

Multimerized variable lymphocyte receptors B of hagfish induced by hydrophobic clustering

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It has been well known that variable lymphocyte receptors (VLRs) of jawless vertebrates directly mediate adaptive immune response (AIS) by antigen-specific binding and memory function. Hagfish and lamprey are the only surviving members of jawless vertebrates, which utilize their VLRs grouped as VLRA, VLRC and VLRB in response to antigen stimulation. Like immunoglobulin of B cell in mammals, VLRB antibodies are secreted from plasma cell after differentiation. Although the structure and the function of VLRB in both hagfish and lamprey are quite similar, the characteristic of each C-terminal tail is totally different. While lamprey's VLRB has Cys-rich tail, the VLRB of hagfish has superhydrophobic tail located at the C-terminal region. The presence of VLRB proteins in the serum of hagfish were detected as multimers (1,000 ~ 2,000 kDa: approximately 25 ~ 50 monomers) by immunoblotting, fast protein liquid chromatography (FPLC) and electron microscopy. When randomly selected VLRB clones were expressed in mammalian 293 cells, the VLRB proteins were expressed and secreted as multimerized forms. Furthermore, when the superhydrophobic tail was genetically conjugated onto mCherry gene, the chimeric protein was not only secreted to the medium, but was also localized on the surface of the transfected 293 cells in a multimerized form. Therefore, we assume that the multimerization of VLRB in hagfish could be induced by the clustering of the c-terminal superhydrophobic tails to make globular-shaped protein complex.

Key words: variable lymphocyte receptors (VLRs), hagfish, superhydrophobic tails

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