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Evaluation of the Genotoxicity of Cell Phone Radiofrequency Radiation in Male and Female Rats and Mice Following Subchronic Exposure. Smith-Roe, SL[1], Wyde ME[1], Stout MD[1], Winters JW[2], Hobbs CA[2], Shepard KG[2], Green AS[2], Kissling GA[1], Tice RR[1], Bucher JR[1], Witt KL[1], [1]NIEHS/NIH, Research Triangle Park, NC, United States, [2]Integrated Laboratory Systems, Inc., Research Triangle Park, NC, United States.

The National Toxicology Program tested the two common radiofrequency radiation (RFR) modulations emitted by cellular telephones in a 2-year rodent cancer bioassay that included additional animal cohorts for interim assessments of genotoxicity endpoints. Male and female Sprague Dawley rats and B6C3F1/N mice were exposed from gestation day 5 or postnatal day 35, respectively, to code division multiple access (CDMA) or global system for mobile (GSM) modulations semi-continuously for 18 h/day in 10 min intervals in reverberation chambers at specific absorption rates (SAR) of 1.5, 3, or 6 W/kg (rats) or 2.5, 5, or 10 W/kg (mice). Rats and mice were exposed at 900 MHz or 1900 MHz, respectively. The interim cohorts, 5 animals per treatment group, were examined after 19 (rats) or 13 (mice) weeks of exposure for evidence of RFR-induced genotoxicity. DNA damage was assessed in three brain regions (frontal cortex, hippocampus, and cerebellum), and in liver cells and blood leukocytes using the comet assay. Chromosomal damage was assessed in peripheral blood erythrocytes using the micronucleus assay. DNA damage was significantly increased in the frontal cortex of male mice (both modulations), peripheral leukocytes of female mice (CDMA only), and hippocampus of male rats (CDMA only). DNA damage was nominally elevated in several other tissues of RFR-exposed rats, although statistical significance was not achieved. No significant increases in micronucleated red blood cells were observed in rats or mice. These results suggest that exposure to RFR has the potential to induce measurable DNA damage under certain exposure conditions.