DNA ストレプトアビジン修飾によるナノポアを用いたターゲット遺伝子検出法の開発

Detection of streptavidin-labeled DNA using solid-state nanopores for target sequence detection

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Along with the global population growth and global warming, further stable supply of agricultural products will be needed. Genetically-modified-organisms (GMO) products are highly resistant to environmental changes. In addition, they have a high yield per unit area. Therefore, GMO products will spread more widely in the future, and the number of GMO testing will also increase. The conventional method of GMO testing is based on target sequence detection using qPCR. Although these testing techniques are widespread, they are time-consuming and will not be able to cover all required GMO testing. By comparison, solid-state nanopores have a potential to provide a rapid and portable testing device because of its electric detection method which does not need optics. For realizing target sequence detection with solid-state nanopores, it is a promising approach to label the target sequence with a large molecule and enlarge a current-blockade value when DNA including the target sequence passed through a nanopore. In this study, the possibility of streptavidin (SA) as a labeled molecule was examined. As a result, we found that the passages of SA-labeled and non-labeled DNA through a nanopore can be clearly distinguished.

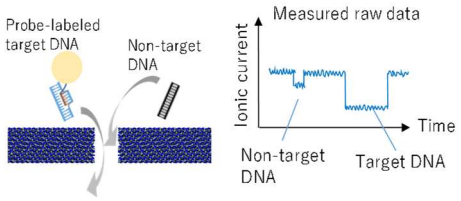

Figure 1 | Schematic diagram of target sequence detection using solid-state nanopore

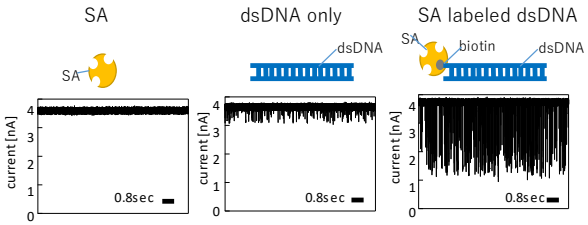

Figure 2 | Ionic-current time traces while SA, dsDNA and SA-labeled dsDNA are present in *cis* chamber, respectively