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EXPOSURE TO ENVIRONMENTAL CHEMICAL SUBSTANCES IN MEDICINE FOR IN VITRO FERTILIZATION (IVF-ET)

Introduction: Very little has been discussed concerning the health hazards posed by environmental chemical substances with regard to assisted reproductive technology (ART), although in vitro fertilization and embryo-transfer (IVF-ET) has been becoming more popular over the last two decades in reproductive medicine.

Materials and Methods: Highly sensitive and specific chromatographic and spectrometric assays have been developed for the measurement of several common but important chemicals including perfluorinated compounds (PFCs), polybrominated diphenyl ethers (PBDEs), and phthalates (DEHP, MEHP). After establishing the reference concentration standards for these chemicals in human fetomaternal environment specimens, we investigated the amounts of contaminations in culture media and culture dishes used for IVF-ET. The possible health hazards induced by exposure to amounts of chemicals detected in the culture media and/or culture dishes were then evaluated by analyzing epigenetic profile alterations in mouse embryonic stem cell (ESCs) and, in some cases, in human pluripotent stem cells (iPS cells).

Results: Levels of MEHP and PBDE that were 10-100 times higher than those in fetomaternal specimens (approximately 1-10 ppb) were detected in some in vitro fertilization-embryo transfer(IVF-ET) media, suggesting that such concentration was capable of inducing reversible/irreversible changes in the epigenetic profile. In contrast only trace amounts of perfluorinated compounds were found in the same culture media.

Conclusion: The present study is the first admonitory report to evaluate the toxicity and/or teratologic influences of chemicals inIVF-ET culture media. (This study was supported by a Health Science Grant from the Ministry of Health, Labour and Welfare, Japan).

Biography

Tsunehisa Makino was graduated from School of Medicine, Keio University, Japan, 1964. Dr. Makino has been at The Laboratory of Human Reproduction and Reproductive Biology, Harvard Medical School between 1970-1973 and was Assistant Professor of the Department of Obstetrics and Gynecology, Harvard Medical School in 1973. Dr Makino promoted his position to Professor and Chairman, Department of Obstetrics and Gynecology, Tokai University Hospital, Japan, in 1995. Dr. Makino was chairman of the Executive Board Meeting of the Japan Society for Immunology of Reproduction(JSIR), also president of IXth International Congress of Reproductive Immunology held at Hakone, Japan, in 2004. Since 2013, Dr. Makino is the director of Fuji-Oyama Hospital in Shizuoka, Japan.

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