

**Evaluation of Mutagenic Effect of Complex Magnetic Fields  
with Static and Time-varying Magnetic Fields**

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The magnetic fields (MFs) of inside and/or outside electric cars are ranged from static to intermediate frequency (IF) and intricately overlapped in consequence of driving mode, train location, vehicle installed-devices, etc. Although there are a lot of studies concerning biological effects of extremely low frequency (ELF)-MF and radiofrequency electromagnetic field because of public concern of its health risks, those regarding the complex MFs have been insufficient. In this study, the mutagenic effect of complex MF with static-, ELF- and IF-MFs was evaluated using the mutation assay in bacteria (Ames' test) and mammalian cells (the mouse lymphoma assay). Consequently, no mutagenicity was observed under all of exposure conditions in this study. This suggests that the complex MF does not have mutagenicity that induces point mutation or chromosomal mutation.