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## Droplet routing and testing technique of digital microfluidic biochips

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Digital micro-fluidic biochips in recent years have been developed as a major alternative platform for conventional bench-top laboratory procedures. It offers better precision, scalability, higher sensitivity and lower cost due to smaller sample and reagent volumes. One of the challenging problems related to the design of DMFB is high performance droplet routing, where each droplet has single source location and single target location. The objectives are minimizing the number of electrodes used in the DMFB and minimizing the total routing time of all the droplets or last arrival time of a droplet at its target. It needs to be addressed. Testing of DMFBs is of major significance in terms of dependability and reliability issues for safety-critical applications. A series of complex micro-fluidic operations are executed in a compact 2D array within a DMFB. The layout engages a group of cells as transportation path as well as a specific cluster of cells as functional modules to perform basic operations of routing, mixing, splitting, merging, storage and detection. In order to determine, the correctness and reliability of results testing of these prescheduled layout are necessary both for transportation (structural) as well as functionality (functional). This issue will be addressed.

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## Management of cardiac implantable electronic devices in patients receiving cancer therapy

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Although cancer and cardiovascular disease remain the two most common causes of mortality in the United States, improved diagnostic and treatment modalities have improved life expectancy dramatically. Patients are being diagnosed with cancer later in life and frequently have cardiovascular comorbidities. A proportion of these patients will present with cardiac implantable electronic devices (CIED) such as pacemakers or defibrillators prior to starting cancer treatments. For those patients with a pre-existing CIED who are receiving chest radiations or surgical procedures such as mastectomy, unique complications may occur. Radiation may cause electromagnetic interference which can lead to over sensing, loss of pacing or inappropriate shocks. It can also lead device resets and even device failure. In certain circumstances, it is necessary to consider relocation of the device in order to deliver appropriate radiation therapy or minimize surgical complications. Additionally, some patients may require a CIED as a result of exposure to certain chemotherapeutics and or radiation. Although implantation in these patients is based on standard indications, oncology patients can pose unique challenges compared to other patient populations. It is essential that oncologists work closely with cardiologists and electrophysiologists to ensure that cancer patients with CIEDs receive appropriate care for their malignancy while ensuring safety to the patient and minimizing impact to the device.

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