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In vivo mutagenicity of diesel exhaust inhalation in the testis of *gpt* delta mice

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Diesel engine emissions are major sources of mutagens in urban air and are suspected of causing lung cancer. We already determined the in vivo mutagenicity of diesel exhaust (DE) inhalation and the potent mutagens in DE, such as benzo[*a*]pyrene and 1,6-dinitropyrene, in lung of *gpt* delta mice, which carry the *gpt* (guanine phosphoribosyl transferase) gene as a mutation target. To estimate the systemic effect of DE inhalation, mutations in the other tissue such as testis were determined.

The mice were inhaled to DE at a concentration of 3 mg/m^3 for 12 or 24 weeks. After DE inhalation for 12 weeks, the mutant frequency was not elevated in the testis, but inhalation for 24 weeks of DE resulted in a 2.0-fold increase in mutant frequency compared with control testis ($0.6 \times 10–^5$). Major mutations induced on the *gpt* gene by DE inhalation in testis were G:C to T:A transversions, 1 base deletions and G:C to A:T transitions, while a major mutation in lung was G:C to A:T transitions only. Our results suggest that DE exerts genotoxicity systemically.

ディーゼル排気曝露した*gpt* deltaマウスの精巣に誘発される突然変異
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N-methyl-*N'*-nitro-*N*-nitrosoguanidine-induced mutations in the *rpsL* transgenic zebrafish embryos persisting in the adult fish

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Zebrafish are reported to be responsive to carcinogenic effects of *N*-methyl-*N'*-nitro-*N*-nitrosoguanidine (MNNG) when treated as embryos. Previously, we exposed embryos of *rpsL* transgenic zebrafish to MNNG and found that the chemical induced mainly G:C to A:T transitions in the *rpsL* gene. In this study, we examined whether mutations induced in embryos persist when they grow up to adult fish. Transgenic fish embryos were treated with 10mg/L or 50mg/L MNNG for 1 h. Proportion of the surviving fish was lower in the treated groups than in the control group during their growth. Six months after the treatment, chromosomal DNA was extracted from the whole fish and mutant frequency (MF) and mutational spectrum were determined. MFs of the treated fish were 4.4×10^{-4} and 5.8×10^{-4}, respectively, which were significantly higher than that of the control fish (1.4×10^{-4}). Mutational spectra revealed that the increase in MFs was observed predominantly in the G:C to A:T transitions, most of which were located in the same hotspots as found for the embryos. These findings suggest that mutations induced in embryos persist after they grow up and that our transgenic fish system is useful to study mutations during fish growth.

*rpsL*トランスジェニックゼブラフィッシュ胚に*N*-methyl-*N'*-nitro-*N*-nitrosoguanidineによって誘発された突然変異は、魚が成長したあとも残っている
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