found to be a serious issue. The conclusion of the GBSI (Global Biological Standards Institute) was that "there is a need for more well-defined and consistently used standards, both material (reference reagents and chemicals) and written (optimal practices and methodologies). Within the COST TD1104 Action; more precisely during the Steering Committee (members: R. Cadossi (IGEA, Italy), J. Teissié (IPBS, France), D. Knorr (TU Berlin, Germany), and J. C. Weaver (MIT, USA)) meeting in Salerno in Sep. 2012, some issues were raised that were further explored:

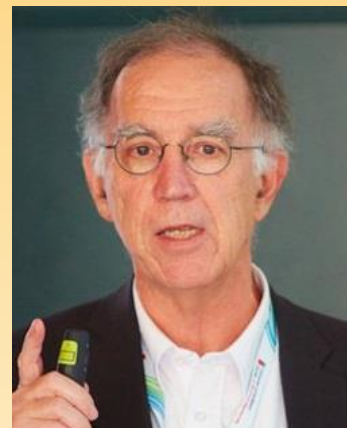
1. Emphasise on good practice in experimental design;
2. Modelling based on data supplied by some agreed cells, material (proposed by J. Weaver);
3. Unifying terminology.

These issues could be addressed through publications such as publishing protocols, and what needed to be reported in an experimental report/paper; or by tutorials clarifying what terminology means and what should be most suitable (e.g. we have PEF treatment, nsPEF treatment, electroporation, electropermeabilization, micropulses, nanoporation, etc...).

A Workshop on recommendations when reporting electroporation and PEF-based treatments and therapies was organized by the COST action in Copenhagen (March 2014) by J. Teissié (Toulouse, France) and J. Raso (Zaragoza, Spain). The critical problems were described (Problems detected in scientific papers – D. Knorr (Berlin, Germany); Ethics in scientific papers – P. Vadgama (Editor Bioelectrochemistry); What is needed for Basic science papers (mostly batch process) – D. Miklavčič (Ljubljana, Slovenia); What is needed for Industry oriented papers – J. Raso (Zaragossa, Spain); What is needed for preclinical – M. Čemažar (Ljubljana, Slovenia); What is needed for clinical papers – Barbara Mali (Ljubljana, Slovenia)).

Based on discussions in Salerno, J. Teissié, J. Raso and D. Miklavčič drafted the paper. J. C. Weaver found similar papers from other scientific fields and shared them with members of the Steering Committee in Ljubljana (Nov. 2014). It was agreed that this should be widely accepted and considered as a consensus paper co-authored by most well-known researchers in the field.

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Newsletter Editor

Damijan Miklavčič
University of Ljubljana, Slovenia
damijan.miklavcic@fe.uni-lj.si

Newsletter Technical Editor and Website Administrator

Samo Mahnič-Kalamiza
University of Ljubljana, Slovenia
samo.mahnic-kalamiza@fe.uni-lj.si

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Damijan Miklavčič (Editor-in-Chief):

Handbook of Electroporation

- ▶ One-shot knowledge base on high intensity pulsed electric fields
- ▶ Regular updates and steady growing in content size
- ▶ Widespread and well-structured information from foundations to the use in biology, medicine, biotechnology, food and environmental technologies

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Following discussions of the COST Steering Committee, a recommendation paper on the guidelines for publishing papers in the field of electroporation-related science and technologies was proposed. Contributions were decided on during the 1st Congress in Portorož (Sep. 2015). J. Teissié spent several days in Ljubljana on a COST STSM grant to work on a draft. It was then decided that it would be more effective to write three recommendations papers; one for basic research (including medical-oriented research), one for clinical applications, and one for food/biotech industry. All were organized with the same backbone: a core paper (easy to read) with basic instructions, a check-list, and an annex with a long list of detailed instructions. The “polishing” of each paper was undertaken by a group of Action members (Basic research: M. Čemažar, G. Serša, W. Frey, D. Miklavčič, J. Teissié; Biotech & Food: J. Raso, W. Frey, G. Ferrari, G. Pataro, D. Knorr, J. Teissie, D. Miklavčič. G. Serša accepted to prepare such a contribution for clinical applications and to organize the relevant sub-group: L. G. Campana, A. J. Clover, S. Valpione, P. Quaglino, J. Gehl, C. Kunte, M. Snoj, M. Čemažar, C. R. Rossi, and D. Miklavčič). These recommendation papers would be published in leading journals in their respective fields. Since recently the last paper of the three was published, we are happy to provide a link to all three here below (click the DOI links for direct access):

Basic Research: Čemažar M, Serša G, Frey W, Miklavčič D, Teissié J. Recommendations and requirements for reporting on applications of electric pulse delivery for electroporation of biological samples. *Bioelectrochemistry* 122, pp. 69-76 (2018). DOI: [10.1016/j.bioelechem.2018.03.005](https://doi.org/10.1016/j.bioelechem.2018.03.005).

Biotech Biofood: Raso J, Frey W, Ferrari G, Pataro G, Knorr D, Teissié J, Miklavčič D. Recommendations guidelines on the key information to be reported in studies of application of PEF technology in food and biotechnological processes *Innovative Food Science & Emerging Technologies* 37 Part C, pp. 312-321 (2016). DOI: [10.1016/j.ifset.2016.08.003](https://doi.org/10.1016/j.ifset.2016.08.003).

Clinical Applications: Campana LG, Clover AJ, Valpione S, Quaglino P, Gehl J, Kunte C, Snoj M, Čemažar M, Rossi CR, Miklavčič D, Serša G. Recommendations for improving the quality of reporting clinical electrochemotherapy studies based on qualitative systematic review. *Radiology & Oncology* 50/1, pp. 1-13 (2016). DOI: [10.1515/raon-2016-0006](https://doi.org/10.1515/raon-2016-0006).

All three are available as open-access, and are also available at www.electroporation.net. They provide a support of the EBTT (see the last listing in forthcoming events, below) courses that furnish participants with theoretical background and practical knowledge of electroporation. The general rule in reporting experimental data requires details on exposure conditions, so that other researchers are able to evaluate and reproduce these experiments. The three papers provide guidelines on the content that should be provided in all papers dealing with electroporation-based treatments.

Forthcoming events

5th School on Pulsed Electric Field Applications in Food and Biotechnology

Quakenbrück, May 14 – 18, 2018; <https://goo.gl/6oKCKH>

Fundamental & Applied Bioelectrics Workshop

Norfolk, July 9 – 12, 2018; <http://2018BioelectricsWorkshop.com>

International Nonthermal Processing Workshop and Short Course

Sorrento, September 25 – 26, 2018; <http://nonthermal.prodalricerche.com>

Electroporation-Based Technologies and Treatments

Ljubljana, November 11 – 17, 2018; <http://2018.ebtt.org>

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