The last decades are characterized by the rapid development of peptidomics - one of the new directions of physicochemical biology that studies the composition, functions, formation mechanisms and elimination of biologically active fragments of proteins - peptides. The concept of “peptide pools” proposed by V.T. Ivanov (1997) became the significant result of such studies. According to it, in addition to well-studied peptide hormones, neuroregulators, protein antibiotics, biological fluids and body tissues contain a set of peptides derived from functionally active high molecular weight proteins by tissue-specific enzymatic hydrolysis [1]. The characterization of these peptide fractions can be useful not only from the theoretical point of view, but also from the practical - the differentiation of the pathological conditions diagnostics and the searching for potential pharmacological agents. Therefore, the purpose of this work was to investigate the presence of the peptide pool and characterize it in patients with ischemic stroke.

**Materials and methods.** The peptide pool with a molecular weight up to 5 kDa [2] was obtained from blood plasma of patients with atherothrombotic ischemic stroke (AII) and cardioembolic ischemic stroke in the acute phase of the disease and a year after it. The obtained fractions were characterized electrophoretically in 7.5-12% SDS-PAAG by the Laemmli method [3] and by size-exclusion chromatography using the Sephadex G 15.

**Results.** It was shown that the peptide pool can cause significant inhibitory effects on ADP-dependent platelet
aggregation of healthy donors. During the research of the chromogenic substrate hydrolysis, the key factors of the hemostasis system showed that fractions of the peptide pool of patients with ischemic stroke, both in the acute phase of the disease and one year after, exhibited maximum effector properties in relation to factor X, intensified the process of enzyme hydrolysis of a specific chromogenic substrate by 80%. The total activation of the researched process by the protein C, activated in blood plasma from the pro-enzyme by the pool of peptides, in healthy donors and people with pathology, is averagely shown by 20%. The effector capacity of the peptide pool has been shown at the level of platelet activation of healthy donors, namely, the secretion of platelet α-granules of the von Willebrand factor and the plasminogen activator inhibitor type-1 has been demonstrated for all the studied fractions. Thus, studies aimed at identifying the composition of peptide pools and studying their properties open up the significant prospects for the creation of new pharmacological agents on the basis of natural peptides for the treatment of diseases associated with degenerative changes, transformation of cells and tissues. The high sensitivity of peptide pools to the physiological status of the organism suggests the possibility of using the peptides studies results in the field of clinical diagnosis in order to find peptide markers of certain pathological conditions.

References:


Key words: peptide pool, ischemic stroke, platelet aggregation

Accepted for printing on 27 Oct 2017