

## The Italian Centro 3R: Mission and early achievements presented during the Second Annual Meeting

Arti Ahluwalia

Department of Information Engineering and Centro di Ricerca "E. Piaggio", University of Pisa, Pisa, Italy

The Italian Interuniversity Center for the Promotion of the 3Rs principles in Teaching and Research, also known as Centro 3R, was established in December 2017. Since then its membership has increased to 6 universities and it continues to grow, attracting numerous members.

The Center stands out with respect to other associations, both in terms of its objectives as well as its inclusivity of all 3Rs and all researchers, whether they study animals or not. Its guiding principles are underpinned by a rational, objective and humane science-based approach to biomedical research, as underlined by the EC directive 2010/63 and the corresponding Italian legislation (DL 2014/26). As does the Directive, we do stress that "the final goal (of humane research) is full replacement of procedures on live animals for scientific and educational purposes as soon as it is scientifically possible to do so". Thanks to this inclusive approach, it is becoming a point of reference for research and teaching resources in Italian academia and a platform for discussions. Indeed, since its inception, the Centro 3R has sought to engage students, researchers, policymakers and the public to underline the importance of the 3Rs in biomedical research - not only from an ethical perspective but because a properly designed experiment which takes into account animal welfare and better technology renders quality data. Besides the institution of courses in degree programs and the sharing of best practices, the Center holds an annual meeting to encourage dialogue and cross-disciplinary exchange between the scientific community, the public and other stakeholders.

These Special Issues of *Biomedical Science and Engineering* are dedicated to the 2019 Annual Meeting of Centro 3R. As attested by the abstracts, the Centro 3R brings together a range of expertise in disci-

plines such as pharmacology, engineering, veterinary science, law, biology, medicine and philosophy. Additionally, attention is being paid to the development of courses on the 3Rs within the different degree programs offered by the participating universities. Two examples have been presented by Bassi<sup>1</sup> and Chiono<sup>2</sup> while Dura and Holloway<sup>3</sup> have described the resources made available by EURL-ECVAM. Of interest to biomedical engineers and scientists are the novel models of epithelial tissues: some focus on corneal epithelia for drug delivery and permeability studies,<sup>4,5</sup> bioreactors with integrated TEER and flow as physiologically relevant *in vitro* models<sup>6</sup> (bioreactors with cyclic) membrane deformation for lung models.<sup>7</sup> Given the extensive expertise on materials and materials engineering in the Centro 3R, many examples of novel scaffolds are reported too.<sup>8-12</sup>

In conclusion, these special issues are testament to the depth and breadth of work being performed in Italy as well as the commitment of its scientists to the principles of the 3Rs.

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Correspondence: Arti Ahluwalia, Department of Information Engineering, University of Pisa, Pisa, Italy  
E-mail: arti.ahluwalia@unipi.it

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