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Short Communication

Cancer Therapy and Microfluidics

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Microfluidics is a novel field that involves manipulating fluids in channels with diameters of tens of micrometers, which has gotten a lot of attention in the recent decade, and there are a lot of different channel designs. Microfluidics might have an impact on everything from chemical synthesis to biological analysis to optics and information technology. However, it is still in its infancy [1-3]. Cancer is one of the most common causes of death across the world and microfluidics has a lot of potential in cancer detection, and it's also becoming a popular technique for learning about cancer biology. Researchers and formulation scientists are becoming more interested in microfluidic techniques due to their capacity to effectively evaluate new drug primary, saving money, material, and time, and the ability to manufacture various system morphologies from nano to microscale [4,5].

The potential of microfluidics in cancer research can be categorize into four groups (Figure 1):

- Isolation of circulating tumor cells (CTCs) using immunoaffinity-based, immunomagnetic-based and size-based methods.
- Molecular diagnosis includes on-chip single-cell RT-qPCR in each reaction chamber, droplet-based PCR for identifying uncommon mutations, and a droplet-scale estrogen test for assessing tiny quantities of tissue.
- Tumor Biology: creation of 3D co-culture spheroids for researching the metastatic milieu of prostate cancer, cell migration platform for evaluating the influence of co-culture settings, and cancer cell movement in a microcapillary array under mechanical confinement.
- High-throughput screening includes an integrated blood barcode chip for detecting plasma proteins, a programmable cell culture array for drug screening, and a single-cell array made up of micromechanical traps for screening anti-cancer medicines that trigger apoptosis [5].

Figure 1: Microfluidics potential in cancer research; isolation of CTCs, molecular diagnosis, tumor biology, and high-throughput screening (From Ref. [5]).

Moreover, microfluidics offers enormous potential to give answers for cancer-patient-specific therapies since it allows for the cost-effective processing of samples that are not readily available in large numbers, as well as the creation of sophisticated cancer models [6].

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