

**Title:** R/F Radiation on Biological Systems I

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Extensive research, spanning several decades, has been done on the non-thermal effects of radiofrequency radiation, on both the non-reproductive and reproductive cells of organisms. This investigation is a literature review of 70 papers published from 2000-2008 dealing with in vitro and in vivo exposure to radiofrequency radiation, generated by either cellular telephones or by a signal generator, generating electromagnetic waves within the frequency range 300MHz-300GHz. The potential effects of radiofrequency radiation on non-reproductive cells were determined using four main parameters; DNA damage, in the form of double strand and single strand breaks in the DNA, micronucleus formation, chromosomal aberrations and sister chromatid exchange. For the reproductive/germ cells the effect of the radiofrequency radiation was determined by investigation of the semen quality after exposure. All experiments reviewed compared radiofrequency exposed samples to sham exposed samples, and in some cases also negative and positive controls.

The papers reviewed have been divided into 2 broad categories; reproductive and non-reproductive cells, with 3 sub-categories; those with positive effects, those with negative effects and those with inconclusive findings. Of the 63 papers dealing with non-reproductive cells 19% of the results indicated that exposure to the radiofrequency radiation had a harmful effect on the cells, 58% cited no negative effects due to exposure and 23% of the findings were inconclusive. Though the majority of the papers reviewed suggests that there are no significant harmful effects, attributed to radiofrequency radiation on non-reproductive cells, for the papers in which experimental evidence did

indicate harmful effects, these effects appear to be dependent on three variables; the specific absorption rate, which is the rate at which radiofrequency energy is absorbed by the body, the length of exposure and the frequency of the incident radiation.

Of the 7 papers reviewed, on the effects of radiofrequency radiation on reproductive cells 86% of the results obtained indicate that the radiation does indeed have a negative effect on the semen quality, by reducing the sperm count, sperm motility and viability, while 14% of the results show no radiofrequency induced effect. Due to conflicting results obtained in experiments involving both non-reproductive and reproductive cells, there is a need for ongoing research on this topic.