Evaluation of Cytotoxicity by Exposure to 60 GHz Millimeter Wave in *In Vitro*

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Recent advances in information processing technology have led to the improvements of wireless data communication technology in various areas including railway systems. This study investigated the possible health effects of millimeter waves (60 GHz), which are used in next-generation communication technology, on the human body. Using a three-dimensional tissue model constructed from normal human cells, the authors conducted experiments for the aim of this study. The results of the experiments showed that the threshold for cell damage is incident power density of approximately 200 mW/cm^2 under exposure conditions of 6 minutes, which is the evaluation time required for compliance with the current regulations. In addition, it was also shown that, the threshold for cytotoxicity decreases to approximately 130 mW/cm^2 under high-temperature and high-humidity conditions (42.5℃, 80% humidity). This mechanism is attributed to thermal factors, and it was found that cell surface temperatures exceeding 50℃ can be a condition that causes damage.