EDITORIAL

Wake-up call from Hong Kong

Victor J. Dzau
is the president of the U.S. National Academy of Medicine.
vdzau@nas.edu

Marcia McNutt
is president of the U.S. National Academy of Sciences.
mmcnutt@nas.edu

Chunli Bai
is president of the Chinese Academy of Sciences.
clbai@cas.cn

The Second International Summit on Human Genome Editing, held in Hong Kong last month, was rocked by the revelation from a researcher from Shenzhen that twins were born whose healthy embryonic genomes had been edited to confer resistance to HIV. Despite widespread condemnation by the summit organizing committee, world scientific academies, and prominent scientific leaders that such research was "deeply disturbing" and "irresponsible," and the launch of an investigation in China into the researcher's actions, it is apparent that the ability to use CRISPR-Cas9 to edit the human genome has outpaced nascent efforts by the scientific and medical communities to confront the complex ethical and governance issues that they raise. The current guidelines and principles on human germline genome editing are based on sound scientific and ethical principles. However, this case highlights the urgent need to accelerate efforts to reach international agreement upon more specific criteria and standards that have to be met before human germline editing would be deemed permissible.

"We need...broad agreement on...criteria for human germline genome editing research..."

Together, we call upon international academies to quickly convene international experts and stakeholders to produce an expedited report that will inform the development of these criteria and standards to which all genome editing in human embryos for reproductive purposes must conform, and to engage scientific bodies around the world in this effort. The United States National Academies are willing to lead in this endeavor. Academies are well-positioned to convene needed international expertise and to help foster broad scientific consensus on the responsible pursuit of human genome editing research and clinical applications. We strongly believe that international consensus on such standards is important to avoid the potential for researchers to rationalize the justification or seek out convenient locales for conducting dangerous and unethical experimentation. The establishment of international scientific standards is not intended to substitute for national regulation but could inform such regulation.

To maintain the public's trust that someday genome editing will be able to treat or prevent disease, the research community needs to take steps now to demonstrate that this new tool can be applied with competence, integrity, and benevolence. Unfortunately, it appears that the case presented in Hong Kong might have failed on all counts, risking human lives as well as rash or hasty political reaction.

Establishing standards alone will not suffice. We also need an international mechanism that would enable scientists to raise concerns about cases of research that are not conforming to the accepted principles or standards. The Second International Summit organizers have called for establishing an ongoing international forum on human genome editing that could provide such a mechanism, along with other important functions such as helping to speed the development of regulatory science, providing a clearinghouse for information about governance options, contributing to the long-term development of common regulatory standards, and enhancing coordination of research and clinical applications through an international registry of planned and ongoing experiments.

More than 40 years ago, scientists organized the renowned Asilomar Conference on Recombinant DNA amid concerns about safety and efficacy of what was then a revolutionary new biomedical technology. They publicly discussed and debated the issues, and ultimately, they were able to reach consensus on a set of research guidelines that eventually formed the basis for official government policy. The model of Asilomar still offers important lessons. We need to build upon the work done at recent international summits and the guidance provided by numerous organizations to achieve broad agreement on specific standards and criteria for human germline genome editing research and clinical applications—agreement that should include not only the scientific and clinical communities, but also society as a whole.

–Victor J. Dzau, Marcia McNutt, Chunli Bai

10.1126/science.aaw3127

ILLUSTRATION: DAVIDE BONAZZI/SALZMANART

Wake-up call from Hong Kong

Victor J. Dzau, Marcia McNutt and Chunli Bai

Science **362** (6420), 1215.
DOI: 10.1126/science.aaw3127