

Phage display has revolutionized modern basic and biomedical research, leading to groundbreaking innovations recognized with the 2018 Nobel Prize in Chemistry. Dr. George Smith of the University of Missouri was one of the recipients of this Nobel Prize whose pioneering work set a strong foundation for drug discovery using phage display technology. His achievement has prompted much pride amongst both local Columbian residents as well as the University of Missouri.

For [Cell Origins](#) COO Jessica Newton-Northup, who has been trained by Dr. George Smith and Dr. Susan Deutscher at Mizzou, it provides an opportunity to grow and establish a foothold in the phage display market. The scientists at Cell Origins bring their extensive experience and expertise to provide services that include peptide and antibody discovery, screening, and method development, as well as premade and customized phage display libraries for customers seeking to develop diagnostic or therapeutic peptides and antibodies.

The drug discovery process poses a number of challenges that must be overcome to develop successful therapeutics. Challenges typically arise from the difficulty of developing peptides and antibodies with all the necessary characteristics to create an effective drug product such as high binding affinity, specificity for the biomarker target, and sufficient stability and solubility. Additionally, the pharmacokinetics of the drug must be developed to ensure desired tissue concentrations while minimizing systemic exposure. To effectively address these obstacles, each drug discovery program must be specifically tailored to bring successful therapeutic and diagnostic peptide and antibody products to market. "What makes Cell Origins unique in the peptide and antibody discovery space, is our custom approach that combines multi-tier phage display selections", says Dr. Mette Soendergaard (CSO). The scientists at Cell Origins also use their deep understanding of molecular targets, disease mechanisms, and pharmacokinetic properties to provide peptides and antibodies with superior characteristics. Jessica Newton-Northup adds "We specialize in tough challenges like small epitopes and biomarkers that have proven difficult to target by others".

Cell Origins is a 100% women-owned business that is operated in Mid-Missouri. The [three owners](#) are alumni of the University of Missouri and owe their friendships and business relationships to the university. It was through Mizzou that Leann Qi (CEO), Jessica Newton-Northup (COO), and Dr. Mette Soendergaard (CSO) joined forces to submit a small business innovation research (SBIR) grant, which formed the foundation of Cell Origins. With this strong foundation, the three Mizzou alumni were able to expand into the many phage display services that the company now offers.

"Our original SBIR grant focused on the use of phage display to develop a method to discern phenotypic changes in human cell lines as a result of different culturing conditions", says Jessica Newton-Northup (COO). This NIH program announcement focused on the development of products able to help the scientific community better standardize and control the myriad of variables inherent to all work with cultured mammalian cells. Most of the proposed protocols for the identification and quality control of laboratory cell lines focus on a single aspect of cell biology or upon documentation. These approaches cannot generate a broad biochemical profile of a cell line and consequently cannot monitor a cell line for phenotypic changes. Thus, the scientific community continues to produce cultured cell-based data without controls for many ill-defined variables. "At Cell Origins, we are, however, actively working on the development of a unique proprietary product able to dually target both mRNA and cell surface phenotypic biomarkers of any composition", says Dr. Mette Soendergaard (CSO). The method can, in concert with Short Tandem Repeat (STR) analysis, probe three tiers of cell biology; DNA, RNA, and cell surface biomarkers. Cell Origin's phage display-selected biomarkers are able to provide initial evidence of changes due to cell age, passage number, media composition, and culture conditions. The scientific community will gain valuable insight from this new product, which can be used to accurately identify cells, adjust culture conditions, and assess data for reproducible results.

Phage display has become a powerful tool in drug discovery, and the owners of Cell Origins are excited about the future of the peptide and antibody drug discovery market. "The global peptide therapeutics market is estimated to reach an impressive value of nearly \$62 billion by 2027, with a remarkable 9.42% compound annual growth rate (CAGR)", says LeAnn Qi (CEO). The North American market for peptide-based cancer therapeutics is experiencing exponential growth, driven by the FDA approval of treatments such as Lutathera and increased investment from pharmaceutical giants. Cell Origins is continuously advancing phage display strategies to provide pharmaceutical companies and academic laboratories with support in their drug discovery projects. For more information, please visit our website: cellorigins.com