Chip-Based Device Measures Drug Resistance in Tumor Cells

May 21 2008

Multiple drug resistance is a major cause of anticancer therapy failure. Most drug-resistance cancer cells develop this unfortunate characteristic due to a drug-pumping protein known as P-glycoprotein.

Now, a team of investigators at Simon Fraser University in Burnaby, British Columbia, has developed a microfluidic chip that can trap individual cancer cells and investigate the ability of various pump-blocking drugs to overcome drug resistance. This new "lab-on-a-chip" device could prove useful for studying multiple drug resistance and for selecting the appropriate therapy for a given patient.

Paul Li, Ph.D., and his colleagues developed the dime-size chip to select and retain individual cancer cells within a chamber that can be dosed with drugs loaded into an on-chip reservoir. An optical detection system, consisting of an inverted fluorescence microscope, enabled the researchers to measure drug influx and efflux in real time, before and after the cells were dosed with various pump inhibitors. In their current work, which appears in the journal *Analytical Chemistry*, the investigators studied the effects of the antipump drug verapamil on the net intake of the anticancer drug daunorubicin.

This work is detailed in the paper "Same-Single-Cell Analysis for the Study of Drug Efflux Modulation of Multidrug Resistant Cells Using a Microfluidic Chip." Investigators from the BC Cancer Research Center in Vancouver also participated in this study. An abstract of this paper is available at the journal's Web site.

Source: National Cancer Institute