Bioconjugation Methods for Improving the Efficiency of Human Epididymis Protein 4 (HE4) Biomarker for Detecting Ovarian Cancer at Early Stages

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Ovarian cancer (OC), whose incidence increases with age, is one of the most common cancer types in woman. OC can be successfully treated if detected early but the diagnosis of OC at early stages is difficult since there are no obvious symptoms and no screening test has proven to be effective. Human Epididymis Protein 4 (HE4) is a serum marker recently developed for earlier detection of ovarian carcinoma. HE4 belongs to the family of Whey Acidic four-disulfide core (WFDC) proteins (WAP). This glycoprotein (gene name *WFDC2*) is highly expressed by ovarian carcinomas, leading to its potential application as a serum biomarker for this cancer. Since the efficiency and sensitivity of HE4 biomarker is still insufficient for early diagnosis of OC, we attempt to develop improved biosensor detection strategies based on bioconjugation with nanobodies against HE4. Several approaches, by which the introduction of a site-specific and bio-orthogonal functional group can pave the way to a uniform orientation of the HE4 nanobodies at the biosensor surface, will be explored. This should lead to an improved sensitivity since all nanobodies will have their active regions accessible for binding the biomarker.

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