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Development of Immunoassays and Biosensor Methods for Detecting HPV-related Biomarkers in Saliva of Oral Cancer Patients

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Oral cancer is a malignant and aggressive tumor which has been one of the top ten causes of death from cancers in Taiwan. Studies of human papilloma virus (HPVs) and oral cancer have demonstrated the importance of their treatments and prognosis. To develop immunoassays and biosensor methods for detecting HPV-related biomarkers in saliva of oral cancer patients, a peptide fragment of HPV type 16 early protein was designed and synthesized as an antigen for preparation of its polyclonal antibodies. The titer and specificity of antibodies were determined by enzyme-linked immunosorbent assay (ELISA) and western blot. A surface plasma resonance (SPR)-based biosensor method was developed for detecting HPV-related proteins in saliva of oral cancer patients. ELISA confirmed the recognition and titer of the peptide for its polyclonal antibodies. The specificity of the peptide for its polyclonal antibodies was confirmed by Western blotting. SPR-biosensor results indicated that the resonance unit (ΔRU) values are higher in saliva of oral cancer patients than in those of normal subjects, suggesting that HPV-related proteins in saliva could be used as biomarkers of oral cancer. In conclusion, we have developed non-invasive methods for detecting biomarkers in saliva of oral cancer patients, which provide clinicians with an effective diagnostic tool.