CFDRC Developing Physiologically Realistic in vitro Tumor Microenvironment Platform

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CFD Research Corporation has been awarded a $1.3M grant from the National Institutes of Health to develop their novel in vitro tumor model. SynVivo-Tumor replicates the tumor microenvironment with physiologically and morphologically realistic microvasculature including endothelial cell-lined leaky vessels and 3D solid tumors.

Tumor drug delivery is a complex phenomenon affected by several elements in addition to physico-chemical properties. "Current in vitro models of tumor drug delivery are oversimplified and show poor correlation with in vivo performance," said Prabhakar Pandian, Ph.D., CFDRC principal investigator. "Our novel platform mimics the in vivo environment with physiologically relevant flow resulting in endothelial cell lined capillary vessels and 3D solid tumors. Most importantly, the SynVivo-Tumor platform enables real-time, quantitative assessment of the performance of drug delivery vehicles."

Jason Fewell, Ph.D., VP, preclinical research and development at EGEN Inc., understands the benefits of this technology. "The result of a study predicting the in vivo transection efficiencies of our polymers was very insightful," said Fewell. "The SynVivo-Tumor assays captured the in vivo response, while the static well plate assays did not, clearly highlighting why static well plate assays are not suitable for predicting drug vehicle delivery in vivo."

Samir Mitagotri, Ph.D., director of the Center for Bioengineering at U.C. Santa Barbara is a key collaborator. "The results obtained using SynVivo's microvascular structures enabled us to identify how the shapes of particles impact drug delivery," said Mitagotri. "It was even more interesting to note that static experiments and linear flow chambers were not able to resolve the differences." He further noted that the demonstration revealed the accuracy of the SynVivo platform and validated its potential as a superior screening tool.

Under this National Cancer Institute grant, CFDRC will further validate the tumor assay for multifunctional nanoparticles with Mohammad Kiani, Ph.D., Temple University; for gene delivery with Jason Fewell, Ph.D., EGEN Inc.; and for nanopolymeric drug delivery with Tacey Viegas, Ph.D., Serina Therapeutics.

"The SynVivo-Tumor platform," said Kapil Pant, Ph.D., director of biomedical technology at CFDRC, "enables critical applications both in basic research, where it can be used to develop next generation delivery vehicles, and in drug discovery and development where it can be used to study drug efficacy in realistic tumor

microenvironments."

CFDRC is exhibiting the SynVivo technology at the 2012 annual meeting of the American Society for Cell Biology, December 15-18 in San Francisco. Experts will be available to discuss SynVivo applications ranging from microvascular networks, to tumor and tissue co-cultures, and blood-brain barrier constructs. Case studies and sample chips will be available.

For more information about the SynVivo family of products visit www.cfdrc.com/synvivo.

About CFDRCCFD Research Corporation develops and commercializes innovative technologies for biomedical, energy, and aerospace markets. CFDRC, founded in 1987, is headquartered in Huntsville, Alabama.