

Meeting Report

Alternative Methods and Citizen Science

doi:10.14573/altex.2112201

The international on-line Summer Meeting “Alternative Methods and CitiZen Science” was held on September 1, 2021, organized by the Department of Environmental Science and Policy, Università degli Studi di Milano, with the patronage of the Italian Platform on Alternative Methods (IPAM).

Francesca Caloni, chair of the meeting, started with a presentation entitled “*Alternative Science and Citizens*”, providing an overview on the concept of citizen science, on the role and responsibility of scientists and the public, and the value and impact of citizen science on alternative methods.

Gianfranco Mormino, Università degli Studi di Milano, Department of Philosophy, presented “*Ethical issues about replacement*”. In the late 1950s, when William Russell and Rex Burch first attempted to define ethical guidelines for animal experimentation, their goal was to meet the requirements of a social morality that was then rapidly evolving. As subsequently emphasized (Kirk, 2017), the 3Rs were a voice against the strong opposition between “two cultures”, then widely considered irreconcilable. Russell and Burch – a zoologist and a microbiologist – tried to find a common domain with humanities scholars in order not only to improve science but also to promote a better use of it in society, according to the ethical and political principles that govern people’s lives inside and outside laboratories. The original inspiration of the 3Rs has been largely betrayed: more than six decades later, e.g., the principle of replacement has been tamed. The necessity to build a bridge between the humanities and science is obvious, as there is a general mistrust and a growing ignorance. Should we not succeed in this task, the very autonomy of science will be at risk, and both cultures will remain ancillary to economy, which now plays the role once occupied by theology.

Isabella De Angelis, Environment and Health Department, Istituto Superiore di Sanità (ISS) presented “*Animals in scientific research: comparative opinions*”. Animal use in science has historically been controversial, and a heated debate involving different stakeholders took place over the last decades. This debate has stimulated a critical reflection on the use of animals for scientific purposes, also guiding legislative decisions. Interest of the public in laboratory animal use remains high, but sometimes extreme positions, poorly supported by scientific evidence, are reported. Therefore, continuous collaboration and dialogue between the different stakeholders is needed to create efficient strategies to reduce or, wherever possible, replace animal models. Opportunities for discussion are frequently organized in Italy by different associations and institutions such as IPAM and ISS. National platforms on alternative methods were

established about twenty years ago with the aim to promote and inform about the application of the 3Rs principle in scientific research and to speed up the regulatory acceptance of replacement methods, now better termed new approach methods (NAMs). To achieve these goals, collaboration between research, industry, government institutions, and associations for animal protection was considered an essential requirement. IPAM pursues to promote research and disseminate information on animal experimentation in Italy, building synergies to accelerate development and acceptance of NAMs in basic, applied, and regulatory research. ISS has a solid background in the application and dissemination of the 3Rs principle. In the last years, several activities have been realized to establish a robust internal scientific network on development/application of NAMs in basic research and to communicate with researchers, citizens, and students on the responsible use of animals in scientific experimentation as well as on the innovative application possibilities offered by NAMs.

Paola Fossati, Università degli Studi di Milano, Department of Environmental Science and Policy, presented a lecture entitled “*Involving citizens in alternative methods: What role of regulation?*” Citizen participation in scientific research is growing as a collaborative form of public engagement aimed at involving nonprofessionals in research ventures. A citizen scientist may be involved in different contexts and various degrees of participation, with manifold desired outcomes. In general, citizen science provides a link between the society and scientists and is expected to drive a “*democratization of knowledge production*” (Irwin, 1995), while promoting science communication and informal education. Each part is assumed to gain benefits from its involvement in terms of advancing scientific knowledge, making science more socially relevant, and fostering enhanced learning. Nevertheless, the rapid growth and the potential for citizen science to promote public support of scientific activities has regulatory implications that have not been fully addressed so far. The availability of regulatory guidelines on the use of citizen science could have positive impacts, such as facilitating the implementation of projects, achieving goals of participant recruitment, enhancing engagement, and changing attitudes and behavior.

Thomas Hartung, Johns Hopkins Center for Alternatives to Animal Testing (CAAT), gave a lecture entitled “*Public engagement and outreach promoting alternative methods*”. He focused on the triangle between science, the public and politics. Scientists often have problems with engaging with either the public or politics. Especially, scientific policy support requires guid-



ing principles such as the Brussels Declaration of 2017¹. Also, the relation of science with the public might need improvement, allowing more active outreach and engagement while currently a one-sided teaching style dominates. He acknowledged the acceleration of the interactions between stakeholders via social media and with non-governmental organizations such as animal welfare groups. New forms of communication offer opportunities for synergies. By moving communication punchlines toward scientific challenges, such as reproducibility and reliability of animal tests and economic considerations, a broader audience can be reached. This was illustrated using examples from CAAT's programs and initiatives.

"The principle of the 3Rs: strengths and weaknesses" was introduced by **Augusto Vitale**, Center for Behavioural Science and Mental Health, ISS. The 3Rs principle is widely recognized as the methodological and ethical backbone of contemporary animal research. Different authors also stress the link between the 3Rs and how they complement and reinforce each other, and the speaker very much agreed with this perspective but raised some problems related to the application of the 3Rs. There are obvious links among "Replacement", "Reduction", and "Refinement", but each "R" also has its own conceptual characteristics as well as its own level of applicability. For example, a "methodological inertia" has to be expected more in the case of "Replacement" than in the case of "Refinement". Sometimes it appears that the application of the 3Rs concept still resolves itself in the use of stereotypical sentences, from which it is difficult to fully understand the reality of the laboratory decisional and procedural processes. However, the demanding characteristics of the 3Rs can vary greatly, and this must be considered.

Piera Anna Martino, Università degli Studi di Milano, Department of Biomedical, Surgical and Dental Sciences, with the lecture "*Animal Research and COVID-19*", focused on the

current pandemic, demonstrating the importance of a dual approach to gain knowledge on infectious diseases and the coexistence of *in vitro* and *in vivo* models. The study of SARS-CoV-2, the etiological agent of COVID-19 disease, is based both on *in vivo* (e.g., animal models for studying viral biology, transmission of infection, etc.) and *in vitro* models (e.g., 2D culture cells, different kinds of organoids for molecular studies of the virus or the identification of new therapeutic strategies), and an integrated strategy is successful in having a wide-ranging vision on SARS-CoV-2 infection and spreading.

References

- Irwin, A. (1995). *Citizen Science: A Study of People, Expertise and Sustainable Development*. London, UK: Routledge Chapman & Hall, Abingdon.
- Kirk, R. G. W. (2018). Recovering the principles of humane experimental technique: The 3Rs and the human essence of animal research. *Sci Technol Human Values* 43, 622-648. doi:10.1177/0162243917726579

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¹ <http://www.euroscientist.com/wp-content/uploads/2017/02/Brussels-Declaration.pdf>