



Kloning, Gene Expression and Purification of ORF138 *Koi herpesvirus* Protein as a Vaccine Candidate

Sigit Surya Putra

Abstract

Koi herpesvirus is a large DNA virus that causes a fatal disease in koi and common carp. Outbreaks with mass mortality have occurred worldwide since 1998. Vaccination is one of prevention methods of viral disease. Glycoprotein membrane has been used for recombinant vaccine development. The aim of this research were to clone gene, express and purify ORF138 KHV protein as a candidate recombinant vaccine. ORF138 KHV gene was successfully amplified and cloned in pET28a expression vector. Sequence analysis showed that ORF138 KHV (isolate from Indonesia) had 99% similarity with *Cyprinid herpesvirus 3* DNA strain Japan, Israel and America. Prediction analysis of T cell epitopes using nHLAPred showed that ORF138 KHV protein had 12 epitopes. B cell prediction using B Cell Epitope Prediction Tools showed that ORF138 KHV protein had 3 epitopes by Karplus and Schulz flexibility scale, 11 epitopes by Emini Surface Accessibility scale and 10 epitopes by Kolaskar and Tongaonkar Antigenicity scale. Based on prediction analysis of T and B cell epitopes showed that ORF138 KHV protein was predicted to be immunogenic and can be used as a vaccine candidate. Result of purified ORF138 KHV protein using Ni-NTA showed that protein ORF138 KHV with a size of about 33 kDa.

Keywords : *Koi herpesvirus*, ORF138, cloning, expression, purification, recombinant vaccine



Kloning, Ekspresi Gen dan Purifikasi Protein ORF138 *Koi herpesvirus* sebagai Kandidat Vaksin

Sigit Surya Putra

Intisari

Koi herpesvirus adalah virus DNA yang menyebabkan fatal pada ikan koi dan carper. Terjangkitnya ikan dengan mortalitas masal terjadi diseluruh negara sejak tahun 1998 di Israel. Vaksinasi merupakan salah satu metode pencegahan penyakit virus. Membran glikoprotein telah digunakan dalam pengembangan vaksin rekombinan. Tujuan dari penelitian ini adalah mengkloning gen, ekspresi dan purifikasi protein ORF138 sebagai kandidat vaksin rekombinan. Gen ORF138 telah berhasil diamplifikasi dan dikloning di vektor ekspresi pET28a. Analisis sekuensing menunjukkan bahwa ORF138 KHV indonesia mempunyai similaritas 99% dengan *Cyprinid herpesvirus 3* DNA strain Jepang, Israel dan Amerika. Analisis prediksi epitop sel T menggunakan nHLA menunjukkan bahwa protein ORF138 KHV memiliki 12 epitop. B cell prediction menggunakan B cell Epitope Prediction Tool menunjukkan bahwa protein ORF138 KHV 3 epitop dengan Karplus dan Schulz flexibility scale, 11 epitop dengan Emini Surface Accessibility scale dan 10 epitop dengan Kolaskar and Tongaonkar Antigenicity scale. Berdasarkan analisis prediksi epitop sel T dan sel B menunjukkan bahwa protein ORF138 KHV diprediksi imunogenik dan berpotensi dijadikan sebagai kandidat vaksin. Hasil dari purifikasi protein ORF138 KHV menggunakan Ni-NTA menunjukkan bahwa protein ORF138 berukuran sekitar 33 kDa.

Kata kunci : *Koi herpesvirus*, ORF138, kloning, ekspresi, purifikasi, vaksin rekombinan