swer those questions, they will offer obvious opportunities for designing drugs to block or enhance those functions—in precise ways.

These new firms aren't alone on the playing field, of course. First-generation firms are gearing up to design small molecules, too. But the start-ups' strategy for getting out of the shadow of established firms lies in fresh ties to leading academics, scientists with the stature to attract investors. At Arris, the scientific advisory board includes all nine who were in the hotel room in Cambridge with Hartman, including such academic heavyweights as chemist George Whitesides of Harvard; Patrick Winston, head of MIT's Artificial Intelligence lab; and Harvey Lodish, Eric Lander, and Peter Kim of the Whitehead Institute.

Icos in Seattle brought together three veterans of early biotechnology firms including Robert Nowinski, the founder of Genetic Systems; Christopher Henney, founder of Immunex; and George Rathmann, the chairman of Amgen. Icos's combination of talent has already paid off: The firm opened its labs earlier this year with an unprecedented $33 million financing package.

But after capital and casting comes product. If the new companies are to succeed, they are going to have to move science from the lab to the factory faster than it has ever been done. Which is why most of the new firms are starting with specific products in mind.

Icos, at less than a year, has received considerable attention for its plans to design small molecules that would work like adhesive proteins to control the inflammatory response, say, to treat muscular sclerosis and rheumatoid arthritis. And Arris is working on drugs based on a paper published in *Nature* only last February. In it, MIT biologist Monty Krieger described how scavenger-cell receptors help build the plaque that causes arteriosclerosis. The Arris team, with Krieger as a consultant, plans to identify natural compounds that bind to the receptors, then use artificial intelligence computing programs to find out what features those compounds have in common. They hope their computer database will help them come up with the optimum design for a synthetic peptide that could be used to block the receptor to prevent arteriosclerosis—in effect, an anti-cholesterol pill.

These are the dreams of which money—and bankruptcies—are made. The seed money hurdle is in some ways the easiest. Says Byers about the financing needs these start-ups will experience in the all-too-near future: "I'm afraid it's easier to raise money to start them than to sustain them." Nowinski agrees: "You have to understand that companies die because they're undercapitalized—not because the science isn't good enough. The elements that create a successful company are the degree of capital and the aggressiveness of the company to be able to pursue its ideas." Aggressiveness and one winning idea are what the money-men are counting on. Says Hartman: "As a venture capitalist, I want to start a company whose scientists can design a small molecule that is orally active and specific enough for a primary care physician to prescribe for outpatient use. Those three things add up to a billion-dollar profit." ■ ANN GIBBONS

Justice Department Joins Whistle-blower Suit

The Justice Department last week announced it was joining forces with a whistleblower in a complaint against a federally funded researcher accused of scientific misconduct. If the suit is successful, the government could recover three times the $1.3 million in grant money awarded to John L. Ninnemann, a researcher formerly at the University of Utah and the University of California at San Diego. The case marks the first time the government has intervened in a so-called "qui tam" suit involving scientific misconduct.

Qui tam suits originated with the False Claims Act in 1863, a law intended to discourage unscrupulous businessmen from defrauding the Union Army by giving financial incentives to private citizens who spot the frauds. Under the act, a whistleblower may receive up to 30% of the money recovered when qui tam suits are successful. Congress amended the act 4 years ago to make it easier for potential whistle-blowers to step forward, and since then 259 suits have been filed, mostly against defense and health care contractors.

Many scientific organizations have expressed concern that a dramatic shift in the way scientific misconduct cases are handled could take place should qui tam suits proliferate in the realm of science. Investigations would be taken over by the justice system, and, they argue, lawyers and judges, not scientists, would become the final arbiters of whether scientific misconduct has occurred (*Science*, p. 802, 16 February).

Unless a pretrial settlement is reached, that could be the fate awaiting Ninnemann. The case against him involves research on the treatment of burn victims. In 1983, his University of Utah lab technician J. Thomas Condie claimed Ninnemann had published false information in scientific journals and presented false information at a scientific meeting. Condie claims an initial internal investigation by the university failed to agree with his charges, and he says he was asked to resign from his technician job.

The next year, Ninnemann transferred to the University of California at San Diego. Condie continued to pursue the case, ultimately teaming up with Eugene Dong, a Stanford University faculty member who holds degrees in both medicine and law. Together they uncovered additional evidence they felt proved Ninnemann's guilt. After receiving this new evidence, the University of Utah conducted a second investigation of Ninnemann in 1987. This in turn led to an investigation by NIH, and one by UCSD. Utah officials will not speak about the case, nor will NIH officials. Gerard N. Burrow, UCSD vice chancellor for health science, issued a statement saying that a 1988 faculty committee asked to examine Ninnemann's work "concluded that there was no evidence of intentional misrepresentation or fraud. We have no reason at this time to question the committee's conclusion."

But even if these investigations had blasted Ninnemann, Dong says the government would still be out the $1.3 million it gave Ninnemann for his research. So in September 1989, Dong and Condie tried a new approach. They filed the qui tam suit to recover the government's grant money, claiming that Ninnemann had made numerous misstatements in his NIH grant applications.

In announcing its decision to join the suit, assistant U.S. attorney general Stuart M. Gerson said, "The government's action in assuming responsibility for the case reflects our insistence that scientific research, especially when federally funded, be truthfully reported." Gerson said the government was seeking reparations not only from Ninnemann, but also from the two universities which had certified that the information in grant applications and progress reports was true.

Ninnemann, who left UCSD in 1988 and is now a faculty member at Adams State University in Alamosa, Colorado, declined to comment on the case. ■ JOSEPH PALCA