Enliven Archive
Intensifying Thoughts

Editorial www.enlivenarchive.org Enliven: Neurology and Neurotechnology

Magneto Encephalography and Taste

A. Kotini*, P. Anninos, T. Gemousakakis, and A. Adamopoulos

Lab of Medical Physics, School of Medicine Democritus University of Thrace, Alexandroupoli, Greece

***Corresponding author**: A. Kotini, Lab of Medical Physics, School of Medicine Democritus University of Thrace, Alexandroupoli, Greece, Tel: 302551030519; Fax: 302551030519; E-mail: akotini@med.duth.gr

Received Date: 25th September 2017
Accepted Date: 26th September 2017
Published Date: 6th October 2017

Citation: Kotini A, Anninos P, Gemousakakis G, Adamopoulos A (2017) Magneto Encephalography and Taste. Enliven: Neurol Neurotech 4(1): e001.

Abbreviations:

MEG: Magneto Encephalography; EEG: Electroencephalography; fMRI: functional Magnetic Resonance Imaging; PET: Positron Emission Tomography

The human gustatory system has been studied using a lot of imaging modalities. EEG and MEG have the advantage of millisecond time resolution but have limited spatial resolution and localization than fMRI. EEG also provides information regarding regional neuronal activity, although has a much minor spatial resolution compared to MEG. In MEG the magnetic field which is hardly affected by intervening tissues such as the skull, in contrast to the electrical field. fMRI, PET and MEG have the advantage of being able to image deeper brain regions.

In our lab MEG data were performed using a whole-head Neuromag122-channel system located in a magnetically shielded room. Every subject was comfortably seated on a non-magnetic chair covered by the helmet-shaped Dewar. During the recordings the healthy volunteers were relaxed and closed their eyes to avoid artifacts from eye flickering. The spontaneous MEG recordings were obtained with a sampling frequency of 256Hz and filtered with cut – off frequencies between 0.3 to 40Hz. The time taken for each recording was 3 min. A software program has been developed in our lab in order to detect the 1st dominant frequency of the power spectra of each channel after the application of Fast Fourier Transform on the MEG raw data, and build a map of their spatial distribution over the scalp. The research was approved by the Scientific Committee and the Committee for Graduate Studies of our Medical School. Informed consents for the methodology and the aim of the research were obtained from the participants prior to the procedure.

Gemousakakis et al. [1] evaluated MEG recordings for healthy female volunteers in five different gustatory states: normal, sweet, bitter, sour and salty in the frequency range 2-7 Hz. The results showed that there is a differentiation in the distribution of the frequencies with increasing age which may give novel insights into the age-dependence of taste quality brain centers. Gemousakakis et al. [2] also evaluated MEG recordings in five different states: normal condition, sweet, bitter, sour, and salty taste in the frequency range (2-7 Hz) in male and female volunteers. The results showed that, under normal conditions, as well as in the sweet and the bitter taste, the male volunteers exhibited a higher count of low-frequency than high-frequency channels compared to the female ones; for the sour taste, there was no clear differentiation between the genders; for the salty taste, the female volunteers exhibited a higher count of low-frequency channels whereas there was no clear differentiation in the number of high frequencies between the genders. Anninos et al. [3] investigated the localization of current sources for spontaneous MEG data in delta and theta rhythms. MEGs were evaluated in three different states: physiological condition, sweet taste, and salty taste. Low frequencies can be seen in the maps obtained with the sweet taste, whereas in the physiological and salty taste, the maps showed higher frequencies in the greater part of channels. Kotini et al. [4] investigated the effects of sweet, bitter, salty and sour stimuli on alpha rhythm. A significant higher percent of alpha power was found irrespective of hemispheric side in all gustatory states located mainly at the occipital, left and right parietal lobes.

The results of our studies revealed the significance of MEG by power spectra in determining gustatory responses. Nevertheless, the specific constituents that caused these responses still need additional research.

Financial Support

Funding for this work was provided by a collaboration of our General Secretariat of Research and Technology, GR and ERGO AEBE, INC, GR under a research program (Grant Number: 80623).

References

1. Gemousakakis T, Anninos P, Zissimopoulos A, Seimenis I, Adamopoulos A, et al. (2013) A study on the age dependency of gustatory states: Low-frequency spectral component in the resting-state MEG. J Integr Neurosci 12: 427-439.
2. Gemousakakis T, Kotini A, Anninos P, Zissimopoulos A, Prassopoulos P (2011) MEG evaluation of taste by gender difference. J Integr Neurosci 10: 537-545.
3. Anninos P, Kotini A, Adamopoulos A, Hatzimihael A, Kekes G, et al. (2006) Identification of taste quality with the use of MEG. J Integr Neurosci 5: 535-540.
4. Kotini A, Anninos P, Gemousakakis T, Adamopoulos A (2016) The Effects of Sweet, Bitter, Salty and Sour Stimuli on Alpha Rhythm. A Meg Study. Maedica (Buchar) 11: 208-213.