

## Commentary

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# An American scientist in Tehran

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## Enthusiastic stem-cell researchers in Iran face plentiful funding but a shortage of equipment

As I filled out the paperwork and purchased a plane ticket to attend the Eighth **International Royan Twin Congress** in Iran, colleagues and acquaintances accused me of acting rashly. They were surprised that I dared to go to Iran; many other US scientists invited had declined because of safety concerns.

During my time in Tehran, however, I encountered only enthusiasm and hospitality. Other Westerners, such as Emory University's Sarah Berga, who has spoken at this conference before, were treated equally well. My only regret is that there were not more Americans there. Despite my colleagues' concerns, I felt safer than if I had been a tourist in a large American city. There were no panhandlers or aggressive touts to harass me, and the country is beautiful. I was, of course, careful to avoid controversial political topics and sensitive to religious feelings. Had I been a woman, I would have worn a long jacket and covered my hair.

The Royan conferences on reproductive biology are hosted by the Royan Institute in Tehran, one of the premier research institutions in the Muslim world. The word *royan* means embryo in Farsi, and the institute has a strong emphasis on human embryonic stem cells and reproductive biomedicine. The Iranian government is enthusiastic about supporting stem-cell science. Researchers must obey some ethical rules: human reproductive cloning is not allowed, and Ayatollah Ali Khamenei, the country's spiritual leader and highest authority, has warned researchers to be careful that making parts of human beings does not lead to the production of a human being. Within those guidelines, scientists in this field are well supported by the religious government. When the Royan Institute moved to a new building this year, Khamenei visited to express his support. The new building is very modern and the institute attracts the best students.



Royan Institute's Hossein Baharvand, Rudolf Jaenisch, and students

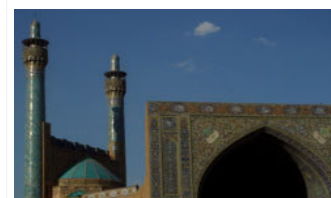
The congress attracted over 2,000 participants and more than 80 speakers from Iran and all over the world, but only seven speakers were from the USA. Sessions were conducted in English and ranged from gynaecology to epidemiology to ethics, as well as, of course, stem-cell biology. The conference facilities were excellent and discussions within sessions and in the corridors were lively. Accomplishments presented at the conference included a cloned sheep, molecular characterizations of pluripotency and other work in proteomics, cellular reprogramming, and work on both adult and embryonic stem cells. This annual congress is of great importance for Iranian scientists, as it is the best, and for many the only, way of meeting foreign scientists.

International collaborations are even more crucial for scientists in Iran than in other countries because of the absurd logistical hurdles Iranian scientists face in doing their work. The main problems for science there are not within the country, but in moving people and equipment between Iran and the rest of the world. Although Iran has a permissive internal regulatory environment and its researchers are well funded, the country cannot import the scientific equipment and supplies that most stem-cell scientists use every day, and that many could not imagine doing without. This is largely the result of trade sanctions imposed on Iran by other countries, including the United States and the European Community, under which the export of some items of scientific equipment to Iran is banned and others require special export licenses.

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One scientist I met had completed a postdoctoral fellowship in Canada before choosing to come back to work in Iran. He now heads a group of researchers studying the proteomics of stem cells; they've solved crystal structures and published in international journals. But they do not have access to a mass spectrometer, the standard workhorse of almost all proteomics laboratories. The lack of instrumentation means that they must partner with other labs. Once they've succeeded in making a protein, they send it off to Germany for analysis. Again, this limitation is not because of the cost of these essential machines; it is because a part is made in America and the US trade embargo prohibits its import into Iran.

Delays and setbacks are built into the scientific process no matter where it occurs, but researchers in Iran face an additional burden imposed, largely, by politics. Cell biologists lack even the machines that sort cells by surface-protein markers because the necessary US-made equipment cannot be imported. They cannot perform many experiments that we consider routine, but rely on collaborators who have the necessary equipment. Even when equipment has been procured, Iranian researchers face logistics that prevent them from getting on with their experiments.



Sheikh Lotfollah mosque in Isfahan

It seems to me that these restrictions are not in anyone's interest. Scientists themselves exacerbate the situation, fuelled by misinformation that they put themselves at personal risk by travelling to Iran. Of course, people who would not be able to refrain from political discussion or dress as expected would be wise not to go. But the vast majority of scientists would find themselves surrounded, as I was, by courteous, hospitable, well-informed men and women who relish interaction with other scientists. Unfounded apprehensions about the risks of travelling to Iran effectively add a scientific embargo to the political one.

Iranian scientists have no such worries about travelling abroad. At every turn, students—both men and women—asked for my advice in obtaining a position in an American laboratory. Although scientific supervisors in Iran are rightfully concerned about a brain drain, they are also keen to support their students' training. If equipment is lacking for a given project, it may make more sense to send a student, and not just samples, to a laboratory outside the country. My understanding is that Iranian students and postdocs who find positions in foreign laboratories can expect government help in covering their expenses.

European and Australian stem-cell laboratories are open for collaboration and exchange with Iranian scientists, but Iranians have little contact with Americans. A major

hurdle is the difficulty in obtaining a US student visa. For this, an Iranian scientist must first go to a third country like Turkey and arrange for an interview with a US consulate. Even after this investment in time, trouble and money, the student cannot be certain whether the visa will be granted. My impression is that many able Iranian students do not, or cannot, even attempt to get permission to study in the United States.

There are clear differences between our countries, but these fade in the laboratory as we approach scientific questions. Furthermore, attitudes and policies that stifle scientific work and collaboration hinder not only science, but also international relations. When we don't have an exchange of ideas, we foster fanaticism and intolerance; this is something that science could help to counteract.

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