

DNA sequencing by End-Labeled Free-Solution Electrophoresis in capillaries and microfluidic devices

원종인*

홍익대학교

(jiwon@hongik.ac.kr*)

Research efforts are described towards the creation of a novel series of non-natural, repetitive polypeptides expressed in bacteria, which are designed to serve as "drag-tags" for microchannel DNA sequencing by End-Labeled Free-Solution Electrophoresis (ELFSE). ELFSE is a promising bioconjugate method for DNA sequencing and genotyping by both capillary and microfluidic device electrophoresis, which eliminates the need for loading viscous polymer matrix into electrophoresis microchannels. To accomplish microchannel DNA sequencing with high performance, ELFSE requires totally monodisperse perturbing entities (i.e. drag-tags) such as proteins, and other properties suitable for microchannel electrophoresis. Non-natural, repetitive polypeptides are promising ELFSE drag-tags because their sequences can be designed for desired properties, such as water-solubility and charge-neutrality. After the proteins were expressed and purified, the resulting proteins were conjugated to ssDNA oligomers using a bifunctional coupling reagent, and tested DNA sequencing by free-solution capillary electrophoresis.