

Awareness and responsibility in academia: a bottom up approach to address the misuse potential of biological research

Summary of three discussion sessions among Swiss life science researchers

In spring 2016, over 40 life scientists from Swiss academic institutions discussed ways on how to address the misuse potential of biological research at three workshops. Vivid discussions revealed the need for increased reflexions and education in order to foster awareness of biosecurity and to reaffirm the commitment to responsible behaviour. Participants would welcome a bottom up approach within academia that uses educational tools and guidance documents. In contrast, they don't consider more formal or stringent controls - in the form of a code of conduct, a biosecurity committee or biosecurity laws - as purposeful in a field as difficult to denominate as misuse of biological research. The discussion sessions were organized by the Forum for Genetic Research of the Swiss Academy of Sciences with support from the Federal Office of Public Health.

Background of the discussions

Research in life science generates knowledge and technologies that significantly contribute to the improvement of human and animal health and welfare and to a sustainable management of the environment. However, some of the same discoveries could also cause harm if they are malevolently applied for nefarious purposes. The anthrax attacks in the US in 2001, one week after the September 11 attacks, suddenly brought this „dual use dilemma“ of biological research into the spotlight. Since, discussions have been further fuelled by a number of virology experiments, most famously the gain-of-function experiments on the avian influenza virus H5N1 in 2012. As a bottom-up approach, expert bodies in Europe and the US repeatedly suggested that increasing awareness of the issues among individual researchers and research institutions via a code of conduct or a biosecurity committee could be the best protection against potential harm. On the other hand, authorities in many European countries evaluate the need for biosecurity regulations as a top down approach, with Denmark being the first country to actually put such regulations into force.

It is in this context that the Forum for Genetic Research of the Swiss Academies of Sciences organized with the support of the Federal Office of Public Health in spring 2016 three workshops in Zürich, Lausanne and Bern, respectively. Forty-two scientists out of over 150 invited - mostly from major academic research institutions - joined the 2.5-hours long discussions. Participants had various research backgrounds - e.g. microbiology, molecular and cellular biology, biotechnology, genomics, neurobiology, plant biology - and were at different career stages.

Variable awareness and hardly any institutional mechanisms

Not surprisingly, the awareness of the dual use nature of life science research varied strongly with the particular field of research individual participants were involved in. Awareness appeared highest among researchers involved in synthetic biology or pathogens research (influenza and others). In these fields, reflexions on biosafety and biosecurity were described as already inherent to the design and execution of research. Outside of these fields, however, participants estimated the awareness of misuse potential among their colleagues, students and institutes as low. As stated by a researcher: *“Biosafety is well taken care of but no one is aware of biosecurity. I have never heard of any discussion at any level about biosecurity.”*

Among the approximately 35 different academic life science institutes represented at the workshops, only one appeared to have put in place specific guidelines for responsible behaviour. Similarly, the “Do-it-yourself Biology” community had developed a code of ethics for their members. Participants stressed, however, that their institutes and laboratories are following strict biosafety measures, which – to some extent - also address biosecurity concerns.

Scientific community best suited to address the misuse potential of their research

Most participants believe that scientists have a responsibility towards society that goes beyond legal requirements. They also think that misuse of life science research is a topic that needs to be addressed by the academic scientific community itself, as proper risk evaluation and management depends on expert knowledge. Therefore, awareness within the research community needs to be raised, and reflexion and discussions encouraged. *“It’s the awareness that is important [...]; if everybody is aware of the possibility that something could go wrong, then people would say: did you think about your experiment? That is something we should aim for.”*

Correspondingly, most scientists questioned the use of implementing biosecurity regulations at a national level. They also worried that too strict regulations could hinder legitimate research: *“It’s dangerous if somebody should judge your research [in regards to its misuse potential]. In this field, you can’t set criteria black and white.”* Interestingly, though, many participants were surprised to hear that federal authorities currently did not evaluate the misuse potential of biological research or request biosecurity measures in the context of biosafety assessment of notifications and authorisation requests according to the Ordinance on Contained Use of Organisms.

More education and guidance material but no formal code of conduct

After a more general discussion, the workshop organizers proposed a code of conduct as a possible tool to raise awareness. This code of conduct had been put together by an expert group based on international recommendations and addressed the following points: 1) be aware and raise awareness; 2) assess the misuse potential; 3) design research to minimize misuse potential; 4) apply safe and secure practices; 5) consider how to transfer and publish information; 6) foster education and oversight.

A majority of participants shared the opinion that a written document of some form could be a useful tool to raise awareness within the scientific community and to serve as a starting point for discussions and reflexions. *“It’s a question of cultural education, this [document] could be part of this; to show what is standard here and what we think”.* However, most scientists questioned the usefulness of the code of conduct in its proposed form and several raised the questions regarding its implementation and enforcement. *“What do we do with those people who don’t sign this code of conduct? Exclude them from research?”*

While a formal code of conduct met with great scepticism – among others due to its restrictive and negative tone, its lack of specificity in some points and questions regarding its implementation -, participants strongly and nearly unanimously expressed support for more awareness raising through education, ideally at all academic levels. In addition, many scientists were in favour of strengthening the dialogue with the public in order to communicate their commitment to responsible research.

The Forum for Genetic Research greatly values these inputs from the life science research community and is currently considering different options on how to integrate them into its current and future activities. Questions and comments regarding these activities can be addressed to Ursula Jenal and Franziska Oeschger from the Forum for Genetic Research (geneticresearch@scnat.ch)