

# The utility of DC electroencephalography in monitoring of brain metabolism disorders

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**Statement of the problem:** A reduced cortical Direct Current (DC) potential correlates with brain metabolic depression and is a common sign in various Alzheimer's Disease (AD) forms. Reduced DC is associated with decreased blood brain flow, low glucose oxidation, mitochondrial impairment and increased oxidative stress that is common in AD patients. Neuroimaging methods, such as PET, SPECT and MRI that are used for brain metabolism evaluation have a common disadvantage of being costly and time-consuming, which limits their usefulness in monitoring of brain metabolism in AD patients.

**Clinical practice:** A complementary method called The Neuro-Metabolic Activity Mapping (NMAM) employs the principle of DC electroencephalography. The method is based on measurement of the DC potentials in the brain followed by computer analysis of acquired data and visual presentation of cortical metabolic map. The method employs correlation of a certain spectrum of DC potentials and metabolic activity of the brain. The method is similar to PET, though based on metabolic electrophysiology of the brain. The method provides mapping and visualization of changes of brain metabolism under various stimuli and helps evaluate response in the course of therapy. A comparison of a standard EEG and NMAM during challenges, such as hypercapnia and hypoxia shows that the NMAM analysis and visualization of cortical field potentials provides a more accurate picture

of the actual metabolic functional state of brain cortex.

**Conclusion and significance:** The NMAM utilize qualitative visual neuroimaging towards prevention of cognitive decline in populations at high risk for dementia and neurodegeneration and is easy applicable in ambulation settings. The NMAM can help identify and differentiate early signs of metabolic perturbations in AD ambulation patients, as well as in TBI, brain tumors and stroke. The findings obtained by the NMAM method can facilitate beneficial lifestyle changes in patients to reduce risks for AD, neurodegenerative diseases and stroke.

## Biography

Arkadi F. Prokopov is founder and Scientific Director of Athletic HighTech S.L. a private company providing education in use of the normobaric intermittent hypoxic-hyperoxic treatment (the IHHT), as well as conducting research and development of related technology. After graduating from the First Setchenov Medical Institute in Moscow, Russia in 1980 he practiced medicine and worked for 10 years in biomedical research on saturation divers and astronauts. Since 1994 he has practiced integrative medicine in Heidelberg, Germany. In 2000 - 2004 he worked in the USA as medical consultant for the IHHT. He has several patents in the field of the IHHT, publishes articles in scientific journals and conducts workshops and seminars for physicians in Germany, Spain and Russia.

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