

# Does Long-term Radiofrequency (RF) Exposure of Laboratory Animals Affect Cancer, Survival and General Health

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**Objective:** To review long-term exposure studies examining whether radiofrequency (RF) energy causes/promotes cancer or affects survival and general health of laboratory animals.

**Methods:** In three tables, this report summarizes more than 30 studies of cancer in laboratory animals exposed to RF energy published since 1962. The first table indicates whether or not a statistically significant increase was observed in cancer incidence as well as effects on survival and body mass, if reported. For each of the studies, information is provided on animal species (mice and rats), frequency (and modulation), dose rate (specific absorption rate, SAR), exposure conditions, cancer model, number of animals per group and reference. A second table presents the 15 studies in which animals were exposed for 12–25 months. Thus, about 50% of the studies employed long-term exposures of one year or longer in duration; in 13 studies, animals were exposed for 18–25 months. Significantly, 9 publications describe lifetime exposure studies in which mice and rats were exposed for 24–25 months, the average lifetime of these animals. A third table lists the studies by cancer model (spontaneous tumors, genetically-modified animals, chemically-induced tumors, ionizing radiation-induced tumors and models employing injected tumor cells).

**Results:** Two studies ([1, 2]) reported that RF exposure had a “protective” effect on cancer development but such results are not supported by the overall evidence. Likewise, the results in three papers ([3–5]) describing carcinogenic effects in RF-exposed animals are not supported by the weight of evidence in the scientific literature that includes follow-up studies addressing the effects reported in Chou, et al. and Repacholi, et al.. Three follow-up studies to the Chou, et al. study failed to confirm an association between RF exposure and an increase in cancer incidence ([6–8]). The follow-up investigation of the experiment by Repacholi, et al., ([9]) by Utteridge, et al., ([10]) used eight times as many animals and four exposure levels (0.25, 1, 2, and 4 W/kg) and did not confirm an increase in tumors. Two studies reported changes that could not be replicated in the same laboratory ([11, 12]).

**Conclusion:** The scientific weight of evidence in more than 30 long-term cancer studies in laboratory animals shows no adverse effect of RF exposure up to two years in duration at dose rates up to 4 W/kg on 1) survival, 2) body mass, an indicator of general health status, and 3) carcinogenic processes (initiation, promotion and co-promotion).

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