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Conference Abstract Proceedings

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Keywords: Bacteriobot, motion control, bacterial chemotaxis, microfluidic channel, Salmonella typhimurium

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Active Triggering Biopsy Device for Magnetically Driven Capsule Endoscope

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Abstract. Recently, with gastrointestinal diseases being on the rise, patient-friendly capsule endoscope has been an increasingly popular diagnostic alternative. Since then, there is a need to make the capsule endoscope device multifunctional, which can take random biopsy sample inside gastrointestinal tract to define cancer from other digestive diseases. In order to achieve this goal, this paper developed an active locomotion capsule endoscope, which could be wireless controlled by electro-magnetic actuation system to have active and flexible targeting motion, integrating with a smart-triggered biopsy tool. The biopsy tool, containing a spring mechanism, is triggered with strong magnetic field by integrating micro Reed switch. To execute biopsy process; firstly, the capsule endoscope with permanent magnet inside was driven by electromagnetic actuation system with moderate intensity magnetic field aiming to the target lesion on intestinal wall. Secondly, by increasing the magnetic field to excited level, the capsule is attached to intestinal wall, then, Reed switch is closed to trigger the biopsy process. The biopsy process executed by capsule endoscope, therefore, is totally wireless controlled by external magnetic field of electromagnetic actuation system without corrupting the conventional controller module. The prototype of biopsy module, with length of 5mm integrated into capsule with the dimension of 12mm in diameter and 33mm in length, performs effectively to successfully extract biopsy sample as it is used in an in-vitro biopsy test.

Keywords: Biopsy device, active locomotive intestine capsule endoscope, Reed switch, electromagnetic actuation system

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Development of a bacteria-based microrobot using chitosan-coated liposomes

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