therefore asked the WHO's Expanded Program on Immunization (EPI) to define what it would require to add SPf66 to the vaccines it already distributes to the world's children.

A new EPI working group will examine the request shortly, but Mark Kane, EPI medical officer and chair of the group, says SPf66 "doesn't sound like it's ready" for incorporation in the standard EPI package. "We've already got difficulties getting hepatitis B vaccine into routine use, and that's got a 90% protective efficacy."

While this debate is being played out, Patarroyo is beavering away in his Bogotá lab, working on a second-generation SPf66 that has built-in protein fragments designed to block entry of the parasite into red blood cells. He is keeping details of the new vaccine close to his chest, but Colombian sources close to Patarroyo hint that early animal studies are "extremely promising." Could this new vaccine pull the rug from under all the fuss over the current version? "Who knows," says Godal. "It's a bit like buying a computer: You have to plunge in and take what is available now. The only difference is, you know for sure your computer will be obsolete a week after you've bought it. With a malaria vaccine, we've probably got more time to make use of it."

–John Maurice

John Maurice is a science writer in Challex, France.

U.S.–RUSSIAN SPACE SCIENCE

Joint Mission Gets Off to Slow Start

When physician Norm Thagard becomes the first U.S. astronaut to go into orbit aboard a Russian spacecraft on 14 March, his flight will mark more than a symbolic end to a space race begun almost 40 years ago. It will also signal the start of an ambitious cooperative research effort between the United States and Russia to probe the long-term effects of microgravity on the human body.

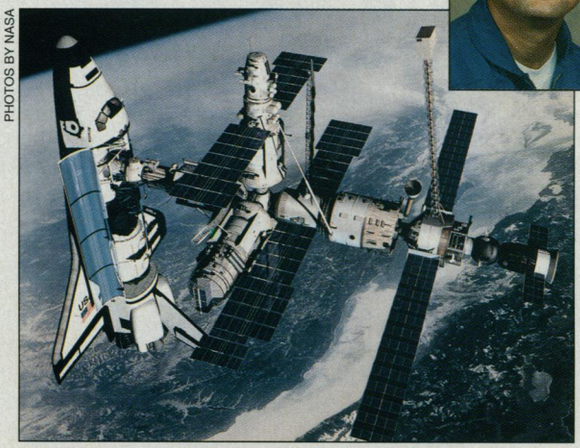
Despite 20 years of collecting data, researchers have learned surprisingly little about the topic, scientists on both sides agree. U.S. researchers are limited by a space shuttle that can stay in orbit only for about 2 weeks. And the Soviet/Russian program, although it can keep crews aloft for more than a year in its Mir space station, has suffered from inadequate equipment and piecemeal data collection, Western scientists say.

Thagard's flight will begin a seven-mission, 3-year research program aimed at answering such questions as whether astronauts face an increased risk of developing kidney stones on long trips. The joint program is the result of a 1993 agreement between U.S. Vice President Al Gore and Russian Prime Minister Viktor Chernomyrdin, which left National Aeronautics and Space Administration managers scrambling to find a way to translate political promises into scientific reality. NASA, however, is following in the wake of the European Space Agency: A European astronaut conducted life sciences research aboard Mir last October, and two more missions are planned.

The U.S.–Russian effort has gotten off to a rocky start. Much of the U.S. biomedical equipment initially planned for Thagard's use will not reach Mir until well into his 3-month tour. The bulk of the instruments are now being loaded, several months behind schedule, into the Spektr module at a Moscow factory. The large module, a pressurized lab that will be attached to Mir, is not slated for launch until 10 May and will have to be readied for use once in orbit.

Both countries share blame for the delays. "The Americans goofed," says one official involved in the project. "They missed deadlines." Arnauld Nicogossian, NASA's deputy associate administrator for life and microgravity sciences and applications, admits "some things were late." But there have also been problems on the Russian side. Customs officials temporarily detained some U.S. equipment because the proper fees had not been paid. Modifications to the Spektr module also took longer than expected, Nicogossian says.

Despite those glitches, Nicogossian insists the Spektr delay should not hamper Thagard's mission. The astronaut, who will be ferried to Mir aboard a Soyuz spacecraft, will make use of U.S., European, and Russian equipment already aboard Mir, and a Progress supply ship will bring more instruments shortly after Thagard's arrival; a second will follow in April. His activities will include a battery of tests on himself and his fellow travelers accompanying him to Mir to measure the loss of calcium, the reduced production of red blood cells, and the failure of some drugs to become active. This information is critical for planning future missions to Mars, say NASA scientists, and could also provide clues to the way the body works on Earth.



PHOTOS BY NASA

Peace dividend. U.S. astronaut Norman Thagard will be aboard Russia's Mir when it docks in June with Atlantis.

The most complicated part of the joint effort will be the Mir/shuttle missions, the first of which will come at the end of Thagard's sojourn. Early next month, the shuttle Discovery will rendezvous with Mir in a trial run for a docking on 8 June between the Atlantis and the Russian station. Atlantis will bring the pressurized laboratory Spacelab, which contains instruments to examine the human immune system, in particular the production of white blood cells. The U.S. and Russian crews will conduct a joint life sciences research program for the few days the two spacecraft are joined before the shuttle returns to Earth with Thagard and two cosmonauts.

The crews will also examine the microbial and radiation environment on Mir in preparation for the international space station. Russia is now a partner in that venture, which includes Europe, Japan, and Canada. Once the station is under construction in the late 1990s, Russia intends to abandon Mir, and life sciences work will continue on the new, $30 billion facility.

In the meantime, the Mir shuttle program has stretched NASA's already tight budget. The U.S. portion of the program will cost about $100 million, not including the cost of shuttle flights and other extras. The Russian contribution is mostly nonmonetary, consisting of Mir and some supply flights.

The rush to prepare for Thagard's mission did not allow for an open solicitation of experiments, and peer review of existing proposals was done "somewhat after the fact," says Tom Sullivan, the NASA mission scientist. The next flight, however, has attracted widespread interest from laboratories and universities around the country. NASA received about 150 proposals, and the 40 or so winners are expected to be announced next month. With the promise of increased activity in orbit, say Sullivan and other researchers, the once-quiet world of space life sciences has started humming.

–Andrew Lawler