der" to the universe, defends giving Meyer a platform. Although Harper says he and his colleagues at the Templeton Foundation don't buy intelligent design, they also don't believe in "blacklisting scholars based on their points of view."

When it comes to research, no one seems to have qualms over how the foundation spends its money—least of all the recipients. A symposium last month on "the biology of belief and trust" "wouldn't have been supported" if the foundation did not exist, says organizer Randolph Nesse, an evolutionary psychologist at the University of Michigan, Ann Arbor, the symposium's venue. The meeting explored how "relationships based on trust" evolve, says Nesse, which is related to how societies adopt moral codes and religion. It's all right by him if the foundation wants everyone to believe God created the universe, Nesse says—Templeton didn't ask him to purvey that message when it gave him $20,000 for the symposium.

University of California, Irvine, biologist Francisco Ayala, an ordained priest who is a foundation adviser as well as head of the AAAS religion program's advisory board, backs what he calls Templeton's "idealistic" goal of "understanding God and spirituality through science." Templeton says he expects "100-fold more spiritual information within a century or two"—a goal Ayala calls "naïve." After all, accumulating religious insights may be a bit harder than growing a mutual fund—barring a miracle, that is.

–CONSTANCE HOLDEN

NUCLEAR PROLIFERATION

U.S. Sanctions Block People But Not Goods From India

A U.S. ban on exports of sensitive weapons material also prevents some Indian scientists from visiting some U.S. civilian labs

MUMBAI AND WASHINGTON, D.C.—One year after India conducted nuclear tests that triggered new U.S. sanctions against dozens of research institutions affiliated with the country's defense sector, it's business as usual for a few U.S. companies buying products and other technology from blacklisted institutions. The deals—covering equipment to monitor power plants and technology to interact with communications satellites—are possible because the sanctions prohibit U.S. exports, but not imports, of technology.

Although hailed by Indian officials as proof of their scientific prowess, the transactions are conducted under rules that scientists from both countries say often defy logic. Those who developed the technology can't travel to the United States to install the equipment, for example, and anything that needs to be repaired can't be sent back because it would violate U.S. export restrictions. And the one-way technology flow also threatens long-standing civilian collaborations that scientists say have nothing to do with nuclear weapons.

The latest U.S. sanctions, imposed last summer, are meant to deprive India of material and knowledge that might advance its nuclear weapons or ballistic missile program. (The sanctions also apply to Pakistan, which conducted its own tests last year in response to India's actions, but there are fewer U.S.-Pakistani scientific interactions.) At their core is a ban on visits to the United States by scientists working at more than 60 institutions, including India's civilian nuclear centers, fundamental science institutes, and its space agency. Visits by U.S. scientists to these institutes are also barred. "We want to limit the threat to U.S. security" from foreign scientists who might bring home information gleaned from their visits, says a spokesperson for the Commerce Department, which enforces the sanctions. "We don't mind learning their secrets, but we don't want to share ours."

Zero tolerance. Part of the D0 experiment team at Fermilab, which is off limits to Indian collaborators from TIFR, headed by S. S. Jha (*inset*).

CREDITS: (LEFT TO RIGHT) FERMILAB VISUAL MEDIA SERVICES; P. BAGLA

U.S. officials say the sanctions could be lifted if India shows a greater commitment to arms control by ratifying the Comprehensive Test Ban Treaty and an agreement on the control of fissile materials. In the meantime, the Department of Energy (DOE) is pressing the State Department for an immediate change in its current policy. Instead of issuing a blanket denial on visa requests by scientists from a blacklisted institution, say DOE officials, immigration officers should examine each request on its merits. The proposal, under review by Energy Secretary Bill Richardson, would also need State Department approval before going out as a policy directive to embassy staffs.

Such a change in policy might yield an immediate payoff for an international collaboration of high-energy physicists working at the Fermi National Accelerator Laboratory (Fermilab) in Batavia, Illinois. The team—450 scientists from 13 countries, including India—is spending $40 million to upgrade a five-story-high detector, called D0, for an experiment due to start late next year on the Tevatron, the world's most powerful proton accelerator. In March 1998, Indian scientists from the Tata Institute of Fundamental Research (TIFR) in Mumbai shipped their contribution, a $500,000 scintillation counter and shield to block out cosmic rays from the outside and to identify muon particles generated in the collision of experimental particles.

The D0 team is beginning to assemble and test the various parts of the massive detector. Under normal circumstances, that would prompt a visit by four or five senior scientists from TIFR to oversee the installa-

tion, along with a handful of students in accelerator physics eager to learn the tricks of the trade. But the Indian component remains packed up in a crate: TIFR is on the government's blacklist, and none of the team is able to obtain a U.S. visa to work at Fermilab.

"We'd like them to come now, but they've been told that's not possible," says David Cutts, a physicist at Brown University who chairs the institutional board for the experiment. "Installing the equipment is more than just tightening the nuts and bolts. We need good experimentalists to make sure that it's working properly. And they are a strong group that has been working with us for more than a decade."

The team expressed its concern in a 10 February letter to Richardson and Secretary of State Madeleine Albright. In a 30 March reply, State's country director, Gary Usrey, agreed that the sanctions have "negatively affected scientific collaboration and the search for fundamental knowledge." But he wrote that the impact is a "regrettable consequence of India's and Pakistan's decisions to conduct nuclear tests" and that "scientific collaboration will continue to be affected" unless the two countries modify their policies. Contacted last week, Usrey explained that "there's a presumption of denial on trips by officials from those entities because they are part of India's nuclear program."

Cutts believes that such an argument is spurious. "[TIFR] is like Fermilab in what it works on—basic high-energy physics," he says. "Of course, both labs are funded by a department of energy that is also responsible for nuclear weapons. But that's not what they do." TIFR's director, Sudhanshu S. Jha, also objects strongly to the current policy. "It seems the U.S. is only interested in the equipment and not the brains that make it work," he scoffs.

That description could also apply to the ongoing ties between General Electric Co. (GE) and the Bhabha Atomic Research Center (BARC) in Mumbai, India's main nuclear weapons laboratory. BARC felt the lash of the sanctions last summer when its former chief, Rajagopala Chidambaram, was denied a visa to attend a crystallography meeting outside Washington, D.C. (*Science*, 24 July 1998, p. 494). But last month the center received its third repeat order from GE's Indian affiliate to supply the industrial giant with components that use radioactive thorium dioxide to monitor the accumulation of moisture in the electric generators of power plants. "Though the [monetary] value may be small, what really matters is that it is an American order," says BARC's current director, Anil Kakodkar, who sees the contract as an endorsement of his lab's technical ability.

The Indian Space Research Organization (ISRO), which comes under the sanctions because it is widely believed to be helping in the development of the country's missile program, still manages to do business worth millions of dollars with several U.S. companies. Only last month ISRO completed a 10-year, $110 million deal to hand over 11 transponders from the Indian communications satellite INSAT 2E to the Washington-based satellite consortium Intelsat. N. Sampath, a director at ISRO, says the arrangement demonstrates that U.S. companies "can get comparable quality at a cheaper price" from India. ISRO still manages to export $2 million worth of satellite subsystems and components to U.S. companies, he notes, although he estimates that the agency has lost as much as $3 million in sales from U.S. companies that are reluctant to tackle the additional paperwork required to deal with an institution on the sanctions list.

Despite such scientific and economic setbacks, most Indian officials say that the sanctions have not prevented the country's defense, space, and atomic energy labs from carrying out high-quality work. "We have lived under embargoes ever since 1974 [when India conducted its first nuclear test] and have learnt how best to turn it to our advantage," says Chidambaram, now head of India's atomic energy program. "We look at the sanctions as a blessing in disguise."

—PALLAVA BAGLA

With reporting by Jeffrey Mervis in Washington.

CELL BIOLOGY

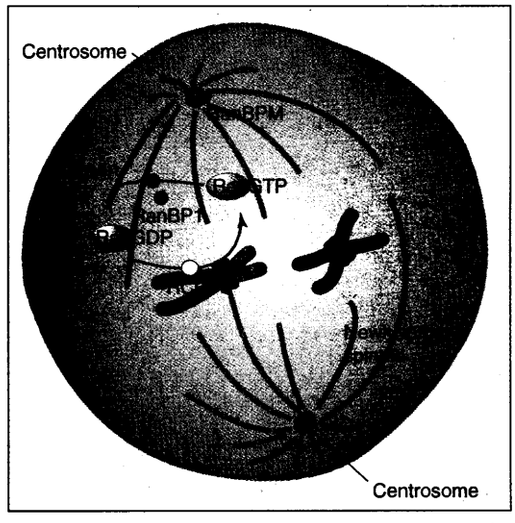
Nuclear Transport Protein Does Double Duty in Mitosis

Several studies now show that Ran, which plays a key role in nuclear transport, is also a trigger for the formation of the mitotic spindle

Like an actor who gets typecast as a villain and can't ever get recognition for his full range of talents, Ran is a protein whose multifaceted nature has often been ignored. By 3 years ago, it had gained fame for its role in shipping other molecules in and out of the cell's nucleus (*Science*, 20 February 1998, p. 1129), and that view of its role stuck. But now Ran's versatility is starting to be appreciated.

Researchers have identified what appears to be a trigger for cell division, and it turns out to be none other than the nuclear transport protein. Several teams, two of which report their results in this issue, have evidence indicating that Ran, when bound to the high-energy molecule guanosine triphosphate (GTP), prompts the formation of the mitotic spindle, an array of polymer threads called microtubules that help draw the chromosomes to the opposite sides of the dividing cell. Exactly how RanGTP does this is unclear, but the results signal the dawn of a new era of exploration into Ran and may help researchers resolve long-standing questions about the timing and progression of this early stage of cell division.

The new findings also bring Ran's career full circle. It originally earned a name for versatility when researchers implicated it in a puzzling array of cellular activities, such as modifying the RNA in the ribosomes, the cell's protein-making organelles, stabilizing chromosomes, and controlling the progression of cell division.



Ran's new role. RanGTP, which is made from RanGDP by the chromosomal protein RCC1, may help with spindle formation in dividing cells. RanGAP, possibly with the aid of RanBP1 and RanBPM, reconverts RanGTP to the GDP form.

But with the discovery of Ran's role in nuclear transport, they concluded that the various derangements seen in cells with a faulty *Ran* gene were the indirect consequence of a disruption in nuclear transport. For example, cells might not divide normally because the messenger RNA encod-