

Diana Spencer is an assistant professor of biotechnology at Tulsa Community College and coordinator of the college's biotechnology program. Spencer helped launch the program in 2006, and it has since grown in student size by more than 800 percent.

1. What are some of the most interesting developments in the bioscience field? Ten years ago, sequencing a human genome took years; today a single "next-generation" sequencer can determine three human genomes in a week. With the new tools and computer capabilities, we can now study gene expression and protein-DNA interactions of rare diseases and cancers with scientists in international consortia. Within this decade, scientists were able to sequence the entire genome of Neandertals and unlock the information for practical use today. "Junk DNA" of the 1990s has turned out to be important regulatory DNA and functional on the cellular level, proving to be of great significance in understanding disease. Also, a positive response to injury, the inflammatory response, has now become accepted as significant in aggravating chronic disease - and therefore, a target of research. Another research result of the last 10 years is the ability to take a differentiated cell and coax it into an induced pluripotent cell, or stem cell state, by simply adding a few factors to the cell's environment. With this technique, we can take cells from patients and grow replacement cells or possibly entire organs. This knowledge has the capability to change medicine.

2. What are some of the ways these developments benefit local companies and consumers?

Biotechniques within the biosciences will allow great progress in our ability to feed, fuel, heal and clean the world. The discoveries found within this decade have implications for chronic disease such as cancer, diabetes, obesity, Alzheimer's, Parkinson's, Huntington's, autism, and atherosclerosis. Agricultural biotechnology works for stronger plants and animals to feed our growing population. Bioenergy companies work to create biofuel opportunities.

3. Are there specific Oklahoma companies that are incorporating bioscience innovations into their work? Oklahoma's bioscience sector continues to grow, with the combined direct and indirect impacts contributing \$6.7 billion in economic activity in the region.

To describe a few companies specifically, Cytovance Biologics is a contract manufacturing organization that

works to create recombinant proteins and antibody therapeutics. Charlesson is developing therapeutics for macular degeneration and systemic diabetes. ARL BioPharma is a contract research lab for the pharmaceutical industry. Kemmx is centered here in Tulsa, and its objective is to bring to market a topical analgesic for rheumatoid arthritis. PharmSci Consulting has hired a couple of our graduates for work in Tulsa, and the Samuel Roberts Noble Foundation conducts plant science and agriculture research.

4. How many students have finished biotech majors since the program began accepting them in 2006? How many applied for the program this school year? Our enrollment continues to increase. In the spring 2011 semester, we had six students complete their A.S. in Biotechnology. We will have four Associate in Science/Biotechnology degrees and four Certificates in Biotechnology this month. We had a total of 34 enrollments in biotechnology classes this semester.

5. What kinds of jobs are these students finding when they graduate? Our first associate of science in biotechnology graduate completed bachelor's degree at Oklahoma State University while working in a research lab. She has now been accepted into a graduate program in forensics at OSU/CHS. Our 14 graduates are doing a variety of things. They're employed in research labs such as the Oklahoma Medical Research Foundation, attending medical school, articulating to NSU/BA in biology with a molecular biology emphasis, traveling to OSU on NSF scholarships, or working as lab coordinators.

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