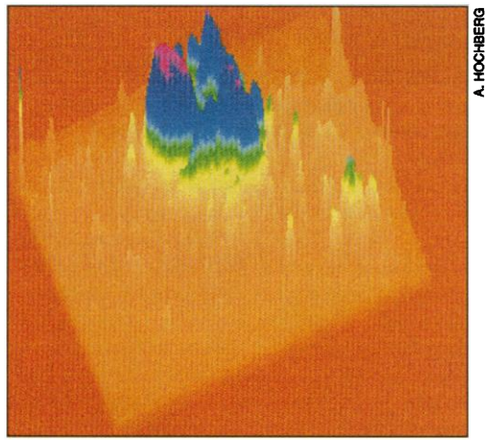
ISRAELI-PALESTINIAN RESEARCH

As Mideast Peace Process Lags, Science Endures

Strife-torn Arab East Jerusalem is not an obvious place to find cutting-edge cell biology. Yet at Makassed Hospital, cytogeneticist Bassam Abu-Libdeh's team is screening cancer patients with an experimental technique so sensitive it can latch onto a single malignant bladder cell among millions of healthy cells. Even more surprising, the Palestinian group's collaborators—who analyze digitized images of tissue samples sent over the Internet—are Israeli researchers across town. "It's science, cancer diagnosis, and peace together," says Hebrew University of Jerusalem cell biologist Abraham Hochberg, a former army officer who initiated what he calls the "telemolecular pathology" project. "I really didn't ever believe I would achieve such a thing."

The project, which also involves scientists in Germany, is one of about two dozen such trilateral research efforts—funded mainly by Germany and the United States—launched in the 5 years since Israel and the Palestine Liberation Organization forged the famous peace accords in Oslo, Norway. By infusing money for labs and training at woefully underfunded Palestinian research institutions, these projects, totaling about $10 million in 1998, are providing crucial sustenance for science in Arab Jerusalem, the West Bank, and Gaza, researchers say. The mostly applied-science collaborations are also meant to help promote peace between Arabs and Jews—although the stalled peace talks have prevented such joint efforts from truly blossoming. "When we started out, we were hoping to strengthen and reinforce" the peace process, says Christoph Mühlberg, who administers a 3-year-old German-Israeli-Palestinian cooperation program run by the DFG, Germany's main scientific grants agency. But these lofty goals have receded, he says, ever since the assassination of Israeli Prime Minister Itzak Rabin in November 1995 and the continuing tense standoff between Israeli Prime Minister Benjamin Netenyahu and Palestinian Authority leader Yassar Arafat wilted hopes of a speedy and lasting peace.

Other political problems threaten the frail scientific detente. Frequent clampdowns on Palestinians who want to cross from the West Bank and Gaza into Israel can make doing science next to impossible, researchers say. And strong anti-Israeli sentiments in Palestinian universities complicate efforts to find Palestinian scientific partners. "We don't have complete separation between politics and science," says Naim Iraki, director of the UNESCO Biotechnology Educational and Training Center at Bethlehem University in the West Bank. Still, researchers on both sides of the political chasm view the collaborations as a vital scientific lifeline linking Palestinians to Israel and beyond. "Using science to improve the well-being of society sends a clear message of peace," says Hebrew University soil chemist Yona Chen. "It's a good, strong bridge on which politics can step."



A. HOCHBERG

One small cell, one giant leap. Israeli and Palestinian researchers teamed up to produce this image of a malignant bladder cell.

Shoring up scientific oases. The U.S.-supported projects are funded by a 20-year-old program aimed at promoting peace between Israel and Egypt. After the historic 1978 Camp David peace agreement between the former adversaries, Congressman Henry Waxman (D–CA) earmarked $5 million in the budget of the U.S. Agency for International Development (USAID) to fund joint research involving Egyptians, Israelis, and Americans. Called USAID's Middle East Regional Cooperation (MERC) program, the money—about $7 million a year—"has equipped an awful lot of laboratories and trained an awful lot of people," says Josette Lewis, who directed MERC until a month ago.

Since the Oslo accords in 1993, many MERC projects have begun to include Palestinians. Most projects are focused on applied problems in water resources, health, and agriculture. The DFG's program, which is independent of MERC's, sprang from its long-running support of joint German-Israeli research. It now funds 11 projects—including one in theoretical physics—to the tune of $5.3 million. Although publications sometimes result, sponsors don't expect the projects to yield a stack of research papers. "Clearly science is more the agent," says William Malamud, a former consultant for Hebrew University in Arlington, Virginia. "We're probably not getting the best science in the world."

But many projects do have practical payoffs in sight. For example, a 4-year-old MERC project on the population dynamics of houseflies and mosquitoes that bedevil West Bank homes and Israeli resorts has led to strategies to curb the bugs, such as improved ways of handling their primary food sources: manure and fertilizer. In another MERC study, researchers are tracking how pollutants find their way into a vast aquifer beneath the West Bank, the only source of ground water for both the West Bank and Israel. The project "hits the whole issue of peace in the region," says co-investigator Hosni Mancy of the University of Michigan, Ann Arbor, because access to water is "one of the most important and contentious issues."

Another aim of the collaborations is to help revitalize some 10 Palestinian universities, which were established in the occupied territories only after Jordan lost the West Bank in the 1967 war. After the Palestinian uprising known as the Intifadah began in 1987, most universities were shut down and professors resorted to holding classes in homes, if at all. With the end of the Intifadah in 1993, universities began to open their doors again but lacked money to teach students—let alone do science. "In [Palestinian] universities and institutions there is no money for research," says Issa Khater, director of the nongovernmental Palestinian Consultancy Group.

That makes the Western grants a lifesaver. For instance, at the Environmental Protection and Research Institute in Gaza, an independent institution, trilateral grants bring in about $700,000, a whopping 75% of its overall support in 1998. "Students who had no chance to do research are now working with very modern equipment and doing research at an international level," says Iraki, who ticks off a list of tools—such as PCR setups, a spectrophotometer, a deep freezer, and an incubator—that his lab recently acquired with its grant to study nematodes. "It's very important in terms of developing scientific infrastructure. Scientists who were just teaching are now starting to be employed in research," Iraki says.

Political reality check. Despite their tangible benefits, the collaborations inevitably get bogged down in the region's everyday troubles. One often-cited problem is the travel restrictions frequently slapped on Palestinians. Although the Internet and phones help keep research projects alive, researchers

Partnering of the Red Sea Lets Scientists Bond

Collaborations between Israeli and Palestinian scientists often have to navigate choppy waters (see main text), but the German government's 3-year-old Red Sea Program (RSP) has had to withstand a whole series of ocean squalls. It's been buffeted by, among other things, arguments over money and a Byzantine research-permits system in Egypt that has slowed research. But participants now say they see calmer weather ahead for joint studies probing the diverse ecosystem of the Red Sea's northeast basin.

The idea for the RSP came from two top scientists: Israeli neurophysiologist Micha Spira and German Nobel laureate and biophysicist Erwin Neher, who persuaded the German science ministry to put up $4.8 million to fund a proposal backed by Egyptian and Palestinian officials. Led by the Center for Tropical Marine Ecology in Bremen, Germany, and based at the Inter-university Institute in Eilat, Israel, its six dozen German, Israeli, and Egyptian scientists, and five Palestinian scientists and grad students, are now engaged in seven peer-reviewed projects spanning plankton dynamics to marine neurotoxins.

Prepeace dividend. Red Sea project scientists, working upside down, use new CaveCam to probe coral reef crevices.

The young program can already point to a handful of achievements, such as using new sonar and video technologies to study patterns of zooplankton drift and coral reef ecology. RSP scientists have also identified key metabolic genes in the plankton *Trichodesmium*, a major player in the ocean's nitrogen fixation cycle that's notoriously difficult to keep alive in the lab.

But RSP has hit plenty of snags, mainly in unraveling the intricacies of getting permits from various Egyptian ministries to work in that country's waters and collect specimens. At one point in 1996, all permits for the RSP were banned for several weeks, throwing a wrench in the program's plans for 50 ship days that year. Permits for this season were also on hold as *Science* went to press. "There's a lot of distrust, a lot of misunderstandings" between the scientists and government officials, says RSP office secretary Claudio Richter. At the same time, he adds, the officials are justifiably worried, for instance, about oversampling of unique microbial mats in Egypt's salty Solar Lake, the project's sole land-based project.

Some observers are less than impressed with the program's political record, however. According to one German official, Germany handed over too much funding and decision-making power to the Israelis, who got most of the program's equipment and in several cases incorporated Arab scientists only after projects had been planned. "It's not a very good example of how you should initiate regional cooperation," the official says. Richter acknowledges that "if you only count the dollars, you probably would reach the conclusion that it's unfair."

But money goes further in Egypt because living costs are cheaper, Richter notes, and when the Egyptians—from the National Institute of Oceanography and Fisheries in Cairo—complained that much of the funding and most equipment were going to Israel, he says, the RSP did what it could to redirect some money.

But with the bickering over funding subsiding, the collaborators say they are keen to forge ahead and even expand the program. Germany plans to fold into the RSP a bilateral marine studies project it has with the Jordanians in nearby Aqaba, Jordan. Also in the works is the first Palestinian marine science department, at Al Quds University in Jerusalem, with hefty financial support from RSP. "We won't change the big political picture," Richter concedes. But "despite all the tensions, we are really now a community of scientists who know each other and come together."

–J.K.

say, certain activities—such as training grad students, attending conferences, and conducting field research—require freedom of movement. Travel restrictions altered the course of the bladder cancer project: Hochberg had initially planned to team up with a hospital in Nablus in the West Bank, but instead chose East Jerusalem because there's no border to cross. The DFG-sponsored team now hopes to expand to West Bank hospitals.

Israel's security apparatus has also put the kibosh on important facets of other projects. For instance, the Israeli government has refused to share any of its extensive aerial surveillance data with the aquifer project, forcing researchers to rely on fuzzier satellite images, Mancy says. And agricultural scientist Jad Isaac, who directs the nongovernmental Jerusalem Applied Research Institute in Bethlehem, recalls the trouble his Palestinian institute ran into with a DFG-sponsored study aimed at finding ways to reduce the oppressive air pollution from Israeli traffic. When Isaac sent out Palestinian field workers to 37 locations to count vehicles for a few days last July, "it was a fiasco," he says. "Some of them were arrested. Some were taken to jail. The Israeli army took papers and destroyed them or never gave them back."

A more insidious problem is that some Palestinians are wary of being ostracized by their peers if they work with Israelis. "Most of the Palestinians I know liked to keep it quietish," says tropical disease researcher and MERC veteran Kate Aultman of the U.S. National Institutes of Health. "It's very much more sensitive today than it was a year ago," perhaps because of heightened tensions between Israel and the Palestinian Authority. Some Palestinians decline to co-author research papers because of the perceived stigma of working with Israelis. "We would like to see more joint publications, but at the same time, we ... certainly don't want to suggest [one] compromise [one's] career," says Lewis.

Given these obstacles, "you just have to be absolutely committed and absolutely patient," says Mancy, who worked with MERC for many years in Egypt. Mühlberg says the DFG is determined to persevere despite the travails of the peace process. The future of MERC is less certain; the program persists as an earmark that Congress adds to USAID's budget every year, and some say it's an unwanted stepchild of the agency, whose mission is development, not science.

But as they wait for an enduring peace, scientists say they take comfort in the small signs of progress. Abe Hochberg says his group pulls together in hard times: "When there was a blast in Jerusalem, [the Makassed hospital partners] would call and say, 'Our heart is with you, Abe.' " Those words alone are worth any political cost of keeping the collaborations alive.

–Jocelyn Kaiser