

THE BIOTECH

A stylized DNA double helix structure is depicted in black lines against a yellow background. The structure is oriented vertically, with the two strands running parallel to each other and connected by horizontal rungs representing base pairs. The helix is shown in a perspective that makes it appear to curve and recede into the distance.

*Lawmakers Consider
Economic Impact of
Growing Industry*

P-R-O-M-I-S-E

Legislators from around the country met in Boston in August to contemplate the economic promise and benefits of biotechnology.

By Sean Slone

Biotechnology is a field that holds great promise not only for medicine but also for states hoping to improve their economic development prospects by attracting biotech companies that will build new facilities and create new jobs.

More than 20 state legislators from around the country met Aug. 1–3 in Boston to contemplate the economic promise of biotechnology at a health policy forum hosted by The Council of State Governments (CSG) through support from Wyeth Pharmaceuticals.

Legislators at the forum came from states still seeking their own piece of the biotech pie as well as from states like Massachusetts, which already has a well-developed biotech industry and the respected academic institutions to train the work force for it. They also came from states like Pennsylvania, where Gov. Ed Rendell has promised huge infusions of cash for bioscience researchers in industry and academia through the Jonas Salk Legacy Fund. Pennsylvania is already a leader in biotech research, but is looking to become even stronger.

“If my constituents only knew the number of mice in their backyards, I might never get re-elected,” joked Pennsylvania Sen. Andrew Dinniman.

Biotechnology relies on living organisms to create commercial products such as vaccines. Whereas traditional pharmaceutical drugs are small chemical molecules, biotech products are large complex molecules that can target diseases tradi-

tional drugs cannot. Biotech products include treatments for diabetes, cancer and rheumatoid arthritis.

The U.S. biotech industry supports 1,452 companies (43 percent of all public biotech companies in the world), which account for 180,800 jobs (at an average of \$60,000 a year) and \$55.5 billion in revenue.

The industry can be divided into three distinct stages according to how far along a given biotech product is in development. It begins with scientific discovery, often at the university level where federal funds support research. Private capital is then needed as a biotech firm emerges to apply the discovery and build facilities to develop it into a product. The final phase is manufacturing the product.

Lengthy research and development phases are generally required before biotech products ever make it to the marketplace. They must also be approved by the Food and Drug Administration, although some companies fail to ever bring a product to market. Of the 4,800 biotech companies in the world, fewer than 100 have at least one commercial product.

“No amount of money can force a discovery whose time is not right,” said Dr. Paul Anderson of Harvard Medical School.

The investments and tax incentives offered to bring biotech firms into a state can be a huge gamble.

“We’re not looking at the typical economic development model,” said North

Dakota Rep. Kim Koppelman, chair-elect of CSG.

Large biotech facilities can challenge local infrastructure and strain local resources. Some can require 1 million gallons of water a day to operate.

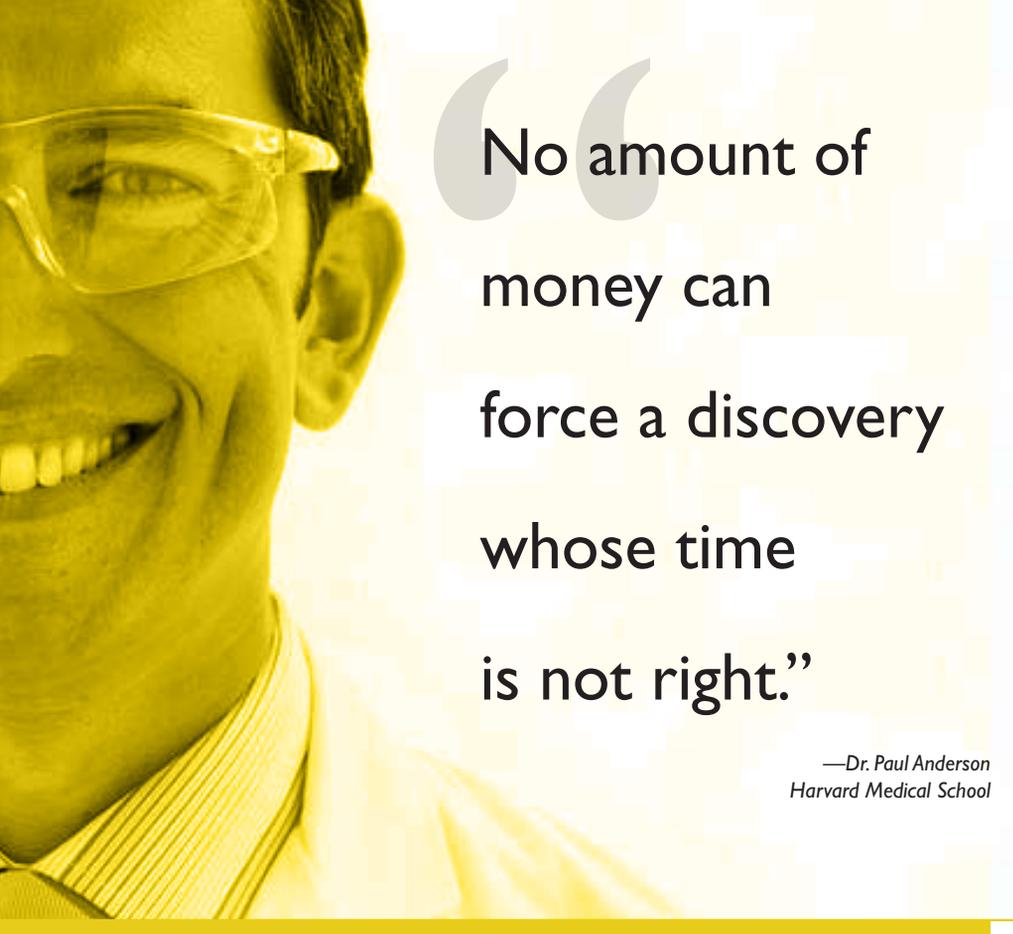
At the same time, the industry depends on a well-educated, well-trained work force, making good schools at all levels a key concern. Individuals with advanced degrees are needed in the initial research and development phase, while individuals with good basic science and laboratory skills are needed as the company moves into the manufacturing phase. High school graduates and individuals with associate degrees can find entry-level employment in the industry at this stage.

Improving education to meet the needs of the biotech industry was clearly on the minds of lawmakers in Boston.

Kansas Rep. Lana Gordon sees a need for a complete overhaul of the education system and a shift in focus from graduation requirements to understanding how learning can be applied to “real life” endeavors such as biotechnology.

“When you give meaning to it, kids are more willing to learn, and you can see where their talents might be,” she said.

Colorado Rep. Jim Riesberg, who has sponsored successful legislation to provide grants for bioscience research, told meeting attendees about a plan to get researchers at companies that receive grants to share their findings with K–12 science classes to spark student interest.



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Dinniman said it's important to remember that “education works as a continuum.” He spoke about the need to tie universities and community colleges together. Community colleges can play roles both in educating entry-level biotech workers and in retraining those with advanced degrees to take on new tasks. Dinniman said he'd also like to see funding for community colleges tied to how much they contribute to economic development within the regions they serve.

Massachusetts Rep. Alice Wolf discussed a certificate program in her state that trains students for entry-level biotech jobs. Her state is also looking to get students interested in biotechnology at an early age. Through its BioTeach program, Massachusetts provides laboratory equipment and professional development resources that will enable every public high school in the state to teach biotechnology by 2010.

Nevada Assemblywoman Valerie Weber said while supporting education is important, the biotech firms often need assistance as they are trying to get started. “They are the risk takers who create jobs,” she said.

Conference attendees heard about the development of life sciences “greenhouses” in Pennsylvania, which provide early-stage

risk capital and support to help commercialize promising technologies and startup companies. The state allocated \$100 million from the national tobacco settlement to fund the greenhouses. States such as Maryland also provide incubator facilities for biotech startups.

Some legislators' interests in biotechnology goes deeper than the ways the industry can benefit their states economically. Arizona Sen. Carolyn Allen is a rheumatoid arthritis sufferer who said she doesn't want future generations to have to live with the disease. “It's personal with me,” she said.

Nevertheless, finding the money to support the industry is often difficult. “It's a struggle for the legislature to understand the benefits of this and to get the public to understand it,” Allen said.

Some believe it may take an appeal to America's competitive nature before the commitment to biotechnology is fully there. Arkansas Sen. James Luker recalled being a high school freshman in 1957 as the Russians were launching Sputnik.

“Maybe we need another shock to the system to get us focused,” he said.

According to Wyeth executive Cavan Redmond, who spoke to the legislators in Boston, that shock could come from a small country like Ireland, where low cor-

porate tax rates, economic incentives and investments in bioscience education have attracted Wyeth and other biotech firms to build manufacturing sites.

It could also come from two sleeping tigers in Asia that are quickly waking up. China is giving biotech startups priority status for bank loans and government grants as well as tax breaks for research. More than 300 companies and more than 20 biotech parks already dot the Chinese landscape. India has attracted 320 firms with large government investments in biotech research and an effort to link universities to the private sector.

Redmond said while the U.S. approach to attracting biotech is state-by-state and even city-by-city with everyone competing against each other, these other countries are making coordinated national efforts that are better organized, well-financed and focused on the future. This allows them to build biotech plants cheaper, faster and with less paperwork.

Many at the meeting said establishing regional multi-state partnerships could prove beneficial in competing for biotech firms. In doing so, it's important for each state to identify what it does best and not try to duplicate what successful states have already done in the biotech arena.

Redmond predicts at least one state or region no one can foresee now may be a biotech leader in five years, joining states like California, Massachusetts and North Carolina. It's not a goal all states will or even can realize, but many are willing to make the effort. According to the Biotechnology Industry Organization, 40 states are targeting the biosciences; 37 have bioscience incubators; 33 fund or offer tax credits for bioscience research and development facilities; and 28 have a bioscience strategy in place.

But some contend the U.S. may need to change some long-held principles to maintain its status as the worldwide leader in the biotech industry.

“Economic development is necessarily competitive; scientific development is cooperative,” said Puerto Rico Sen. Jose Garriga Pico.

The intersection of the two presents enormous challenges for states but also enormous opportunities for health care and for future economic vitality.

—Sean Slone is a health policy analyst at The Council of State Governments.