

Peroxidase-Mimetic Peptide Nanoassembly-Au Complex Based Fluorescence Turn-On Sensor for Label Free Detection of Amyloid Beta

윤세빈, 이남훈, 이상명†
강원대학교

(sangmyung@kangwon.ac.kr†)

Alzheimer's disease (AD) is the most common form of dementia and currently affects about 500,000 Korean over 65 age. So, the highly-sensitive biosensors deserved to be developed because the early diagnosis of AD is becoming very important. Amyloid beta ($A\beta$) peptide which is directly related to AD is considered as an emerging AD marker, but it is delicate to detect it without secondary labels like fluorophores. Here, we prepared peroxidase-mimetic gold nanoparticle-decorated peptide self-assembly nanostructure (PEPAu/Sat) based fluorescence turn-on sensor for the label-free detection of $A\beta(1-42)$ as AD marker. The detection mechanism largely composed of oxidation of $A\beta(1-42)$ by Fe(III) or Cu(II), which produce hydrogen peroxide from dissolved oxygen in situ, and sequential oxidation of Amplex Red (AR) by the gold nanoparticles coupled on PEPAu/Sat to emit fluorescence around 585 nm. To apply this novel mechanism to $A\beta(1-42)$ biosensor, anti- $A\beta(1-42)$ antibody was immobilized on PEPAu/Sat and $A\beta(1-42)$ was captured by them. We hope this novel biosensor platform can expand their applications to other disease markers including cancers.