

## Abstract

The more we know about the circulation of CSF through ventricle system, brain parenchyma, subarachnoideal space and the development of intracranial pressure (ICP), the more we understand different pathologies and pathological processes of the central nervous system. The knowledge about the basic hydrodynamic characteristics of craniospinal system is a key factor for understanding a wide range of pathological situations affecting CNS, these are for example intracranial hypertension, normal pressure hydrocephalus and syringomyelia. In the presented paper, we are presenting a newly developed measuring system Visionbrain that enables us to gain the biological data and consequently to analyse them. At the same time, the results of such measurements were used to specify the compartmental model of CSF circulation. The model divides craniospinal system into five divisions - two intracranial and three spinal. Such model is the third generation of this model and, compared to the older version, it includes two intracranial veins. Thanks to this structure, the model enables us simultaneous modeling of heart and respiratory pulsations of CSF. Compared to the other published models, it also includes defined structure of spinal part. The model is derived using laws of conservation and it encompasses pressure dependent non-linear compliance and non-constant resorption. According to our gained clinical data, the model represents a proper tool for simulation of certain pathological processes.