Annual Progress of EMF studies in China

June 2020

o General research activities in your country related to non-ionizing radiation (NIR) health

Bio-electrotechnical subcommittee attached to China Electrotechnical Society was established in July 2019. It promotes research in Bioelectromagnetics. Provincial key bioelectromagnetic lab in Zhejiang University has held two committee meetings to discuss the recent progress in EMF and the cognitive effect in 2019.

Chinese researchers continued to conduct a series of studies on health effect of EMF exposure in the past year. At frequency band below 10 MHz, researchers from Fourth Military Medical University and China Academy of Information and Communications Technology focused on the optimization of the nervous stimulation instrument and the instrument safety (10.1186/s12868-019-0523-7; 10.1155/2019/9461018). A simulation tool for calculating E-field distribution during TMS has also been published and shared (10.1002/bem.22178). Research group from Zhejiang University evaluated the effect of the cell-culture medium on cell function when exposed by 50 Hz MF (10.1093/jrr/rrz020), the mechanism of MF exposure (10.1002/bem.22249) as well as the relation of 50 Hz MF exposure with the occurrence of Alzheimer's dementia and Parkinson's disease (10.1093/ije/dyaa023). The research group from China Academy of Information and Communications Technology conducted a 3-year consecutive monitoring for extremely low frequency magnetic field exposure in electric vehicle (10.3390/ijerph16193765). The effect of EMF and bone cells have been reviewed by the research group from Army Medical University (10.1002/bem.22258). At beyond 10 MHz band, the research group from Institute of Radiation Medicine investigated accumulative microwave-induced (2.85 GHz) cognitive impairment (doi.org/10.1007/s11356-019-04873-0) using rat models. They also developed a fine-resolution rat head model for dosimetry (10.1038/s41598-019-49719-4). The research group from Fourth Military Medical University published several studies on sperm quality and hematological effect by pulsed microwave exposure (10.3390/ijerph16071286; 10.1155/2019/3628956). China Institute of Metrology published a dosimetric study on management of MRI RF safety (10.3390/ijerph16061069).

In particular, in mid-2019, China issued the 5G commercial licenses. Since then, the 5G base

stations have been quickly deployed in the territories. By mid-2020, 250,000 5G base stations have been built and put into service. The number of subscribers has reached 36 million. The research group form China Academy of Information and Communications Technology evaluated the functional connectivity change by LTE exposure using fMRI (10.1002/bem.22165) and conducted a numerical analysis for the human exposure to EMF in environment defined by 3GPP (10.1007/s12243-018-0682-z). The results may shed lights on 5G exposure.

- **Areas of public concern and national responses**

Public concerns have been raised on the issue of health effect by exposure to 5G signals. In Beijing city, Hu'nan province, Fujian province and Guangxi Autonomous Region, the removal of the base stations has been reported due to the concerns of the habitants. The government has published the scientific-based information on the official websites to explain the mechanism of EMF exposure. At the end of 2019, China Association for Science and Technology has announced top10 rumors in China with "significant health effect could be induced by 5G base station" ranking as the first place (http://www.kepuchina.cn/more/201912/t20191217_1175494.shtml). Dr. Tongning WU was officially appointed to explain the topic.

- **New public information activities**

Some books on 5G and human health has recently been published in Chinese. The targeted readers were the general publics without EMF background.

- **New policies and legislations regarding NIR exposure**

"Monitoring method for electromagnetic radiation environment of 5G Mobile communication base station" drafted by Ministry of Ecology and Environment of PRC had been online (http://www.mee.gov.cn/xxgk2018/xxgk/xxgk06/202004/W020200429349887059529.pdf) and had called for revision between 04/26/2020 and 05/28/2020. The standard will be applicable to the measurement of 5G mobile communication base station operating below 6 GHz.

In the standard, the frequent-selective instrument was used. At least one mobile terminal should be connected to the base station at normal operation state during measurement. The separation of the measurement probe and the operator was kept as no less than 0.5 m. And the distance between the measurement probe and the mobile terminal should be within 1 to 3 m. The averaging time for

measurement was no less than 6 min. Necessary information, as GPS of the base station, specification of the structure of the antenna and owner of the antenna, should be documented in the measurement report.

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