tion that occurs for the first time in that person. When this happens, the patient's NF gene must differ from those of his parents, who do not have the disease. By scanning the DNA in one such a patient, Collins found an extra half a kilobase of DNA stuck in the middle of the candidate gene. The patient's parents did not have that insert. "That's like catching it in the act," says Collins. Collins started writing.

White, meanwhile, had landed on the same gene and was furiously trying to characterize it. He knew Collins was "hot on the trail," he says. Indeed, following a mid-May meeting, sponsored by the National Neurofibromatosis Foundation, White surmised that they were closing in on the same gene. After that meeting, his lab redoubled its efforts. "These guys did not take a lot of vacations," says White.

They, too, found the gene was interrupted by at least one of the breakpoints. And while they found nothing as telling as Collins' new mutation, they did find strong circumstantial evidence implicating the new gene: three different patients all lacked pieces of this gene. Presumably, those deletions would knock out the gene and bring on the disease.

White still needed a mutation that would tie the gene to the disease, so he scoured the DNA of about 70 NF patients and 65 controls, looking for a single base pair change. He found six potential mutations in NF patients and none in the controls. What's more, two of the mutations would have a major effect on the gene's protein product. In fact, one mutation created a stop codon, which would stop gene transcription, creating a truncated protein.

That did it, says White. "We named it the NF gene and decided to write it up." And they "wrote as fast as they could," says White, who admits that by that time he had heard that Collins had already submitted a paper to *Science* describing the gene. "The grapevine is very efficient." White called *Cell*'s editor, Ben Lewin, who, he says, "appreciated the highly competitive nature of this research" and agreed to rush White's two papers into print.

By that same grapevine, Collins learned that White's paper, submitted 14 days after his own, was going to appear in *Cell* a week before his would be out in *Science*. He would have been scooped had not *Science* editor Dan Koshland agreed to remake the pages at the last moment and slip Collins' paper in a week earlier than planned, so at least they would appear simultaneously.

White and Collins did not see each others' papers until 3 days before last week's press conference. Only then were they sure that they had the same gene.

What makes these gene hunts so competitive, says Lap-Chee Tsui of the Hospital for Sick Children in Toronto, who has his own battle scars from his successful race for the cystic fibrosis gene, is simple: "It's public recognition. People don't come to you if you are second." Certainly, when two groups devote years of sweat and blood to tracking down a gene, their colleagues recognize their individual contributions. But the headlines go to whoever publishes first.

In this case, Collins and White both shared the glory in a front-page story in the *New York Times*. Indeed, their public personas were linked even more closely than the article intended: the paper ran a picture of White but identified him as Collins.

■ **LESLIE ROBERTS**

Shuttle Leaks: Good News for Science

Although the National Aeronautics and Space Administration continued to take a beating last week in Congress over a flaw in the Hubble Space Telescope, the space agency's engineers tempered the criticism with one piece of good news. If the latest test results hold up, two mysterious hydrogen fuel leaks that have grounded the shuttle fleet since 29 June (see *Science*, 13 June, p. 116) are probably not related, making it unlikely that the shuttle design itself is at fault.

One of the biggest beneficiaries should be the Ulysses solar spacecraft, which NASA officials say will fly on schedule through a narrow launch window on or around 5 October. Similarly, astronomers who have been waiting years to fly a package of telescopes known as Astro-1 (see *Science*, 22 June, p. 1486) may soon get their days in space. Astro-1 was scheduled for launch on 29 May, but was pulled off the launch pad when its shuttle sprang a leak. Now, if the leak repairs are straightforward, *Columbia* could fly again as early as 1 September. Failing that, NASA will launch Astro-1 immediately following the Ulysses mission.

In tests carried out last week on the launch pad and at Rocketdyne laboratories in Downey, California, NASA engineers exonerated their "prime suspect"—the main seal in the disconnect assembly that joins the shuttle orbiter to its external fuel tanks (ETs, in NASAspeak). Instead, engineers believe they've located two unrelated leaks in the shuttles *Atlantis* and *Columbia*. "It is not a generic problem, which would have been much more difficult to deal with," says shuttle program director Robert Crippen.

On *Atlantis*, the leak appears to be confined to the ET side of the disconnect assembly. After stripping away the foam insulation from the disconnect, engineers attached "baggies" at each likely leak location to capture escaping hydrogen. When they pressurized the fuel lines on 13 July, they found a substantial hydrogen leak in a flange seal on the ET side of the disconnect. William Lenoir, NASA associate administrator for space flight, told reporters that the leak could not have been detected by tests conducted when the disconnect was accepted because the seal isn't engaged until the orbiter is actually mated to an external tank—an action performed just before launch. While NASA may still decide to roll *Atlantis* back into its hangar for repair, it's possible that engineers could fix the leak on the pad by retightening or replacing the flange bolts.

Columbia, on the other hand, apparently leaks from both sides, although the leak from the ET side is ten times larger than that on the orbiter side. In the Downey laboratory, engineers discovered that the shuttle's disconnect assembly leaked at two seals where drive shafts pass through the 17-inch main fuel line. In a crude sense, these leaks have already been "repaired"; last week, engineers replaced *Columbia*'s disconnect assembly with one snitched from *Endeavor*, the replacement shuttle for *Challenger*. The *Endeavor* parts recently completed acceptance testing under liquid hydrogen conditions—which, according to Lenoir, should ensure that the parts will perform well. The *Columbia* parts are slated for failure analysis once NASA engineers complete their laboratory tests, which may be as early as this week.

Even if both problems are easily fixable, it's still likely that only one of the two shuttles will fly before Ulysses. "Our preference is to launch *Atlantis* first" with its classified military payload, Lenoir says. The reason? *Atlantis*'s next scheduled payload is the Gamma Ray Observatory, which will be considerably delayed if *Atlantis* is forced to wait until after Ulysses is launched. "Like Hubble, it's an expensive piece of hardware to have sitting on the ground," Lenoir says.

NASA officials are most clearly relieved not to have a major design problem on their hands. Although the test analysis is still tentative, Lenoir said the problem could be the result of an aging shuttle fleet. "You're always suspicious of coincidence, but we've had that before," says Lenoir. "Back on STS-5 [a 1982 *Columbia* mission on which Lenoir flew], what was the chance that we'd have two space suits fail in different ways? Well, it happened."

■ **DAVID P. HAMILTON**