Photoelectrochemical detection of dengue - related oligonucleotide sequence using anthocyanin as a intercalating agent and electrochromic material

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Abstrak

World Health Organization (WHO) presupposes a confirmation of dengue virus infection diagnosis with two criteria,
i.e. clinical and laboratory criteria. One of the basic methods used by most laboratories to diagnose dengue virus is to
detect oligonucleotide sequence using a DNA amplification technique. In this research, the measurement of denguerelated
oligonucleotide was conducted by photoelectrochemical method. The presence of oligonucleotide sequence in
target DNA can be detected by DNA probe that is immobilized on TiO2 electrode. The DNA hybrid is then bound to
electrochromic substance like anthocyanin that generates current when it is subjected to light. The photocurrent is
directly proportional to the number of target DNA. The aim of this research is to obtain photoelectrochemical system
that has sensitivity and high responsiveness toward the change in oligonucleotide concentration, especially the
applicability of anthocyanin as a electrochromic substance and intercalating agent. Linearity (R2) generated from the
change of current in response to concentration changes of target DNA (in the concentration range of 0.75?3.00 nM) is
0.9611. Thus, this method has the potential to be developed to detect the presence of dengue virus in biological sample.