Abstract

Nasopharyngeal carcinoma (NPC) is a rare malignancy. It is, however, endemic in the regions of Southeast Asia, and has a poor prognosis. In Indonesia, NPC is the fourth most common cancer of both sexes, yet little is recorded about it. NPC is related to Epstein-Barr virus (EBV) infection; this means that NPC is a potential target for immunotherapy strategies. Thus far, there has been much research for NPC vaccines targeting the viral genes of the EBV which are not expressed by cancer cells. Developing a multi epitope-based NPC vaccine might be helpful for patients with advanced cancer stages and who are resistant to treatment. Targeting the overexpressed antigens by the tumor may evoke immune response against the cancer cell. NPC has overexpressed levels of peptidyl-prolyl cis-trans isomerase (PIN1), which stimulates activating transcription factor 1 (ATF1) and tumorigenesis. Another overexpressed gene in NPC is ATP-binding cassette subfamily C member 5 (ABCC5). Its overexpression is reported in paclitaxel resistant NPC cells. A multi-epitope vaccination based on PIN1 and ABCC5 peptides was created in silico in this study. The ability of the proposed vaccination to elicit a successful immune response was evaluated with an in silico immunological simulation. In silico, the vaccine's overall quality was confirmed, and structural modeling proved the vaccine's stability. Docking tests demonstrated that the vaccine had steady interactions with Toll-Like Receptors. According to the computational assessments, the developed multi-epitope vaccine is antigenic and immunogenic, and can trigger specific immune responses, making it a promising vaccination candidate against NPC.

Keywords: B-cell epitopes, T-cell epitopes, PIN1, ABCC5, vaccine design, immunoinformatics, NPC