

**RUSSIAN ACADEMY OF SCIENCES
I.P. PAVLOV PHYSIOLOGICAL SOCIETY
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M. GORKY DONETSK NATIONAL MEDICAL UNIVERSITY**



**FIFTH INTERNATIONAL INTERDISCIPLINARY
CONGRESS
NEUROSCIENCE FOR MEDICINE
AND PSYCHOLOGY**

**School-WORKSHOP
NEW TECHNOLOGIES IN DIAGNOSTICS AND
THERAPY OF NERVOUS SYSTEM DISEASES**

Sudak, Crimea, Ukraine, June 3-13, 2009

Web site: <http://brainres.narod.ru/>

The V International interdisciplinary congress, "Neuroscience for Medicine and Psychology," is devoted to progress in basic sciences for human health. This is continuation of previous events (High Tatry, Slovakia, 2002 and 2003; Karadag, Crimea, Ukraine, 2002 and 2003; Hurgada, Egypt, 2004; Sudak, Crimea, Ukraine, 2004, 2005, 2006, 2007, 2008). This congress is the fifth in the series with the focus on Neuroscience which embrace a wide variety of studies dealing with the central and peripheral nervous systems together with those from both medical and psychiatric fields. We hope that the congress will attract various professionals with an interest in a multidisciplinary approach to studying the central and peripheral nervous systems.

AGE PECULIARITIES OF RELATIONS BETWEEN BRAIN BLOOD FLOW, LYQUORODYNAMICS AND BIOMECHANICAL PROPERTIES OF THE SKULL.

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Introduction: Cerebral blood flow (CBF), cerebrospinal fluid mobility (CSFm) and mechanical properties of skull (cranium compliance, CC) tend to change significantly with ageing. However, their comparative contribution to process of stabilization of physical and chemical indices of brain extracellular media, which determine important brain functions, such as cognitive activity, have not been clarified due to of methodical difficulties. Recently, the non-invasive approach for comparative evaluation of CSFm, CC and blood flow in the large brain arteries was developed. This study reports comparative changes of CBF, CSFm and CC over ages ranging from adult to the elderly, taking into account also the quality of brain cognitive function of every individual investigated.

Method: Comparative evaluation of ageing changes of CBF, CSFm and CC was based on simultaneous recordings of transcranial dopplerogram (TCD) at the middle cerebral artery (MCA), and rheoencephalogram (REG) with electrodes positioned fronto-mastoidally. Computer-aid analysis of these recordings permits to observe the changes of dynamics of pressure/volume relations within the cranium during a pulse cycle. Brain cognitive ability was evaluated by psycho-physiological method «Prognosis-1». The 98 persons of both sexes at age ranges 25 – 85 years were examined in this study.

Results: The data obtained show that CBF gradually decreases with age while both CSFm and CC vary. At the age of 40-50 CSFm and CC decrease by up to 10-15%, but after 50 CSFm and CC increase again. At the age of 70-85 CBF in MCA decreases by about 25-30%, while CSFm and CC increase up to 20-25% and 25-35%, respectively. At the age of 40-50 the quality of cognitive brain ability was correlated to level of CSFm and CC decrease. In the elderly group the moderate CSFm and CC increases correlated to cognitive dysfunctions.

Conclusions: The peculiarities of age relations between CBF, CSFm and CC suggest that decrease of CBF, caused by changes of mechanical properties of cerebral vessel wall, could be compensated by activation of intracranial CSF-mobility and by increasing of cranial compliance at systolic phase of cardiac cycle as it helps to maintain the brain extracellular fluid homeostasis. The decrease of CSFm and CC might be regarded as the important factors, which determine brain cognitive dysfunction at ageing.