
Genotoxicity tests on mouse embryos : a model to assess environmental impact on reproduction

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Abstract

Infertility concerns 10% of couples in France and varies between 2 and 28% worldwide. Importantly, incidence of couples consulting for infertility due to alteration of reproductive health parameters is increasing. Genetic or constitutional causes excluded, this raise of incidence is mainly attributed to behaviour (i.e. delayed pregnancy, tobacco and obesity). However, environmental factors have recently been incriminated. Among human health characteristics, fertility is less frequently considered to be affected by environmental exposures, partly due to technical difficulties which hamper studies on this issue. At the moment, there is a lack of rapid and sensitive test to assess the genotoxic impact of physical and chemical agents on germ cells and embryos. In the Biogenotoxicology, Human Health and Environment (BSHE) team, we routinely use genotoxicity tests on somatic and germ cells (eggs, sperm), which transfer on embryos is challenging and requires setup. We are currently developing 3 genotoxicity tests (comet and micronuclei assays, γ H2AX) on pre-implantation mouse embryos to assess the relationship between infertility and environment. The development of genotoxicity tests on mouse embryos is the prerequisite to assess the impact of environmental agents (Polycyclic Aromatic Hydrocarbon, solvents, nanoparticles) in the field of Assisted Reproductive Technology (ART). We also aim to study the genotoxicity of chemotherapy and targeted therapies agents used in childbearing age patients.

Keywords: genotoxicity, embryo, environmental exposure, comet assay, micronuclei assay, gammaH2AX assay

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