

Correspondence

CRISPR twins: China academy responds

As representatives of the Committee of Genome Editing of the Genetics Society of China and of the Chinese Society for Stem Cell Research, we were shocked by He Jiankui's claims last month that twin girls were born from embryos that were gene-edited for HIV resistance (*Nature* **563**, 607–608; 2018). Such work would violate the current code of conduct from China's ministry of health, as well as internationally accepted ethical guidelines (see go.nature.com/2erqwpcc).

The consensus of the international scientific community, including Chinese researchers in genome editing, is that engineering the human germline for reproductive purposes should be forbidden until the scientific issues have been resolved and there is broad social agreement. China has clear regulations specifying that human embryos with genetic modifications cannot be implanted, in agreement with regulations adopted worldwide.

Genome editing in somatic cells holds promise for treating many genetic diseases. This powerful technology must not be abused or allowed to undermine the trust of regulators and the public in responsible scientific research.

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CRISPR twins: what does 'editing' mean?

In view of the far-reaching implications of the birth of allegedly 'gene-edited' twin girls announced by Chinese researcher He Jiankui last month (*Nature* **563**, 607–608; 2018), we urgently need to revisit the use of the term.

It is ten years since the concept of gene editing took off (see, for

example, E. E. Perez *et al.* *Nature Biotechnol.* **26**, 808–816; 2008). This was used to describe just about any DNA modification by exogenous nuclease systems. It now makes more sense to apply it only to deliberate, precise alterations to DNA sequences. Sequences modified haphazardly by cells after the introduction of CRISPR would then be classified simply as random mutations and not as 'gene edits'.

This is not just a matter of semantics (see also M. O'Keefe *et al.* *Am. J. Bioeth.* **15**, 3–10; 2015). Characterizing He's claimed mutations to the *CCR5* gene as 'edits' misleads the public by implying that they were planned and applied with accuracy. It seems, however, that they were the result of random insertions and deletions of DNA. Exaggerating the precision of the process is harmful — in part, because it downplays the potential biological risks associated with random gene mutations in the germline.

Overall, a more-precise definition of genome editing will be helpful in the human reproductive context — in the event of more 'CRISPR babies' — and for broader CRISPR-related applications.

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WHO code on free outbreak data

To understand and control disease outbreaks, researchers need free access to the genetic sequences of pathogenic organisms as soon as they are ready (N. L. Yozwiak *et al.* *Nature* **518**, 477–479; 2015).

The World Health Organization (WHO) is proposing a code of conduct for the public release of pathogen genomic sequences at the time of disease outbreaks. By making it easier to share the benefits rapidly and equitably, the code will help public-health authorities, product developers and researchers to

collaborate more effectively, and from a position of mutual trust.

The WHO code of conduct is based on consultations with stakeholders and on lessons from recent outbreaks. Crucially, all parties must recognize the importance of early pathogen sequencing and early public sharing of data and benefits, before and during outbreaks. Sequence sharing before publication should become standard; secondary users and data providers need to collaborate on reports of sequence analyses; and international partners should support local sequencing efforts and develop a sequence-analysis network. Exploring different models for sharing sequence data will allow for the preferences of data providers.

The draft code of conduct is available at go.nature.com/2bb1kts and the deadline for commenting is 28 January 2019. **Vasee Moorthy, Peter Salama, Soumya Swaminathan** *WHO, Geneva, Switzerland.*
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Rallying cry to halt biodiversity loss

Writing on behalf of the authors of the biodiversity section of the latest Global Environment Outlook (GEO-6) from the United Nations Environment Programme, to be released in March 2019 (see go.nature.com/2b9fp9o), we are concerned about your discussion on the progress of the IPBES assessment (see *Nature* **560**, 423–425; 2018). It risks diverting attention away from the scientific consensus on the perilous status and trends of biodiversity worldwide (see, for example, go.nature.com/2rttvwn).

GEO-6 indicates that policy responses have so far been insufficient to reduce or reverse biodiversity decline. Debate on best practice for conserving biodiversity is crucial. In our view, a 'conservation triage' approach must not prioritize reactive responses to environmental

pressures at the expense of reducing those pressures. Empirical evidence indicates that land sparing benefits biodiversity more than land sharing does, yet the 'half-Earth' concept — setting aside half the Earth for biodiversity — remains controversial. Indigenous people and local communities should not be overlooked. They can offer bottom-up and innovative solutions for protecting biodiversity.

We do not yet know whether we have entered a sixth mass extinction or whether there are planetary boundaries that could define a safe Earth system for people. Meanwhile, GEO-6 reinforces the stark message that the health of the planet and its people depend absolutely on biodiversity.

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King Faisal prize a Nobel harbinger?

The prestigious King Faisal International Prize for medicine (kingfaisalprize.org) was awarded in January to James Allison, who later shared this year's Nobel Prize in Medicine or Physiology (*Nature* **562**, 20–21; 2018). Gregory Winter, one of the three 2018 Nobel laureates in chemistry (*Nature* **562**, 176; 2018), won the King Faisal prize in 1995.

Like the Nobels, the King Faisal prize still has a long way to go towards rewarding women's contributions equitably. Out of the 113 winners of the King Faisal prizes in science and medicine since 1982, 4 were women (3.54%). This is marginally higher than for Nobels: just 20 women (3.29%) are named among the 607 Nobel prizewinners in the fields of science and medicine since 1901. **Sameen Ahmed Khan** *Dhofar University, Salalah, Oman.*
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