tries to assemble a finished sequence from overlapping stretches of raw DNA data. Then it includes in the final sequence only data that meet a minimum standard.

Waterston, acknowledging that "there have been some changes in what the community would like," says he will now aim for the goal of 99.99% accuracy. He says his team at Washington University, which got the largest sequencing grant ($6.7 million), calculates that this high-precision goal "is going to raise costs and slow work down a little." But he adds: "We still think we can be pretty cost-effective." He estimates that it will cost around 30 cents per base for the first year's operations. Collins is looking for considerable improvements over that figure in subsequent years: "If we can't get the price down to 20 cents a base, it's going to be hard to get this project done," he says.

Some researchers, Gibbs among them, worry that with those kinds of pressures, some sequencing teams will cut corners to meet production goals as the deadline for reviewing these grants draws near in 1998. Gibbs is concerned that quality of data will suffer as sequencers get trapped on this "slippery slope," allowing more and more ambiguity to creep into their data in order to keep output high. To offset that possibility, Collins says NCHGR may ask an independent team to sequence random lengths of DNA already generated by the grantees, to check for gaps and errors. He admits, however, that this kind of monitoring would be expensive.

The 1998 reviews will mark another critical turning point in the program: Some—but perhaps not all—of these labs will make it into the third year of funding. After that, NCHGR may pick one or more of the most successful strategies they have developed to receive support for an even more ambitious ramp-up of genome sequencing. Collins promises, however, that the competition will not be restricted to the six labs that won the grants announced this week: If other sequencing efforts improve upon what is being done, they could eventually win support.

Indeed, NCHGR has already reached beyond the established sequencing community for this first round of grants, funding as sequencers several groups that had focused primarily on gene mapping. These include Eric Lander's mapping team at the Whitehead Institute–Massachusetts Institute of Technology Center for Genome Research in Cambridge, Massachusetts, Maynard Olson at the University of Washington, Seattle, and Richard Myers at Stanford University.

Gibbs, who says he looks forward to the competition, observes: "It's going to be a very interesting 2 years."

–Eliot Marshall and Elizabeth Pennisi

SCIENCE AND THE LAW

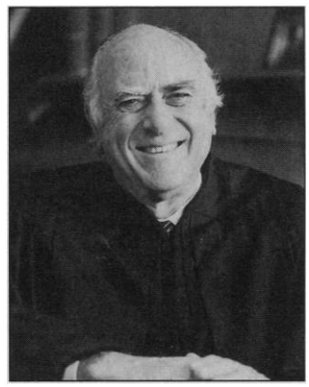
New York Courts Seek 'Neutral' Experts

Facing a flood of claims that turn on disputed scientific evidence, New York courts have taken an unusual step: They are bringing in their own experts. Out of the hundreds of thousands of women seeking redress for health problems they believe may be linked to silicone breast implants, thousands have filed claims in New York; one plaintiff's attorney, Perry Weitz of Weitz & Luxenberg, himself represents about 6000 such women. To manage this impending barrage of litigation and referee the combat among hired experts, three judges, led by Jack Weinstein, chief judge for the federal court for eastern New York, decided to create an independent panel of scientific experts to give them neutral advice.

The panel's first task—according to an order signed on 3 April by Weinstein, federal Judge Harold Baer Jr., and state Supreme Court Judge Joan Lobis—will be to identify and recruit other nonpartisan experts willing to help the court. Then, once this larger advisory body is in place, it will consider general principles for establishing cause and effect in these cases, giving "particular attention ... to claims respecting immune system dysfunction and connective tissue and rheumatic disease" as described in a summary of complaints prepared for the court by Weitz's law firm.

The scientific battles are likely to be intense. Three major epidemiological studies have found little or no evidence that implants have caused serious immune system or other diseases. But Weitz and his experts charge that the studies were manipulated to find no health effects. Weitz also claims that the studies used erroneous and outdated definitions that caused them to understate the real incidence of disease.

According to Margaret Berger, a professor at Brooklyn Law School whom Weinstein has consulted on this and other technically complex cases, the goal will be to establish a "dialogue among the experts" that will clear away confusing side issues before substantive disputes are presented to the judge and jury. Berger is one of the three outsiders who have been asked to help out. The others are Joel Cohen, a population expert at Rockefeller University, and Fred Alan Wolf, a physicist and lawyer at the Cooper Union for the Advancement of Science and the Arts in New York. Berger and Cohen have some idea of what they are getting into: Both provided advice to Weinstein on the Johns Manville bankruptcy case after the company was hit with thousands of lawsuits alleging health problems linked to asbestos.



Seeking scientific help. Judge Jack Weinstein.

Judges have been empowered to use such panels since 1975, after Congress adopted Federal Rule of Civil Procedure 706. It says that any federal court "may appoint expert witnesses of its own selection," to be compensated in civil cases by the parties to the suit. But courts have rarely taken advantage of the rule, says Joe Cecil, a researcher at the Federal Judicial Center in Washington, D.C. The reason, says Paul Carrington, director of the Center for Private Adjudication associated with Duke University, is that "the judges don't like it, and the reason the judges don't like is that the lawyers don't like it."

Lawyers are against the rule because it forces them to pay for expert testimony they can't control and which may even go against them. The other problem, Carrington says, is that judges don't know how to find the relevant experts or which ones to trust. Two groups are now trying to develop information centers that would help the courts find reliable experts: Carrington's center and a group coordinated by Deborah Runkle at the American Association for the Advancement of Science (*Science*'s publisher).

As might be expected, plaintiff's attorney Weitz argued strenuously against the creation of an independent panel in the breast implant cases. Weitz had objected that judges who use Rule 706 are "usurping the adversarial process" and denying juries an opportunity to weigh all the evidence. But now that Weinstein has ruled against Weitz's objections, Weitz says he's focusing on the positive aspects of the decision. Perhaps, he says, this panel "could be very useful" if it allows his side to expose the alleged manipulation of data in the epidemiological studies.

As for the court's new experts, they're keeping mum. All that Wolf would say about the litigation, for example, is that it may give him a rare opportunity to make use of his own field of expertise—chaos theory.

–Eliot Marshall