Spectratech Inc.

Press Release

" Hemodynamics modality separation (HMS) method " developed by AIST was adopted for all OEG fNIRS for research

Nov 10,2017
Spectratech Inc.

Spectratech adopted the new technology of “Hemodynamics modality separation (HMS) method” associated with the skin blood flow separation developed by The National Institute of Advanced Industrial Science and Technology (AIST: http://www.aist.go.jp/index_en.html) for all the models of Spectratech OEG series fNIRS equipments for research purpose, and released it on Nov 10,2017.

It is known that the hemoglobin change signal obtained by fNIRS equipment includes the blood flow change signal from the scalp which is accompanied mainly by the systemic changes other than the regional blood flow change signal which results from the brain activity. It is the component part called skin blood flow component. In this respect, the researchers who measure with fNIRS equipment have corresponded to it by the way of deducting the skin blood flow component by devising the measuring methods, and various component analysis methods, etc.

AIST devised the new technology of " Hemodynamics modality separation (HMS) method” which extracts the blood flow change associated with the brain function activity, which was publicized under the patent [1)] and on the paper[2)] by discriminating the hemodynamics in capillaries of the brain where oxygen metabolism is caused from the hemodynamics in other thick blood vessels. In addition, Spectratech has indicated the comparative evaluation of the separation capacity between this separation method and "Multidistance Probe Arrangement Method” developed by AIST to the basic fNIRS signal using Spectratech OEG-17APD fNIRS[3), 4), 5)]. On validation by the finger tapping in the motor area, it indicated a better result than Multidistance Probe Arrangement Method which had been promising. It is an excellent method which can be used also for the past measured data without adding the expensive auxiliary sensor like Multidistance Probe Arrangement Method. It is also capable of monitoring the signals by switching between the original signal and the signal obtained by this separation method in real time during a measurement.

Spectratech has been collaborating with AIST on fNIRS from 2014. Spectratech already has started to provide this software for Spectratech OEG series (OEG-16, OEG-SpO2 and OEG-17APD) for research purpose having a license from AIST. The customers who purchased OEG equipment may download the software from our website at no charge.

fNIRS equipment is being used recently for various research purposes such as psychology, education, linguistics, health science, nursing science, sports and BCI (Brain Computer Interface), etc. in attracting public attention beyond the medical front. Spectratech OEG series has been developed aiming at being of help for the researchers in such wide fields.

Spectratech is a venture company based on the business of development of medical equipment, fables manufacturing and worldwide sales where the researchers and engineers of medical equipment, semiconductor and image processing, etc. are working on it. Especially, Spectratech has owned the high technologies with novelty such as the patents related to the medical equipments for which the spread spectrum technology is used.

Brain blood flow change: In general, it indicates the concentration change of oxyhemoglobin, deoxyhemoglobin measured at a brain region, which becomes to be called “hemoglobin change” recently in the academic society, etc.
fNIRS equipment: The cerebral blood flow measurement equipment utilizing near infrared rays, which has been called optical topography, functional test oxymeter, or optical imaging brain function measurement equipment, etc. is expected to be unified to be the name of fNIRS (functional NIRS equipment) in the future.

References:

1) Japan Patent No.5641355, Biological optical measurement device, Program and biological optical measurement method
2) Toru Yamada, Shinji Umeyama, and Keiji Matsuda, Separation of fNIRS Signals into Functional and Systemic Components Based on Differences in Hemodynamic Modalities, PLOS ONE,7(11), e50271(2012)
3) Toru Yamada, Real-time system for extracting and monitoring cerebral functional component during fNIRS measurement. SPIE Biophotonics Japan, 2015.10.27
4) Toru Yamada and others, Trial extraction of actual time/monitoring of brain function signals in fNIRS measurement, 17th Japan Hito Brain Mapping Workshop, 2015.7.2
5) Toru Yamada, Development of a fiber-less fNIRS system and its application to hair-covered head, SPIE 2014, 2014.2.1 c.

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