



Nebraska

Programs & Initiatives Advancing the Biopharmaceutical Industry



Key Programs & Initiatives

The opportunities generated by the biopharmaceutical sector as a leader in innovation and high quality job creation are not limited to just a few states, but have a substantial national footprint across states. States proactively pursue the development of the biopharmaceutical sector because it represents: a large-scale, geographically dispersed supply chain spanning R&D through to production and distribution; a key driver of the economy including the recent economic recovery; and a sector paying high wage rates in quality jobs. States are deploying a range of programs and initiatives to support and grow the biopharmaceutical industry, including: comprehensive state development strategies; investments in R&D and related infrastructure; programs to boost venture capital, entrepreneurship, and innovation development; advanced manufacturing; economic incentive initiatives; and programs working to advance STEM education and training. With the University of Nebraska system and state legislative efforts, Nebraska has focused considerable efforts in support of its bioscience industry.

Quick Guide: Nebraska's Programs & Initiatives Advancing the Biopharmaceutical Industry



Comprehensive State Strategies to Support Biopharmaceutical Development:

- Nebraska Department of Economic Development
- BioNebraska



R&D Investment:

- University of Nebraska-Lincoln Center for Biotechnology
- Nebraska Research Initiative



Biosciences Infrastructure Development:

- Nebraska Innovation Campus



Venture Capital, Entrepreneurship, and Other Innovation Related Programs and Initiatives:

- Business Innovation Act Initiatives
 - Nebraska Innovation Fund
 - Nebraska Small Business Innovation Research Initiative
 - Academic R&D Grant Program
 - Site & Building Development Fund
 - Microenterprise Assistance Program
- Nebraska Business Development Center
- Invest Nebraska Corporation
- Nebraska Innovation Seed Fund
- Nebraska Angel Sidecar Fund



Advanced Manufacturing:

- University of Nebraska-Lincoln Biological Process Development Facility



Economic Incentives:

- Nebraska Advantage Tax Credit Package
- R&D Tax Credit
- Angel Investment Tax Credit Act



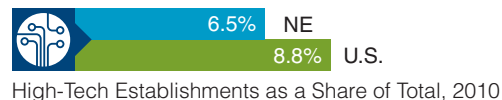
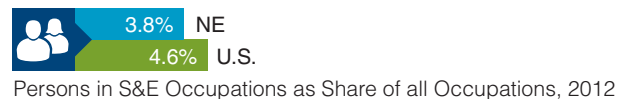
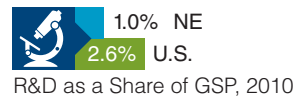
STEM Workforce & Education:

- Intern Nebraska Program
- University of Nebraska Medical Center INBRE Program
- Biological Process Development Facility Undergraduate Courses
- University of Nebraska-Omaha STEM Academic Programs
- University of Nebraska-Lincoln's Center for Science, Mathematics and Computer Education

Impacts

- **The University of Nebraska-Omaha STEM Priority** has successfully engaged 80 faculty and 60 community organizations (including school districts and other education venues) in developing STEM initiatives in the state. Plans for a STEM Building at UNO are also underway.

Nebraska by the Numbers



Source: National Science Foundation, Science & Engineering Indicators 2014.

Comprehensive State Strategies to Support Biopharmaceutical Development

Nebraska Department of Economic Development. The department is the leading economic development organization in Nebraska, and supports the development and retention of businesses in the state. According to a study developed by Battelle, Nebraska has nine industry clusters, one of which is the bioscience and medical technology cluster.

BioNebraska. This organization works to spotlight Nebraska's life science industry, and helps to partner its member organizations with industry, government and academic members to further develop the industry. Working with the Nebraska Legislature Natural Resources Committee, BioNebraska released the Nebraska Bioscience Roadmap, which is a five-year strategy to develop Nebraska's bioscience industry.

R&D Investment Programs and Initiatives

University of Nebraska Lincoln (UNL) Center for Biotechnology. The Center for Biotechnology was established in 1987 as a central set of research facilities that would enable Nebraska's academic and business researchers to have access to cutting edge bio-related technologies. Primarily housed at the UNL campus, these facilities are focused on seven areas: microscopy, plant transformation, bioinformatics, genomics, mass spectrometry, proteomics & metabolomics and flow cytometry. The Center also offers educational seminars and courses for students and industry and academic researchers, and also offers biotechnology scholarships and fellowships. Over the 2014-15 period, 23 scholarships were awarded and 11 fellowships were awarded.

Nebraska Research Initiative (NRI). The state legislature created the Nebraska Research Initiative to help create a solid research foundation within the University of Nebraska state university system. While all full-time faculty are allowed to apply for funding, the NRI is focused on funding research in: nanotechnology and materials science; bioengineering; molecular genetics; water and environmental management; sustainable and renewable energy; and development and management of information systems. Annual total funding for all NRI projects averages \$11 million. The Nebraska Biobank is funded by the Nebraska Research Initiative. This joint effort between UNMC and Nebraska Medicine allows researchers to access patient

blood samples, with the hopes of increasing the speed of health care research.

Programs and Initiatives to Build Bioscience Infrastructure

Nebraska Innovation Campus (NIC). Established to promote academic-industry partnerships, the NIC is expected to reach 2.2 million square feet at full build-out. Adjacent to the University of Nebraska-Lincoln campus, it currently has 20 companies located on the campus, in addition to University research centers. The majority of the partners are involved in agriculture, health, and food industries, including MetaGenome Analytics, LLC, which provides next generation DNA sequencing and analysis. Companies receive access to industry members through university-industry collaborations, as well as tap into the university's research talent and student intern resources. NIC also provides office and conference rooms.

Venture Capital, Entrepreneurship, and Other Innovation Related Programs and Initiatives

Innovation Development

Business Innovation Act of 2011. This initiative, passed in 2011, provides funding to help businesses develop new technologies that lead to quality jobs across the state. It does this specifically through a suite of competitive grants, funds, and tax credits. Some of the programs include:

- **Nebraska Innovation Fund:** this fund assists in the commercialization of products developed by state-based companies. The funds are offered at the pre-seed (prototyping) and seed (commercialization) stage of business development. In the pre-seed stage, 50 percent of funds awarded must be matched, with a maximum grant award of \$50,000 per project. For the seed stage, 50 percent of the award must be matched, with a maximum award amount of \$500,000.
- **Nebraska Small Business Innovation Research Initiative:** this initiative provides financial support to principally located in Nebraska who are applying for Federal SBIR funds.

Depending on what phase the SBIR application is in, awards can vary from \$5,000 to \$100,000 per project.

- **Academic R&D Grant Program:** Allows the state to fund business and academic applied R&D activities. The awards are in two phases, with phase 1 awards totaling \$100,000 and phase 2 totaling \$400,000. The grants must be matched at 100 percent.
- **Site & Building Development Fund:** A fund that can be used to support the preparation, building or repair of industrial building developments in the state.
- **Microenterprise Assistance Program:** Provides technical assistance and loans to Nebraska microenterprises located in distressed rural and urban areas.

Entrepreneurial Development

Nebraska Business Development Center (NBDC). Located at the University of Nebraska – Omaha, the NBDC provides financial, consulting and technology transfer services to small businesses in Nebraska. It helps connect these small businesses with angel investors, crowdfunding sources and venture capital funds. NBDC consultants also help small business leaders to understand how to market their products, perform certified business valuation reports, and create export strategies, among other things. The center also offers workshops in topics such as business analysis and applied leadership, and also offers certificates in project management, leadership and other areas through UNO.

Invest Nebraska Corporation. Invest Nebraska was created by the Nebraska Venture Capital Forum Act of 2001. Invest Nebraska provides direct operational assistance to help entrepreneurs address key business challenges and reach growth objectives. Assistance can include reviewing business plans, identifying a key hire, modeling financials, evaluating investor pitches, making introductions with business professionals, and introducing you to potential investors. The crucial objective of this operational assistance is to prepare the entrepreneur for the type of funding needed to reach the next stage of the company's growth cycle. Should Invest Nebraska make an investment in the company, this assistance intensifies to include representation on the board of directors, identifying and recruiting C-level executives, and assisting with future capital raises.

Venture Financing

Nebraska Innovation Seed Fund. The Invest Nebraska Corporation, a private non-profit, established the Nebraska Innovation Seed Fund to offer investments ranging from \$50,000 to \$500,000 to small businesses working in advanced technology sectors, which typically includes the biotechnology and medical devices industries. The awarded funds can be used for working capital, to cover the costs of market assessments equipment and other startup costs. Eligible businesses must have fewer

than 500 employees, be engaged in a non-retail industry, and must match 100 percent of the investment using any non-state government source.

Nebraska Angel Sidecar Fund. Invest Nebraska has also created the Nebraska Angel Sidecar Fund, which provides additional leverage capital for any Nebraska company that receives angel investment by matching that investment 1:1. Companies at the seed or early stage of the financing continuum of business development can utilize the funds for working capital, commercialization, hiring key personnel, and product development. This fund is helping to maximize the growth potential of the growing angel investment community in Nebraska.

Advanced Manufacturing Programs and Initiatives

UNL Biological Process Development Facility (BPDF). The BPDF is focused mainly on advancing biopharmaceutical therapeutics and specializes in the development of peptides and recombinant proteins. The BPDF offers state-of-the-art lab and manufacturing space, as well as highly trained and experienced scientists to help with client projects. The BPDF has manufactured biopharmaceutical products since 1998, including vaccines, enzymes and other products. The \$11 million GMP facility is home to a bioreactor with 150 liters of working volume, and can accommodate a 1,000-liter fermenter. It also has 6,000 square feet of modular laboratory space along with 7,000 square feet of support space. On top of that, the BPDF is home to five specialized laboratories, including the Molecular Biology Laboratory, Purification Development Laboratory, Protein Characterization Laboratory, Fermentation Development Laboratory and the Analytical Methods Laboratory.

Economic Incentives

Nebraska Advantage Tax Credit Package. This package of economic development incentives came into effect in 2006, and has supported the financial needs of businesses either expanding or relocating to the state. The benefits packages are tiered depending on the investment and job creation created by the expanding or relocating company. Benefits under these tiers include refund of sales taxes, application of wage credits, investment credits, and personal property tax exemptions. Other incentives include job training grants, manufacturing machinery and equipment sales tax exemptions, and an R&D tax credit.

- **R&D Tax Credit:** This refundable tax credit can be applied to any company engaged in qualified R&D activities. The credit is equal to 15 percent of the federal R&D tax credit. However,

the credit can be increased to 35 percent if the R&D activities are taking place on an academic campus in the state.

Angel Investment Tax Credit Act. Created through the Nebraska Talent and Innovation Initiative, the Angel Investment Tax Credit offers refundable income tax credits to those who invest in early-stage Nebraska companies. Individuals must invest at least \$25K per year, while investment funds must have a minimum of three investors and invest at least \$50K per year. The credit can reach a maximum of \$300K to \$350K depending on filing status, with a maximum amount of \$1 million for investments in one business. The fund offers \$4 million in credits per year.

STEM Workforce & Education Programs and Initiatives

Intern Nebraska (InternNE): The InternNE program connects college students and employers from across the state, providing a unique opportunity for them to co-invest in the future. Interns gain valuable business experience that will help them in future careers, while successful internships help businesses develop tomorrow's leaders. The InternNE Grant Program provides financial assistance to companies in Nebraska who are creating new internships. Businesses who are awarded grants receive up to a 50% reimbursement of what they pay their intern, up to \$5,000 per internship. Businesses that hire students receiving Federal Pell Grants may provide a supplemental application and may be awarded a grant of up to 75% and an additional \$2,500 per internship.

University of Nebraska Medical Center INBRE Program: The INBRE program is a partnership between twelve state institutions, which act as a training and mentoring network for both faculty and students with the goal of improving biomedical research opportunities in the state. This program was funded by a \$17 million grant awarded over five years to UNMC's Dr. James Turpen. The scientific themes of the Nebraska INBRE Program are structural biology, cell signaling and infectious diseases. The program supports research through the funding of faculty salaries, student stipends, equipment and travel expenses. One of the programs offered through the INBRE Program is the INBRE Scholars Program. This two-week mentored research program allows for accepted undergraduates to conduct research at their home institutions and assists undergraduates

financially if they choose to continue their research through a PhD program at one of the program PhD granting institutions.

BPDF Undergraduate Courses: The BPDF seeks to train Nebraska's workforce in biotechnology by offering two courses: a lecture course covering theoretical and practical concepts in bioproduction and its related topics, and a lab course that is focused on providing hands-on experience in fermentation, upstream and downstream processing. This lab course provides a base understanding of the biotechnological production process with a focus on biomanufacturing.

University of Nebraska-Omaha STEM Academic Programs: The Office of STEM Education at The University of Nebraska – Omaha (UNO) offers a number of STEM-related programs to help further STEM education efforts in the state. These programs include:

- **The Teacher Academy Project (TAP),** which allows students with an undergraduate degree to obtain a master's-level certificate in secondary education. This program helps to provide students with the credentials to become STEM educators.
- **UNO STEM Priority:** STEM was designated as one of five priorities for UNO, which has led to the development of the STEM Leadership Team, made up of 12 individuals from the local community and the campus. The leadership team is working to implement interdisciplinary actions in the areas of curriculum enhancement, capacity building, and community collaboration.
 - **Outcomes:** The STEM Priority has successfully engaged 80 faculty and 60 community organizations (including school districts and other education venues) in developing STEM initiatives in the state. Plans for a STEM Building at UNO are also underway.

UNL's Center for Science, Mathematics and Computer Education: The Center is dedicated to supporting faculty engaged in STEM education efforts at K-12 and college levels. The Center hosts a multitude of annual conferences focused on STEM education methods and best practices, and offers a number of networking and other resources for STEM educators. Two of these resources are NebraskaScience and NebraskaMath, which are multi-institutional efforts offer continuing education and mentoring programs for STEM educators.