Molecular Engineering

Linda Powers' research spans starving plague bacteria, growing stem cells, and catching transient optical data.

Professor Linda Powers

Adipose tissue is a valuable source of stem cells for regenerative medicine, but purifying therapeutic quantities of stem cells requires costly antibodies. Instead of antibodies, Powers, a professor of electrical and computer engineering, is using small molecules tethered to magnetic beads for affinity purification of stem cells, stripping away the endothelial cells and fibroblasts that can cause undesirable mechanical tissue properties.

Pathogenic bacteria, such as plague-causing *Yesinia pestis,* get nutritional iron From their hosts, so Powers is developing molecules that block iron uptake by *Y.pestis.* "This work constitutes a radically different approach to the development of antibacterial drugs," Powers said. "Starve the bacterial cells by iron deprivation."

There is no method to sequentially collect time-resolved fluorescence measurements in real-time upon excitation by a single pulse, which makes it difficult to collect fluorescence data on transient or unstable processes. Powers' answer is to capture photons in a photomultiplier tube and convert the signal to an electrical current. "This system uses a very high speed digital signal processor," Powers said.