

Drug-Eluting Microarrays for Cell-Based Screening of Chemical-Induced Apoptosis

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Traditional high-throughput screening (HTS) is carried out in centralized facilities that require extensive robotic liquid and plate handling equipment. This model of HTS is restrictive as such facilities are not accessible to many researchers. We have designed a simple microarray platform for cell based screening that can be carried out at the benchtop. The device creates a microarray of 2100 individual cell-based assays in a standard microscope slide format. A microarray of chemical-laden hydrogels addresses a matching array of cell-laden microwells thus creating a microarray of sealed microscale cell cultures each with unique conditions. We demonstrate the utility of the device by screening the extent of apoptosis and necrosis in MCF7 breast cancer cells. Treatment with doxorubicin induced high levels of apoptosis in comparison with staurosporine, ethanol, and hydrogen peroxide, whereas treatment with 100 micromole ethanol induced minimal apoptosis with high levels of necrosis. We anticipate broad application of the device for various research and discovery applications as it is easy to use, scalable, and can be fabricated and operated with minimal peripheral equipment.