

## **Engaging the public to build a better biosafety and biosecurity culture**

Lei Pei, PhD, Biofaction KG, Vienna, Austria

Biosafety and Biosecurity are now topics receiving more public attention due to the recent media coverage of the biosafety and biosecurity cases. Although there are continuous debates on the issues along the development of the research in the field, the recent reports on biosafety and biosecurity lapses indicate that it is necessary to reinforce our biosafety and biosecurity culture [1, 2]. These incidences, ranging from lab staff members potentially exposed to anthrax, shipping samples contaminated with lethal flu strains, to smallpox vial unattended, all violating the existing guidelines, showed the lack of compliance and oversight even in those prestige laboratories. Thus, novel strategies are needed to strengthen a biosafety and biosecurity culture. On the one hand, it is important to initiate a movement dedicated to biosafety and biosecurity among the research community, by means of continuous education on the issues and stringent oversight from the corresponding authorities is the best practice to ensure public trust and support on our research. On the other hand, engaging the public to this movement should help to build a better biosafety and biosecurity culture.

Biosafety encompasses the prevention of unintended negative consequences involving biological material, such as accidents. Biosecurity deals with all the intentional misuse for nefarious purposes. Biosafety wants to keep the pathogens away from people, while biosecurity aims to keep those with malicious intention away from getting access to the pathogens. Recent discussions on the challenges raised by synthetic biology showed that the challenges came from two perspectives- one was the extent of what synthetic biology would have achieved as an engineering discipline, and the other was the extent of de-skilling the tacit knowledge and other socio-technical factors to reproduce experiments based on available scientific knowledge [3]. One of the goals of synthetic biology is making biology easier to engineer. If such a goal can really be achieved, the tangible and intangible barriers to prevent misuse of science will not function any longer. The de-skilling of factors critical to reproduce the technologies would provide outsiders more accesses and increase the biosecurity threat. Meanwhile, the lay people will not only just learn about the technology, but also they are more likely able to apply the technologies to those that of their own interest. Thus, engaging the public in would be an important to build the framework of better biosafety and biosecurity culture.

To engage the public is not easy. The communication skills of the scientists to interact with the public are not sufficient [5]. Switching the scientific communication between scientists and the public from a deficient model to a public debate model and a co-production of knowledge model should be applied to the communication on biosafety and biosecurity issues. Both of the latter two models call for a two-way communication [4]. Such bi-direction communication between the scientists and the public will address a broad range of issues, which is also an important component for the framework of Responsible Research and Innovation.

Besides the traditional approaches to engage the public (such as survey, workshop, and etc), there are new channels for scientific communication. The internet has brought a convenient channel for science communication to engage the public. Studies have shown that more and more laypeople obtain science and technology related information from the web [6]. While online media provide more channels to reach the public, there are also challenges of using them for biosafety and biosecurity communication —the information should not be too complex but still factually correct; while the web should be designed to provide incentives and motivations for the public to engage in a participatory manner. A tailored made documentary film on the topic may probably easily provide

the information. It has been shown repeatedly that audio-visual content is widely preferred over written materials when it comes to information consumption about science and technology. To programme a science game may provide another approach to engage the public, exploiting the benefits of science gamification which is currently one of the new trends in communicating educational content in an entertaining way. Furthermore, organizing a science/culture fair would provide an attractive platform for scientific communication, of which is more likely receiving attention from the interested public and coverage from the media.

Engaging public to build a better biosafety and biosecurity culture is not an easy task, although it is an urgent issue [7]. More research on this topic is needed. Thus new approaches or models can be developed to engage the public in an efficient way.

#### Reference:

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