

THIS WEEK

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Stem-cell fiasco must be stopped

In the public interest, the Italian health minister should resolve the ongoing uncertainty over a government trial of a controversial therapy.

“This is the end of the matter and we are very happy.” That was the reaction of Luca Pani, head of the Italian Medicines Agency, to the news in October that the Italian health minister had halted a government trial of a controversial stem-cell therapy. He is less happy now, and his dissatisfaction should be shared by anyone who cares about the rigorous use of scientific evidence and the protection of vulnerable patients.

Just when Pani and others in Italy were breathing a sigh of relief, an Italian court has thrown an unexpected spanner into the works. The court ruled last week that an expert committee behind a detailed report that demolished the scientific basis for the clinical trial of the claimed treatment was unlawfully biased (see *Nature* <http://doi.org/qgr; 2013>).

The judgement undermines the October decision made by health minister Beatrice Lorenzin to cancel the trial, which could yet be allowed to proceed. It must not. As *Nature* and independent experts have pointed out many times, there is no evidence that the claimed therapy works, and indeed it could be harmful.

Lorenzin should bring a stop to this uncertainty. She must release the members of the committee who prepared the critical report from a confidentiality agreement. They must be free to give the public their expert opinion on the claims of the Stamina Foundation based in Brescia, which extracts stem cells from a patient's bone marrow, manipulates them and then injects them back into the same patient's blood or spinal cord. And Lorenzin should release to broader scrutiny the protocol that the organization says it will follow to conduct the trial.

Already, members of one patient group have appealed for such openness, arguing that they have waited long enough to understand whether the Stamina method could help them live, and they want to be able to judge for themselves.

Lorenzin has responded that this is not in her power. It is unusual for a government-sponsored clinical trial to be so secretive, and it is natural that many are now asking questions about why the government insisted on confidentiality that would extend well beyond any trial, and why it should not be lifted when it is so clear that this would be in the public interest.

She must act now because things could soon get worse. Last week's ruling by a regional administrative court in Rome said that a new committee should be appointed to take another look at the validity of the trial. To make this successor committee more balanced, the court suggested, it could invite foreign scientists to participate.

This may seem a good idea, but it is venturing onto dangerous ground. There exist powerful international interests that support clinics offering unproven stem-cell therapies in countries such as Mexico and Uganda. Such countries lack the strict regulatory oversight that prevents the exploitation of desperate patients in Europe and the United States — and the clinics would love to see a regulatory loophole open in a European country. In setting up a replacement committee, Lorenzin must go to scientists who are independent of the companies

that lobby for looser regulation of stem-cell therapies.

Stamina had been treating seriously ill patients, mostly children, on a ‘compassionate basis’, since 2007 — until Pani's agency closed its laboratory in Brescia in August 2012 for safety reasons. Some patient groups have lobbied passionately and publicly for access to the therapy that Stamina chief Davide Vannoni claims can cure a range of otherwise deadly diseases.

In November, when it seemed that the clinical trial was finally off the books, Vannoni led a demonstration in front of the parliamentary buildings in Rome, where patients threw their own blood at pictures of the president and prime minister. The emotion of those whose children are fatally ill is a powerful weapon.

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The judgement — a ruling on an appeal by Stamina — shocked scientists in Italy and should shock scientists elsewhere. It seems not to take into account that the committee was restricted to considering Stamina's clinical protocol and recommending which specific disorders should be treated in any clinical trial. The committee was asked only to assess whether the technical aspects of the proposed study satisfied ethical, clinical and legal standards.

The court argued that the committee lacked balance because most members were known opponents of the Stamina approach. It also complained that the committee had failed to look at documentation of Stamina's claims to treatment successes (something beyond its mandate).

The uncertainty resulting from this latest judgement must be ended. Lorenzin must find the courage to act. ■

Sink or swim?

A rethink on monitoring land-use change is needed to estimate effects on global warming.

During the seven decades of its existence, the Soviet Union was a notorious terra incognita for Western geographers and map-makers. Information improved when remote-sensing satellites began to circle the globe, but the vast lands of Russia and her former satellite states only became accessible to Western scientists after the end of the cold war.

More than 20 years on, the region continues to surprise. The demise of the Soviet Union and the socio-economic disruption left in its wake resulted in a rural exodus and substantial changes in land use. A study

by researchers in Germany (F. Schierhorn *et al.* *Glob. Biogeochem. Cycles* <http://doi.org/qg8>; 2013) now suggests that the area of cropland abandoned since 1990 is much larger than most people in the West would have guessed (see page 342).

The information that redraw the map was not supplied by sophisticated satellite-borne sensors. Instead, the authors analysed the annual sowing statistics for crops between 1990 and 2009 — which were still hard to come by — and deduced that the area used for grain production in the former Soviet breadbaskets of western Russia, Belarus and Ukraine has decreased by more than one-quarter. This decline is substantially greater than the estimate made, mainly from satellite data, in 2009 by the UN Food and Agricultural Organization.

Why does this decrease matter? Most immediately, millions of hectares of fertile land are lying idle while a growing world population demands more food. As urbanization, desertification and increasing water scarcity constrain the extension of arable land worldwide, this unsown land might look like a precious resource. But as nature gives with one hand, it takes away with the other. These abandoned areas have become important carbon sinks. Substantial amounts of organic carbon have accumulated in their untilled soils and natural vegetation over the past two decades. If intensive agriculture were to resume, this carbon would be rapidly released into the atmosphere as carbon dioxide, contributing to global warming.

The abandoned Eastern European croplands highlight the perennial trade-off between agriculture and climate protection. And they show yet again that the debate over what to do about this needs to be better-informed by more robust data.

Russian soils and forests are a major part of the global terrestrial carbon sink. Russia's last-minute signing of the 1997 Kyoto Protocol on Climate Change (and its possible involvement in a future international agreement) owe much to the prospect of substantial gains from the sale of carbon credits. The possibility that Russia's natural carbon sink has increased is potentially lucrative news for a country whose leaders and scientists often keep a low profile when it comes to global warming.

However, the true size of the Eastern European — and the global — terrestrial carbon sink remains disturbingly uncertain. Discrepancies

in various estimates of its size based on changes in land use point to shortcomings in regional and global carbon accounting — a discipline on which any new international climate regime will fundamentally rely. Whether or not the revised estimates on the extent of post-Soviet land abandonment are correct, they underscore the fact that satellite observations of land-use dynamics, in Russia or elsewhere, are no credible guide to a region's carbon balance.

A matter so central to predicting the rate of global warming deserves more attention. But existing remote-sensing technology offers relatively coarse observations of land cover and land-use change, which means that assessments are often little more than good guesses.

“Millions of hectares of fertile land are lying idle while a growing world population demands more food.”

Space-borne sensors such as the Moderate Resolution Imaging Spectroradiometer (MODIS) instruments on NASA's Terra and Aqua satellites do provide rough but useful land-cover classifications. But over dry regions such as the south Russian steppes, spectral analysis does not discriminate well.

Moreover, the spectral fingerprint of an area tells nothing about its past and current management, such as the application of fertilizer, which affects a soil's carbon-sequestration capacity.

In the absence of reliable satellite observations, land-use dynamics need to be continuously monitored on the ground. A NASA-funded project on land cover and land-use change in western Russia is setting the right tone by incorporating the results of field surveys with remote sensing and statistical modelling. Similar field studies would be desirable in other countries, such as Brazil, Argentina, China and India, where land use is undergoing major transitions.

Ultimately, only improved satellite observations can provide the global data sets required to understand the elusive global carbon sink. The European Space Agency's €400-million (US\$551-million) BIOMASS radar mission, selected in spring as Europe's next Earth Explorer mission and scheduled for launch around the end of the decade, could make a real difference — if mainly in the tropics. Emerging space nations, there is a great opportunity to be seized. ■

Futures redux

Can you tell a sci-fi tale in just 200 characters? Then the Nature Futures competition is for you.

As 2013 prepares to gasp its last, this issue follows a venerable tradition and looks back at the myriad events, images and people that made the news and shaped the year's scientific agenda (see page 344). These are collected together with a host of highlights on our website (www.nature.com/2013), where there is even an online quiz to test your memory of what happened in science this year (go.nature.com/izlxfn).

There remains one darkened recess of the *Nature* enterprise that, Scrooge-like, is resolutely refusing to join in. Futures, our science-fiction column, is doggedly pursuing its agenda and is keeping its sights fixed firmly on the, well, future. For more than a decade, Futures authors have been addressing the key questions that any visionary would wish to answer. Is the human race doomed? What are aliens really like? How will technology change the way we live? And can a soft drink really save your life?

Like the famous Time Lord who turned 50 last month, Futures has enjoyed more than one incarnation — although its present form has proved most stable, appearing as it has on the back page of *Nature* since July 2007 (nature.com/futures). So far, Futures has published more than 500 stories — and sadly has been forced to reject more than

ten times that number (often because of space constraints, although there was one unfortunate time when a pan-dimensional being from a parallel universe took possession of the editor for a week — apologies to those whose e-mails went unanswered).

As well as watching the skies, Futures has surreptitiously infiltrated the office across the hall, where it has activated the sleeper implanted several years ago behind the filing cabinet in the corner. The result is that from January, sci-fi will return to the pages of *Nature Physics*, offering an extra 12 chances a year to predict what may come to pass. (The submission address is the same: futures@nature.com.)

And the changes don't end there. Back in 2007, we published an anthology of some of the early Futures stories. That too has regenerated, and *Futures 1* (note the '1': there are more planned for 2014) will be available as an eBook from 24 December — ideal, say, for a last-minute virtual stocking filler.

To celebrate this release and the fact that *Nature Physics* is going back to the Futures, we are offering a chance to win a copy of the eBook, plus a year's subscription to *Nature*, in a dazzling competition. Inspired by the brevity of Twitter, we want you to tell a short sci-fi story. And we mean short. No more than 200 characters. This truncated tale can be input at these galactic coordinates: go.nature.com/rnrnxx. The closing date is 31 January 2014.

Robots, extrasolar aliens and genetically modified beings are not eligible to participate — unless you have managed to take over the planet by the closing date. In which case, can we just say how well your new skin suits you, and please allow us to show you the way to the executive suite. ■

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