At issue is not the nuclear genome, which contains the blueprint of an entire organism, but the genomes in our mitochondria — the small, energy-generating organelles in most of our cells. The often-overlooked mitochondrial genome contains only a few dozen genes, but it deserves as much respect as its much larger room-mate, which contains some 20,000. The impacts of an unfortunate mitochondrial mutation range from an inability to exercise hard to very serious, albeit rare, diseases.

Mitochondrial replacement involves replacing diseased mitochondria with fresh, healthy ones. This requires involving a third person beyond the parents — a woman to donate an egg to the process that contains only healthy mitochondria (hence 'three-person embryo').

The procedure does not alter the mitochondrial genome. But on the basis of animal experiments, some biologists claim that foreign mitochondrial genes might interfere with the expression of the nuclear genome in unpredictable, and perhaps dangerous, ways (see page 444).

These concerns were brought up during the consultation process with scientists and the public carried out by the UK Human Fertilisation and Embryology Authority (HFEA) before the UK Parliament voted in February in favour of allowing the procedure. Far from being rushed, as some claim, the consultation was done over many years and was judged as a fair public-engagement exercise by independent experts who monitored the process.

The HFEA believes that the problems seen in organisms such as flies and mice would not be repeated in humans — in the main because they have not shown up in children of mixed-race couples in which the mitochondrial DNA of the mother and the nuclear DNA of the father are likely to be the most distant. This point helps to address ethicists' worries that unanticipated problems in children born following mitochondrial replacement could be passed on through the generations.

Other ethical concerns about the UK move can be summarized as anxiety over a possible slippery slope to full-scale germline manipulation to address a broader range of conditions. These concerns are heightened by advances in gene-editing techniques such as CRISPR/Cas9.

Last week's release of the HFEA regulations should dispel fears of a slippery slope. Applications are narrow and oversight is strict. The agency decided to allow mitochondrial replacement only to avoid serious diseases, and not for the attempted treatment of infertility. (Some clinics in Canada have offered the procedure in the belief that a shot of fresh, young mitochondria may somehow invigorate eggs from older women, but there is little scientific evidence for this.)

"The HFEA regulations should dispel fears of a slippery slope."

The regulations explicitly exclude the editing of the nuclear or mitochondrial genome. Licences will be given only to centres whose competence has been approved, and even then, these centres will have to seek separate approval for each patient. Licensed centres will be obliged to put a process in place to monitor the clinical follow-up of children born following mitochondrial donation, providing that parents agree.

Scientists estimate that the number of women likely to be eligible for the procedure will be around 150 per year in Britain and about 800 in the United States, where the Institute of Medicine is carrying out a similar consultation for the US Food and Drug Agency, which will be responsible for licensing it. The United Kingdom has made an advisable step forward that serves as a useful invitation for all to follow. ■

STAP revisited

Reanalysis of the controversy provides a strong example of the self-correcting nature of science.

This week, *Nature* revisits one of the most controversial scientific episodes in recent years: the now-retracted discovery of a claimed new way to reprogram cells, stimulus-triggered acquisition of pluripotency (STAP). On our website we publish two Brief Communications Arising (BCAs) that relate to the retraction. And on page 469 we publish a related Review on pluripotency.

One BCA details the efforts made by many laboratories to reproduce the STAP phenomenon without success (A. De Los Angeles *et al. Nature* http://dx.doi.org/10.1038/nature15513; 2015). The other presents the results of a genomic analysis of the claimed STAP cells, performed as part of a 2014 investigation by Japan's RIKEN institute but not previously published (D. Konno *et al. Nature* http://dx.doi.org/10.1038/nature15366; 2015). Using sequencing-based approaches, this analysis shows that all of the claimed STAP cell lines were contaminated with embryonic stem cells, and that this contamination affected the results. De Los Angeles and colleagues' BCA also includes an analysis of sequencing results published in the original papers, and reaches similar conclusions regarding contamination.

The Review, written by a collaboration of leading scientists who work with pluripotent stem cells, offers a state-of-the-art summary of the field, and provides a checklist that researchers can use to determine whether a cell has pluripotent capacity.

Why is *Nature* publishing these pieces? The main reason is to update the scientific record. The wording of the STAP retraction notices left open the possibility that the phenomenon was genuine. It said: "Multiple errors impair the credibility of the study as a whole and we are unable to say without doubt whether the STAP-SC phenomenon is real." The two BCAs clearly establish that it is not.

It is also important to recognize and highlight the community-driven effort to reproduce the findings. The negative results of some of these efforts were made public informally during the controversy, but for some lengthy experiments this was not possible. Science-in-the-making can be made public immediately. But, ultimately, reproducibility efforts should be peer reviewed.

Another reason why *Nature* has chosen to publish this trio of pieces is to address some of the indirect questions posed by the high-profile controversy, which provoked discussions in both the stem-cell field and the broader research community. The Review, in particular, is intended to offer guidance from the community to help researchers, editors and reviewers to decide how best to evaluate future claims as well as how to view those already published in the scientific literature. Comparing the genotypes of reprogrammed pluripotent stem cells with those of parental cells, it points out, can check their provenance.

The stem-cell field holds enormous promise for therapy. As a result, all claims of considerable importance should be verified with utmost care before being made public. The Review suggests that such claims in the field of reprogramming and pluripotency should be demonstrated in more than one experimental model, and encourages their independent replication.

Nature will endeavour to help the field to achieve its promise, and is looking at ways to support and encourage this reproducibility enterprise. For example, we ask authors to include more details about the methods developed in their studies. We strongly encourage our authors to deposit step-by-step protocols on freely accessible platforms, such as Protocol Exchange (www.nature.com/protocolexchange) — this may be requested for extraordinary claims, at the editor's discretion. We encourage our authors to verify the origin of the cell lines they use, as we do for cancer cell lines (see *Nature* **520,** 264; 2015).

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The Review concludes: "Science is ultimately a self-correcting process where the scientific community plays a crucial and collective role." In this case, the stem-cell community has excelled in that role and should be congratulated. ■