Germany Joins the Biotech Race

After years of yielding to fierce public opposition, the German government has picked three regions of the country to spearhead its attempt to make up lost ground in biotech

Five years ago, Germany provided perhaps the most inhospitable climate for biotechnology in the Western world. Biomedical laboratories were occasional targets for fire bombs, and molecular biologists had long been regarded as antisocial at best and criminal at worst. The country's laws regulating genetic engineering were among the most restrictive on the planet, and the best modern biologists had a tradition of keeping their heads down in academic labs, avoiding industry, and routinely escaping abroad to pursue top-level research. Not surprisingly, the pharmaceutical industry had long since given up on building fermenters at home and relocated nearly all of its production facilities to friendlier locales.

ENGEL/GREENPEACE

Some distrust remains. Protesters opposing the import of U.S. genetically modified soybeans last month.

Now, the German government is trying to transform the country virtually overnight into a biotech powerhouse, complete with venture capital, start-up companies, and lots of close collaboration among industry, academia, and financial and political backers. "They want to jump onto a train they've missed," says Axel Ullrich, a German biotech veteran who helped found Genentech in the 1970s and later returned to do research in Munich. "They are saying to themselves, 'We've missed out on all this wonderful technology; now we have to move, quick, quick, quick,' " he says.

The latest move in this would-be transformation came last week, when the German government held a biotech "beauty contest" in which 17 regions of the country competed for "BioRegio" status. Three winners—areas around Heidelberg, Munich, and Cologne—will each receive $30 million in special funding and loans over several years. Someday, government and industry officials hope, these regions will become Germany's version of biotech boomtowns such as Boston, San Francisco, and Cambridge, U.K.

The new program is part of a larger plan spearheaded by Research Minister Jürgen Rüttgers to stimulate biotech. "We want to be number one in Europe in biotech," said Rüttgers in a recent speech, and he has freed up funds in his ministry to try to achieve that aim. After years of foot-dragging, Germany finally streamlined its laws regulating genetic technologies in 1993 and in the past year has set up its own national genome program (*Science*, 16 June 1995, p. 1556, and 2 August 1996, p. 570). At the same time, state and local governments—especially in the richer southern states—are supporting an unprecedented amount of both basic and applied research at universities and outside institutes to secure and broaden Germany's base in the biosciences.

Much of the groundwork for this effort was laid by a ministry task force on biotech begun in 1993. "We concluded that we have a strong research base and some of the most highly trained technical personnel in the world, as well as a strong pharmaceutical and chemical industry. Also, our home market is one of the largest worldwide. But what we absolutely lack is a venture-capital–based biotech industry," says task force member Peter Stadler, head of biotech for the pharmaceutical giant Bayer AG in Wuppertal. And, adds biochemist Hans-Günter Gassen of the Technical University in Darmstadt, one of the leaders of the Frankfurt area's entry in the BioRegio contest, "The gap [between Germany and the rest of the world] was increasing, not decreasing."

Deep-seated distrust

The roots of the problem are buried deep in Germany's history and culture. In the late 1980s, while genetic engineering was gaining widespread public acceptance in the United States, politicians from Germany's Green Party and a strong grassroots environmental movement fanned public distrust of genetic manipulation, which was tied in the public's mind to Nazi eugenic policies and human experimentation. The Greens "exploited and misused the facts," says Stadler. "They mobilized public opinion by playing on people's anxiety," warning that experiments would lead to a "genetic Chernobyl." They were very successful, admits Stadler, to the point where the German drug industry decided to invest in biotech companies in the United States rather than at home. The result of this flight is striking: Whereas there are an estimated 1500 biotech companies in the United States, Germany has no more than a few dozen.

But by the early 1990s, when U.S. biotechnology was blossoming, German industrial leaders began to realize that burying their heads in the sand could prove disastrous for the economy. And that, more than anything else, is what pushed politicians and industrialists into a new, friendlier attitude to biotech. Says Gassen, "They looked at the U.S. and saw not only a blooming business but a long-lasting one. The talk here always was, yes, U.S. biotech is successful, but this industry could disappear again as quickly as it appeared. Now they see it is here to stay."

Mobilizing industry leaders to support biotech was one thing. The big surprise for many scientists is that the public has come on board too. According to a ministry survey, 60% of Germans say they want their country to play a leading role in establishing the budding European biotechnology industry. "It's a fever" in support of biotech, says molecular biologist Ernst-Ludwig Winnacker of the Munich Gene Center.

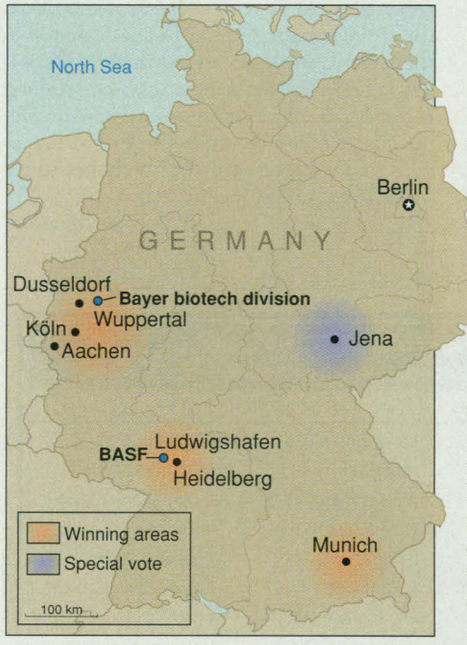
The unexpected turnaround came partly in response to a concerted campaign by the pharmaceutical industry to challenge the misconceptions promoted by the Greens and persuade Germans that biotech—especially for the purpose of drug discovery—was in their interests. "We took responsible and honorable people," says Stadler, including scientists, industry representatives, and politicians, and "went to television, newspapers, assembly halls, churches, and trade unions, and we told people what is really going on in biotech—the facts, including the risks. We didn't hide our emotions. If you do this long enough," he says, "you are bound to see an impact."

Other German scientists are more down-to-earth in assessing the origin of the change. "I know it sounds cynical to say this," says Maria Leptin, head of the genetics faculty at

the University of Cologne, "but if there's anything that's more important [to Germans] than saving the environment, it's saving jobs. As soon as people saw the [pharmaceutical] industry possibly disappearing, morality went out the window."

The biotech Olympics

With a government eager to fuel the rise of biotech and a suddenly supportive population, the field has taken off. Take the response to the BioRegio "beauty contest." The research ministry deliberately sought to pick winners, rather than follow its usual practice of spreading funding widely and without too much regard to scientific quality. BioRegio is more like "the Olympics," according to Gassen, and that has woken up many local government officials and gotten their competitive juices flowing. The competition culminated in Bonn last week with presentations by each of the 17 regions before a jury of 10 bankers, industrialists, and Swiss and Dutch scientists, followed by the announcement of the winning regions.



Biotech hot spots. These regions were chosen to receive government incentives for biotechnology.

The selection of Heidelberg and Munich came as no surprise, says molecular biologist Hermann Bujard of the University of Heidelberg, because of the high concentration of good genetics research there. The Heidelberg region also includes drug giant BASF in Ludwigshafen, while the Munich region includes many of Germany's biotech start-ups which have grown up around the university and the Max Planck Institute for Biochemistry. Bujard adds that by choosing the Cologne region, which includes the biotech arm of Bayer in Wuppertal, instead of Berlin, which is strong scientifically and also Germany's future capital, the jury showed that its decisions went beyond politics.

The jury also awarded the eastern German region around Jena with a "special vote" that could lead to as yet undetermined financial and political benefits. Research managers in Jena have done a good job breaking up unwieldy former East German institutes into successful functional units, says Bujard. "We're not going to create brand-new pharmaceutical companies out of thin air here," says Albert Hinnen, a yeast geneticist who runs one of the new Jena institutes. "Instead, we are creating a synthesis between biology and the design and manufacture of optical and other highly specialized equipment for which this region is known." Jena was the original home of Carl Zeiss, the mirror and optical instrument manufacturer, and is still strong in optics.

Once under way, the new program will take a two-pronged approach, says Gassen. First, the availability of matching funds will make it easier for young people to establish their own entrepreneurial companies. At the same time, government funds or loans will be available to existing companies that are eager to strengthen budding relationships with universities. And Winnacker adds that nascent technology transfer departments at many German universities could be expanded through BioRegio.

Needed: Entrepreneurs

Despite all the hoopla, Germany still has a way to go before it becomes a biotech powerhouse. The overwhelming majority of scientists who spoke with *Science* said the chief obstacle is the "lack of an innovation culture" in Germany. "There is certainly a deficit" in this area, says clinical pharmacologist Detlev Ganten, head of the Max Delbrück Center in Berlin. "There are very few go-getters here," adds Ullrich. And those who exist may not be available, adds a prominent university researcher who requested anonymity: "The best Germans [in academic research] tend to already have collaboration agreements with American biotech companies. It will take a while to change that."

Another factor holding back the German effort, say many scientists, is a deeply entrenched type of social welfare thinking which leads young researchers to simply keep studying if nothing else comes along. "People hide out at universities when they can't find jobs," says Winnacker. "That has cut deeply into any entrepreneurial spirit that might have developed here." Even BioRegio, say Gassen and others, can be seen as a type of employment program for jobless biologists. "There are three or four thousand unemployed Ph.D. chemists and biologists," Gassen asserts. "Maybe some of them will now found companies." But Gassen believes that most of these researchers would rather have a job at a big drug company than take the leap into entrepreneurship. His estimate of the percentage of these reluctant entrepreneurs whose companies will ultimately succeed: "0.1%."

Even those who have succeeded in creating new ventures seem to lack commitment to them. Molecular biologist Horst Domdey of the University of Munich cites the case of a prominent American biotech executive who a few weeks ago addressed a gathering of a half-dozen German university scientists who had formed or helped form local start-ups. When he asked how many of them owned shares or options in the newly minted companies, not a single hand went up. German biotechnology's rebirth will also have to accept that some companies will fail—something of a bugbear for German industry. "The attitude here is, you can't just give someone $2 million and then let him fail," says Leptin. If the business gets in trouble, she says, it is considered "immoral" not to try to "bail him out. "

Despite all these hurdles, most German researchers told *Science* that they are optimistic for German biotech's long-term prospects, and not only because of the government funding. "Forget the money," says Stadler. "You can't build an industry for [$90 million]." Much more important, he says, is the role BioRegio will play to catalyze venture capital, technology transfer, and a general shift of German know-how out of universities and big pharmaceutical companies and into an R&D–rich zone at their interface. Spurred on by BioRegio, university scientists, bankers, and venture capitalists in every region of Germany have met to discuss possible new ventures.

Ganten, for one, believes that the lack of an entrepreneurial culture is "not genetic" and that the genteel atmosphere at universities is giving way to a more competitive climate. "If you show people that this is what is needed, they can get enthusiastic about it," he says. As an example, Ganten cites a handful of young people who left secure jobs in his institute and invested their own money into the companies they founded. Similarly, in the years after World War II, many entrepreneurial Germans founded companies that are now world-famous and very profitable. "We have just gotten lazy," he concludes. At the very least, says the more skeptical Gassen, "this approach is good. It makes people aware of how bad the situation is. That is always the first step to success."

–Steven Dickman

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