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Soft implantable microchip for controlled drug delivery

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Implantable drug delivery devices for the treatment of chronic diseases have drawn a great deal of interest recently. Considering many different types of drug regimen needed for various diseases, the implantable devices would be more advantageous when equipped with an ability to accurately control drug release. However, many of such devices are made of hard materials, often causing foreign body sensation after implantation. Therefore, we have developed an implantable microchip made of a soft polymer, Poly Di Methyl Siloxane (PDMS) and to allow for controlled drug delivery, the device was embedded with multiple pairs of micro-channels and reservoirs. In channels, a biocompatible hydrogel, gelatin was filled to serve as a drug diffusion barrier. To test feasibility, the reservoir was loaded with a model compound, fluorescein. The loading amount of fluorescein was about 2.6±0.2 mg per reservoir. After implantation, water could infiltrate via the gelatin hydrogel network in the channel to reach the reservoir and then, solubilize drug to be diffused out through the same hydrogel channel. By varying the lengths and cross-sectional areas of channels, we sought to precisely control the profile and onset of drug release. In this work, we changed length of the channel and cross-sectional areas from 4 mm to 12 mm and from 1 mm^2 to 4 mm^2, respectively. The *in vitro* release profile showed that the average rate and onset time of drug release could be varied from 8.3%/day to 14.28%/day and from day 2 and day 14, respectively.

Biography

Han Bi Ji has received her Bachelor of Science degree in Biotechnology at CHA University and presently pursuing her Masters and Doctoral integration course in Bioengineering at College of Engineering, Seoul National University. She has her expertise and passion in developing implantable devices for controlled drug delivery.

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