Abstract

Miniature Devices for Closed-loop Health Management

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Mobile technologies have changed our life style significantly. Personalized tools such as wearable and implantable devices through wireless communication have been utilized in medicine to provide unique functions and reduce costs. Individuals can be empowered with tailored solutions without limitation in mobility or daily activities. Quantitative documentation of physiological parameters presents more accurate assessment for symptoms. Direct stimulation on tissues by electrical signals can restore or improve body functions. Continuous monitoring and adaptive administration of therapy to treat symptoms can optimize the closed-loop health management.

This presentation discusses the development of wireless micro devices and integrated systems for clinical applications. The systems are based on batteryless, wireless, flexible implants with enhancement in miniaturization and functionalization. Miniaturization allows endoscopic or minimally invasive procedures to deploy the implants without painful surgeries. Several examples for management of gastric and neural disorders, particularly as closed-loop systems, will be introduced. These examples aim to inspire new system application ideas to address the grand challenges in healthcare by integration of electronics and medicines.