Abstract

Determining the health state and condition of vertebrates based on hematological traits is currently dependent on technically imperfect and erroneous quantification of blood cells. Solution of this problem can be found in the use of flow cytometry. This is, however, complicated by the presence of nuclear erythrocytes in all vertebrate groups outside the mammals. To distinguish erythrocytes from leukocytes, it is necessary to use specific labeling with a leukocyte marker, which is the CD45 surface molekule encoded by the *PTPRC* gene. Current literature suggests high expression and structural interspecific variability of this molecule, which highly complicates the possible use of this marker in zoological research. Based on the prediction of domains from genomic sequence data, my analysis comparing the structure of the CD45 in various vertebrate representatives showed a high variability of the extracellular part, even in fibronectin domains, which have been earlier described as conservative. Although the CD45 receptor function has not been sufficiently resolved yet, the existing research results indicate strong positive selection aimed to this molecule. Taken together, although the CD45 is a useful molecular marker, the possibility of designing a universal antibody allowing testing of a wide range of phylogenetically unrelated animals remains unlikely.

Keywords: CD45, comparative imunology, evolution, selection, leukocyte markers, cell surface molecules, protein phosphatases, condition, health state.