THE WATER CRISIS IS HAPPENING NOW
Severe water scarcity arrives decades earlier than predicted.
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A vigil for past victims ends this year's international AIDS conference in Canada.

PD-1 could shed light on the subject. So far, he has studied 12 élite controllers, and all have normal levels of PD-1 expression — much lower than those found in most HIV patients.

Still, other scientists caution that the PD-1 story cannot explain everything. PD-1 is found on many cells, not just those that target HIV. So interfering with it may have unpredictable consequences, says Rick Koup, an immunologist at the US National Institute of Allergy and Infectious Diseases (NIAID).

Koup is publishing a paper on the PD-1/PD-1 ligand interaction in HIV patients on 5 September, in the *Journal of Experimental Medicine*. His findings indicate that blocking PD-1's interaction with PD-1 ligand may simply prevent T cells from dying, rather than rejuvenating them.

Anthony Fauci, director of the NIAID, agrees that further investigation is needed to follow up the PD-1 findings. "This work is elegant and very carefully done, and from a scientific standpoint it's solid," he says. "But we've got to be careful we don't make the majestic leap to say: now we've solved the issue of unresponsiveness in people infected with HIV. It may turn out to be that way, but we've got to be cautious." ■

Erika Check

1. Barber, D. L. *et al. Nature* **439,** 682–687 (2006).
2. Trautmann, L. *et al. Nature Med.* advance online publication, doi:10.1038/nm1482 (20 August 2006).
3. Day, C. L. *et al. Nature* advance online publication, doi:10.1038/nature05115 (20 August 2006).

China set to make fusion history

The world's first fully superconducting tokamak is soon to produce a discharge of ionized gas or plasma.

If all goes as planned, China's Experimental Advanced Superconducting Tokamak (EAST) project will make its first plasma in the next few weeks.

EAST uses superconducting coils to create a magnetic field that confines plasma inside a doughnut-shaped vessel known as a tokamak. The behaviour of the plasma should shed light on the potential of nuclear fusion as an energy source.

Conventional experimental fusion machines use copper coils, or a combination of copper and superconducting coils, to trap the hot plasma. But copper coils heat up and need to be cooled down regularly, thus limiting operating time. EAST has only superconducting coils so it can be operated continuously.

The US$25-million machine sets the stage for the multibillion-dollar ITER fusion experiment that is to be built in France; ITER, due to start operations in 2016, is similarly designed to be all-superconducting.

"We'll need new energy resources for a long-term period, and fusion will be one of them," says Peide Weng, deputy manager and chief engineer of the EAST project at the Institute of Plasma Physics of the Chinese Academy of Sciences. "For commercial use, it should be superconducting because it will need continuous operation."

China approved the machine in 1998, as part of a push towards new energy sources. Construction then began in 2000 in Hefei, in southern China. The 150-member EAST team imported some material and components, but designed and fabricated the bulk of the equipment on its own.

EAST is only one-tenth the volume of Japan's JT-60 tokamak, and one-hundredth the expected volume of ITER. It won't produce fusion power, and is designed to study advanced tokamak physics. The first plasma, created from heated hydrogen gas, will probably last for only a few seconds. Still, "it will be a very important step forward," says Toshihide Tsunematsu, director-general of the Naka Fusion Institute of the Japan Atomic Energy Agency, who visited EAST a few weeks ago. The agency owns the JT-60 tokamak.

Eventually, the EAST team aims to hold a plasma for study for as long as 1,000 seconds. In other tokamaks plasmas last for only a few tens of seconds.

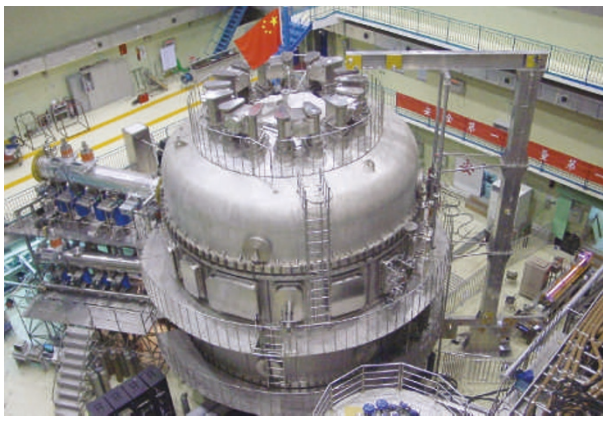
South Korea is currently developing a tokamak similar to EAST, called the Korean Superconducting Tokamak Reactor (KSTAR), whose construction is expected to be completed at the end of 2007. Japan also plans to upgrade its JT-60 machine to make it fully superconducting in a few years.

International physicists praise what China has accomplished so far. In 2003, 25 physicists visited EAST as part of its international advisory committee.

"Everybody came away very impressed," says Dale Meade, a physicist with the Princeton Plasma Physics Laboratory in Princeton, New Jersey, and a member of the group. The committee plans to hold another meeting in October, when China hosts a conference of the International Atomic Energy Agency.

In the meantime, the EAST researchers have plenty to work on, says Tsunematsu. They will have to improve key technologies, such as a device to heat the plasma, and be able to effectively control high-temperature plasma for a long period of time. "China will face a real challenge," he says. ■

Ichiko Fuyuno
With additional reporting by Geoff Brumfiel



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In the lead: if China's EAST project is a success, it will pave the way for other major fusion experiments around the world.