

# Hoffmann-La Roche's PCR Push

While the polymerase chain reaction (PCR) has long been the darling of the research community, invading fields faster than a virus, it hasn't yet become a standard tool in applied fields such as medical diagnosis. But that won't be the case for long, if pharmaceutical giant Hoffmann-La Roche has anything to say about it. And it will, having just paid \$300 million for exclusive rights to all applications of the hottest biomedical technique of the '90s.

At a meeting of the American Association for Clinical Chemistry in Washington, D.C., last week, Hoffmann-La Roche scientists described their plans to seek Food and Drug Administration approval for three PCR-based diagnostic tests. The tests—for AIDS in newborn babies, Lyme disease, and chlamydia, a sexually transmitted parasite—would be the first approved clinical applications of PCR. Meanwhile, the company is plunging into developing a wide range of other tests to diagnose infectious diseases, cancer, and some genetic disorders, such as sickle cell anemia. "We are not talking futuristic timetables for the development of this important technology," says Thomas P. MacMahon, president of Hoffmann-La Roche's diagnostic group. "We plan to commercialize PCR as fast as we can."

Hoffmann-La Roche is counting on a billion-dollar market for PCR-based diagnostic technologies by the year 2000. One reason: PCR probes can detect elusive bacteria, viruses, and very low-level infections well before traditional culture-based tests can. What's more, says Thomas J. White, senior director of diagnostic research at Roche Diagnostic Systems, "with organisms that are slow or dangerous to culture or that can't be cultured, PCR will replace culturing altogether."

PCR diagnostics is familiar ground for Hoffmann-La Roche, which acquired rights to commercialize PCR technology for in vitro tests in humans 2 years ago from Cetus Corp., the developer of the technology. But now that Hoffmann-La Roche has bought exclusive rights to all known—and unknown—uses of the technology, it will also be the primary supplier of PCR to basic researchers, for whom PCR has become a laboratory workhorse. That market used to be shared with Cetus' 100-employee PCR division, which Hoffmann-La Roche is absorbing, and Perkin Elmer, which had acquired rights to develop PCR instrumentation and will continue to do so in a joint venture with Hoffmann-La Roche.

In its new relationship with basic research-

ers, Roche says that it means to continue the spirit of collaboration Cetus fostered. "In the beginning, researchers who collaborated with Cetus had access to reagents before they were available from Perkin Elmer," White says. He promises that researchers "will see not only a continuation of that, but more of it."

Such collaboration, after all, can pay off for Roche as well as for academics. Roche has already been working closely with re-

searchers to try to overcome some of the problems with PCR: in particular, its sensitivity to contamination from stray DNA sequences, which can give false positives in diagnostic tests. But now Roche will make it easy for researchers to flush out errant DNA in pipettes or even in lab air. The DNA-digesting enzyme "will be integrated into the test kits as part of the reagents so clinical researchers won't even have to think about it," says White. These steady improvements in the technology, Roche hopes, will keep PCR multiplying profits almost as fast as it multiplies DNA. ■ ANN GIBBONS

## The Hubble: One Sick Puppy

Saddled with cloudy vision from the start of its brief orbital career, the \$2.1-billion Hubble Space Telescope also suffers from a case of the shakes, originating in its solar panels. Now comes an even more worrisome symptom, hinting at a potential systemic weakness. Two of Hubble's six major gyroscopes have failed since last December; then, 2 weeks ago, a third gyro suddenly developed an unusual thirst for more power, though this hasn't interfered with observations. The telescope can operate perfectly well on three gyroscopes, but if the gyro failures prove catching, the Hubble could lose fine motor control, leaving it unable to carry out its scientific missions.

Needless to say, Hubble doctors at NASA and at the Space Telescope Science Institute in Baltimore are feeling queasy. One cure being considered at press time might entail a house call—another one, that is. A Space Shuttle repair mission had already been scheduled for late 1993 or early 1994 to rocket new solar panels, gyros, and the equivalent of contact lenses up to the myopic scope. But now, the level of concern at NASA has risen to the point that agency scientists are at least discussing an earlier emergency mission. "People are thinking about that more seriously today than a week ago," says James Westphal, a Caltech astronomer who heads the Wide Field/Planetary Camera team.

NASA officials are facing a conundrum: The special optics wouldn't be ready for a hurry-up mission to fix the gyros. But more gyro trouble or the telescope's other ailments just might tip the balance in favor of an earlier flight, which could leave the agency struggling with the cost and disruption of two repair missions.

Take the solar panels. As they flex during their on-again, off-again exposure to the sun, they cause a nagging, though scientifi-

cally tolerable, wobble in the spacecraft. But a computer model of the expansion and contraction is now suggesting that the panels' frames might be cyclically bending—"more than anyone had imagined," says Westphal. And that raises the specter of metal fatigue and structural failure, which could cut off electrical power to the telescope and cripple it completely. "If you haven't got a wire cutter and you want to cut a wire, that's what you do," Westphal remarks.

As for the gyroscope assemblies, John Quinn, an engineer in NASA's Pointing Control Systems group at the Goddard Space Flight Center, says that the two that have already failed probably succumbed to a "purple plague" of corrosion in their electrical contacts. When one of the four remaining gyroscopes suddenly began drawing slightly more electrical power than usual on 26 July, engineers began working long hours to learn what caused the anomaly and to determine if it is a sign of an imminent failure. NASA officials remain hopeful that the continuing surge in the third gyro is harmless.

If it isn't and the third gyro does fail, Quinn says, "science will not be interrupted, but we would start pulling our hair out here on the ground." Like a motorist without a spare tire, they'll start wondering how far they can go without stopping for a repair.

In the face of these quandaries, NASA officials and some Hubble scientists maintain a well-practiced aplomb. From the start, nobody expected the Hubble to get through life without an emergency or two, they point out. "It is surprising that these particular systems have failed," admits Robert Brown, a senior astronomer at the Space Telescope Science Institute, "but from the beginning, the telescope was designed with service missions in mind." ■ IVAN AMATO