

Scientific Life

A Plea for the Renewal of the ISBR

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The recent meeting of the International Society for Biosafety Research (ISBR) focused on so-called genetically modified organisms. For decades, in most regulatory frameworks, recombinant DNA-modified organisms have been the wrong focus of unbalanced agri-food regulations. The ISBR should instead adopt a scientifically defensible and truly risk-based perspective, abandoning a misleading pseudo-category.

The International Society for Biosafety Research (ISBR) is a nonprofit organization (http://isbr.info/About_Us) whose members are 'researchers from academia, government bodies and technology developers, as well as risk assessors and regulators.'

According to the main Web page of the Society (<http://isbr.info/>), 'the mission of ISBR is to promote the practice and application of science in the fields of agricultural biotechnology and environmental risk analysis. In particular, ISBR aims to encourage research which supports the safe and effective use of biotechnology in agriculture and food production and assists the development of the relevant policy and regulation.'

In our opinion, any reasonable person should agree with this goal, with 'agricultural biotechnology' defined appropriately, that is, a broad and comprehensive approach, encompassing the whole 'green' biotech arena, older and newer techniques and methods, and

centering on a scientifically defensible and risk-based consideration of the safety and environmental issues of each new product (crops, animals, microorganisms, and their by-products). Such an approach should focus on the phenotypic traits of an organism, irrespective of the processes that breeders have used to obtain it [1].

However, the ISBR's main mission statement appears to conflict with the organization's actual practice, in that all the ISBR documents (comprising the bylaws: <http://isbr.info/Bylaws>) make reference to 'genetically modified organisms (GMOs)', as though they were the only group of agri-food products derived from 'agricultural biotechnology'. That misconception feeds the popular myth that GMOs are in some way a meaningful category, ignoring, for example, the 3000+ crop varieties obtained via physical/chemical mutagenesis (<http://mvgs.iaea.org/>) as well as untold numbers of plants obtained via wide crosses with embryo rescue, which are 'transgenic' in fact, if not in name.

The biotechnology research and community (R&D) community is well aware that the traditional methods (e.g., chemical and irradiation mutagenesis and wide crosses with embryo rescue) have been excluded from regulation for purely political reasons. Furthermore, it is well known that even – one might argue, especially – the most traditional techniques can result in unsafe outputs: consider, for example, the Lenape potato (<http://boingboing.net/2013/03/25/the-case-of-the-poison-potato.html>). Theoretically, any new plant variety may be unfriendly to an environment (e.g., invasive). Yet, for the most part, there is little concern if these potentially noxious organisms have been obtained via methods that do not fall into the legalistic pseudo-category of GMO.

In our opinion, organizations such as the ISBR should avoid that unscientific

dichotomy, because there is no satisfactory explanation of why so-called GMOs, however defined, have been the focus of 40 years of excessive attention and regulation, while very similar products – for example, herbicide-tolerant crops obtained by 'conventional' techniques, such as the Clearfield varieties obtained by crossbreeding naturally occurring varieties [2] – are not subject to the endless, redundant red tape; over-regulation; and even outright bans of GMOs.

Similarly, if transgenesis is the (supposed) problem, why are naturally occurring or man-made but 'non-molecular transgenic plants' not of concern? Among the former is the well-known case of the sweet potato [3] with its natural transgenes, and dozens of other documented cases of organisms with natural transgenes (see the extensive lists at <http://gmopundit.blogspot.it/search?q=natural+gm0s>).

The latter include the many examples of intentional movement of genes from one species or genus to another.

As biologists, geneticists, and scientific societies have explained since the 1980s, scientifically this conceptual and regulatory divide does not make sense. It is the error that one of us (K.A.) dubbed the 'Genomic Misconception' [4]. To explain the mistake, we refer to a seminal paper (preceded and followed by many similar ones) by Nobel Laureate Werner Arber: 'conjectural risks of genetic engineering must be of the same order as those for natural biological evolution and for conventional breeding methods. [...] There is no scientific reason to assume special long-term risks for GM crops' (see the abstract in [5]). For a reference list of many similar positions, see [6].

The pseudo-controversy over pseudo-categories has been rejuvenated by the attention paid to the relatively new techniques of 'gene editing', including

transcription activator-like effector nucleases (TALENs), zinc finger nucleases, and clustered regularly interspaced short palindromic repeats-CRISPR-associated protein 9 (CRISPR-Cas9). We oppose simplistic solutions that would (1) include all gene editing in old or new regulatory law or (2) exclude all exogenous DNA-free new varieties from regulation. Rather, we promote a stratified approach (such as described in detail in [7]). We emphasize, however, that the objective of formulating more scientifically defensible and risk-based regulatory approaches cannot be merely redefining 'GMO' to be more widely acceptable. Rather, regulations must be genuinely risk based.

We welcome Alan Gray's answer (www.ask-force.org/web/ISBGMO/Gray-Alan-ISBGMO14-Reply-to-Letter-Tagliabue-et-al-June-2017.pdf) to our letter concerning the 14th International Symposium on the Biosafety of Genetically Modified Organisms (ISBGMO), organized by the ISBR. Nevertheless, in most of the sessions, the ISBR discussed recombinant DNA products and operations with a focus on the pseudo-category of GMO – and all the mischief that it engenders. We would be happy to see the ISBR live up to the stated scope of its activity, which is nicely phrased at the very beginning of its mission statement (but is soon abandoned). In fact, examining the scientific program of the ISBGMO meeting (June 2017) held in Mexico, we cannot discover any discussion of how to make regulation truly risk based.

Some may feel that GMOs, defined in some ingenious way, should be the subject of particular attention because there is much concern among the public regarding that pseudo-category. We disagree. We do not believe that such concern justifies contravening sound science in the formulation of public policy. In any case, the current flawed approaches to regulation do a disservice to the public,

who most often assume that more highly regulated products and processes pose the most risk, whereas exactly the opposite is the case here.

We cannot fully address this important issue in a short letter: suffice to say here that various of the signatories have authored articles in which it is shown that a misinterpreted concept of democracy opens the gates to the influence of destructive ideologies and reduces science to popular whim. See, for example, [8]. Encouraging the perpetuation of the anti-scientific 'GMO' meme is part of the contemporary attack on reason and on enlightened democratic values, a theme explored thoughtfully and at length [9]. Furthermore, the GMO misconception is the primary source of a relentless, ongoing, destructive, socio-political struggle that has hampered efforts to assure a higher level of food security in low-income countries [10].

We hope that in future more weight will be given by ISBR to the reality that genetic modification is a long-standing, seamless continuum of methods and technologies and that risk analysis and regulation must take that into account, and we hope that they and others will abandon the unscientific notion of 'GMOs' as a category.

The content of this letter has been endorsed by the following scientists:

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<https://doi.org/10.1016/j.tibtech.2017.10.019>

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