

세미나 요약 (Abstract)

강연제목 (Title)	Implantable Batteryless Devices Designed for Precise On-demand Drug Delivery		
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(참여대학원생에게 세미나 안내 및 보관 자료로 참고로 사용될 예정입니다.)

Self-injectable therapy has several advantages in the treatment of metabolic disorders. However, frequent injections with needles impair patient compliance and medication adherence. To resolve this, many implantable systems have been introduced; however, they often require electrical power supplies (e.g., batteries) and thus, they are large and heavy for implantation. Therefore, in this work, we propose three different types of implantable devices enabled with patient-driven, on-demand drug release without electric power sources. For the first, we design the pump to be actuated by an externally applied magnetic field, which can release an accurate amount of drug only when a magnetic field is applied outside the body. The other type of an implantable device is embedded with multiple drug reservoirs that are capped with a stimulus-responsive membrane (SRM), which can be ruptured by noninvasive near-infrared (NIR) irradiation from the outside skin, hence opening a single selected reservoir to release the drug. Here, we also propose an implantable device capable of on-demand administration of drugs via noninvasive manual button clicks on the outer skin. Those implantable devices do not contain any electronic compartments or batteries, making it compact, and semi-permanent. They exhibit the pharmacokinetic and pharmacodynamic profiles, similar to those in animals treated with conventional subcutaneous drug injections. Therefore, we conclude that the systems proposed herein are promising for noninvasive, on-demand pulsatile drug administrations.

