Microfluidic hybrid method for preparation of E. Coli encapsulated PEG-based hydrogel microbeads

이경균, 박태정[1], 왕계원[1], 이석재[2], 김도현[1,*]
한국과학기술원 생명화학공학과; [1]한국과학기술원;
[2]나노종합팹센터
(DoHyun.Kim@kaist.ac.kr*)

Polymeric hydrogel is important and essential for biological applications due to its low cytotoxicity and easiness to control the size and shapes in the manipulation and encapsulation of biological substances. Among various methods to synthesize hydrogel beads, the combination of UV irradiation and microfluidic systems is promising for the encapsulation. However, because of the potential damages to the cellular structure by UV irradiation, the combined use of chemical synthesis and microfluidic systems would be one of the choices.
UV free and biocompatible polyethylene glycol (PEG)-based polymer would provide a unique platform to compartmentalize microorganisms. To demonstrate the feasibility of PEG for the biological applications, we combined a microfluidic device and PEG-based polymer for the encapsulation of Escherichia coli. The microfluidic device can produce PEG hydrogel microdroplets for the encapsulation of E. coli to extend long term storage. The encapsulated E. coli in hydrogel microbeads can be used in various applications such as biological conversions, biosensing, and bioremediation.