Fertility studies

Almost all the studies of which we are awarre found an association between EMF exposure and negative effects on fertility.(click on the studies below for more details):

Need help understanding the studies?...

Glossary...

Male Fertility

Desai NR, Kesari KK, Agarwal A.Pathophysiology of cell phone radiation: oxidative stress and carcinogenesis with focus on male reproductive system. 2009 Reprod Biol Endocrinol. 2009 Oct 22;7(1):114. [Epub ahead of print]

Hazardous health effects stemming from exposure to radiofrequency electromagnetic waves (RF-EMW) emitted from cell phones have been reported in the literature. However, the cellular target of RF-EMW is still controversial. This review identifies the plasma membrane as a target of RF-EMW. In addition, the effects of RF-EMW on plasma membrane structures (i.e. NADH oxidase, phosphatidylserine, ornithine decarboxylase) and voltage-gated calcium channels are discussed. We explore the disturbance in reactive oxygen species (ROS) metabolism caused by RF-EMW and delineate NADH oxidase mediated ROS formation as playing a central role in oxidative stress (OS) due to cell phone radiation (with a focus on the male reproductive system). This review also addresses 1) the controversial effects of RF-EMW on mammalian cells and sperm

DNA as well as its effect on apoptosis, 2) epidemiological, in vivo animal and in vitro studies on the effect of RF-EMW on male reproductive system, and 3) finally, exposure assessment and dosimetry by comp

Otitoloju AA, Obe IA, Adewale OA, Otubanjo OA, Osunkalu VO. 2009 Preliminary Study on the Induction of Sperm Head Abnormalities in Mice, Mus musculus, Exposed to Radiofrequency Radiations from Global System for Mobile Communication Base Stations.Department of Zoology, Faculty of Science, University of Lagos, Akoka, Lagos, Nigeria

The exposure of male mice to radiofrequency radiations from mobile phone (GSM) base stations at a workplace complex and residential quarters caused 39.78 and 46.03%, respectively, in sperm head abnormalities compared to 2.13% in control group. Statistical analysis of sperm head abnormality score showed that there was a significant ($p < 0.05$) difference in occurrence of sperm head abnormalities in test animals. The major abnormalities observed were knobbed hook, pin-head and banana-shaped sperm head. The occurrence of the sperm head abnormalities was also found to be dose dependent. The implications of the observed increase occurrence of sperm head abnormalities

on the reproductive health of humans living in close proximity to GSM base stations were discussed. PMID: 19816647 [PubMed - as supplied by publisher]

O. Erogul, E. Oztas, I. Yildirim, T. Kir, E. Aydur, G. Komesli, H. Irkilata, M. Irmak, A. Peker. 2006. Effects of Electromagnetic Radiation from a Cellular Phone on Human Sperm Motility: An In Vitro Study. Archives of Medical Research, Volume 37, Issue 7, Pages 840-843

Statistically significant changes were observed in the rapid

progressive, slow progressive and no-motility categories of sperm movement. EMR exposure caused a subtle decrease in the rapid progressive and slow progressive sperm movement. It also caused an increase in the no-motility category of sperm movement. There was no statistically significant difference in the sperm concentration between two groups.

These data suggest that EMR emitted by cellular phone influences human sperm motility. In addition to these acute adverse effects of EMR on sperm motility, long-term EMR exposure may lead to behavioral or structural changes of the male germ

cell. These effects may be observed later in life, and they are to be investigated more seriously.

Effects of radiofrequency electromagnetic waves (RF-EMW) from cellular phones on human ejaculated semen: an in vitro pilot study.Agarwal A, Desai NR, Makker K, Varghese A, Mouradi R, Sabanegh E, Sharma R. 2008. Center for Reproductive Medicine, Glickman Urological and Kidney Institute, Cleveland Clinic, Cleveland, Ohio; Obstetrics and Gynecology and Women's Health Institute, Cleveland Clinic Cleveland, Ohio.

Fertil Steril. 2008 Sep 18. [Epub ahead of print]

Radiofrequency electromagnetic waves emitted from cell phones may lead to oxidative stress in human semen. Authors speculate that keeping the cell phone in a trouser pocket in talk mode may negatively affect spermatozoa and impair male fertility.

In vitro effect of pulsed 900 MHz GSM radiation on mitochondrial membrane potential and motility of human spermatozoa. Falzone N,

Department of Biomedical Sciences, Tshwane University of Technology, Pretoria, South Africa. Bioelectromagnetics. 2008 May; 29(4):268-76.

Over time, the two kinematic parameters straight line velocity (VSL) and beat-cross frequency (BCF) were significantly impaired ($P < 0.05$) after the exposure at SAR 5.7 W/kg and no exposure by time interaction was present.

I. Fejes a; Z. Zaacutevaczki a; J.

Szoumlllodblacsi a; S. Koloszaacuter a; J. Daru a; L. Kovaacutecs a; A. Paacutel. 2005. IS THERE A RELATIONSHIP BETWEEN CELL PHONE USE AND SEMEN QUALITY? Andrology Unit, Department of Obstetrics and Gynaecology, University of Szeged, Hungry. Journal Systems Biology in Reproductive Medicine, Volume 51, Issue 5 September 2005 , pages 385 - 393.

The duration of possession and the daily transmission time correlated negatively with the proportion of rapid progressive motile sperm (r = - 0.12 and r = - 0.19, respectively), and positively with the proportion of slow progressive motile sperm (r = 0.12 and r = 0.28, respectively).

The low and high transmitter groups also differed in the proportion of rapid progressive

motile sperm (48.7% vs. 40.6%). The prolonged use of cell phones may have negative effects on the sperm motility characteristics.

Agarwal A, Deepinder F, Sharma RK, Ranga G, Li J. 2007. Effect of cell phone usage on semen analysis in men attending infertility clinic: an observational study. Reproductive Research Center, Glickman Urological Institute and

Department of Obstetrics-Gynecology, Fertil Steril. 2008 Jan;89(1):124-8. Epub 2007 May 4.

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Use of cell phones decrease the semen quality in men by decreasing the sperm count, motility, viability, and normal morphology. The decrease in sperm parameters was dependent on the duration of

daily exposure to cell phones and independent of the initial semen quality.

Wdowiak A, Wdowiak L, Wiktor H. 2007. Evaluation of the effect of using mobile phones on male fertility. Ann Agric Environ Med. 2007;14(1):169-72.

In the analysis of the effect

of GSM equipment on the semen it was noted that an increase in the percentage of sperm cells of abnormal morphology is associated with the duration of exposure to the waves emitted by the GSM phone. It was also confirmed that a decrease in the percentage of sperm cells in vital progressing motility in the semen is correlated with the frequency of using

mobile phones.

Salama N, Kishimoto T, Kanayama HO. 2008. Effects of exposure to a mobile phone on testicular function and structure in adult rabbit Int J Androl. 2008 Dec 2

A drop in the sperm concentration appeared in the phone group at week 6. This became statistically significant at week 8, compared with the two control (stress and ordinary) groups (133, 339 and 356 x 106/mL, respectively) and to the initial sperm count (341 x 106/mL) of this group. Motile sperm population

showed similarity amongst the three study groups until week 10 when it declined significantly, and thereafter in the phone and stress control groups, with more significant decline in the phone animals (50, 61 and 72.4%, respectively). Histological examination showed also a significant decrease in the diameter

of seminiferous tubules in the phone group vs. the stress and ordinary controls (191 mum vs. 206 and 226 mum, respectively). The other study points did not show any difference.

Author's conclusion, low intensity pulsed radio

frequency emitted by a conventional mobile phone kept in the standby position could affect the testicular function and structure in the adult rabbit.

R. J. AITKEN*, L. E. BENNETTS*, D. SAWYER*, A. M. WIKLENDT* and B. V. KING. 2005. Impact of

radio frequency electromagnetic radiation on DNA integrity in the male germline.

A detailed analysis of DNA integrity using QPCR revealed statistically significant damage to both the mitochondrial genome (p

< 0.05) and the nuclear ?-globin locus (p < 0.01). This study suggests that while RFEMR does not have a dramatic impact on male germ cell development, a significant genotoxic effect on epididymal spermatozoa is evident and deserves further investigation.

Pregnancy and miscarriage

Divan HA, Kheifets L, Obel C, Olsen J.Prenatal and postnatal exposure to cell phone use and behavioral problems in children. Epidemiology. 2008

Jul;19(4):523-9.   Department of Epidemiology, UCLA School of Public Health, University of California

Mothers were recruited to the

Danish National Birth Cohort early in pregnancy. When the children of those pregnancies reached 7 years of age in 2005 and 2006, mothers were asked to complete a questionnaire regarding the current

health and behavioral status of children, as well as past exposure to cell phone use. Mothers evaluated the child's behavior problems using the Strength and Difficulties Questionnaire. Greater odds ratios

for behavioral problems were observed for children who had possible prenatal or postnatal exposure to cell phone use. After adjustment for potential confounders, the odds ratio for a

higher overall behavioral problems score was 1.80 (95% confidence interval = 1.45-2.23) in children with both prenatal and postnatal exposure to cell phones.

Author's conclusions: Exposure to cell phones prenatally-and, to a lesser degree, postnatally-was associated with behavioral difficulties such as emotional and

hyperactivity problems around the age of school entry. These associations may be noncausal and may be due to unmeasured confounding. If real, they would be of public health concern given the

widespread use of this technology.

Rezk AY, Abdulqawi K, Mustafa RM, Abo El-Azm TM, Al-Inany H. 2008. Fetal and neonatal responses following maternal

exposure to mobile phones.

A statistically significant increase in fetal and neonatal HR, and statistical significant decrease in stroke volume

and COP before and after use of mobile phone were noted. All these changes are attenuated with increase in gestational age.

Author's conclusion: Exposure of pregnant women to mobile phone significantly increase fetal and neonatal HR, and significantly decreased the COP.

Celik, O. 2003. Effect of electromagnetic field emitted by cellular phones on fetal heart rate patterns

Electromagnetic

fields produced by cellular phones do not cause any demonsterable affect in fetal heart rate, acceleration and deceleration.

Rita Ouellet-Hellstrom

and Walter F Stewart. 1993. Miscarriages among Female Physical Therapists Who Report Using Radio- and Microwave-frequency

Electromagnetic Radiation. American Journal of Epidemiology Vol. 138, No. 10: 775-786 1993. Department of Epidemiology, School of Hygiene

and Public Health, The Johns Hopkins University Baltimore, MD

Pregnancies of mothers reporting

microwave use 6 months prior to the pregnancy or during the first trimester were more likely to result in miscarriage (odds ratio (OR) = 1.28,

95% confidence interval (CI) 1.02–1 59) The odds ratio increased with increasing level of exposure (x2 = 7 25, p < 0.005). The odds ratio in the highest exposure

group (20 or more exposures/ month) was 1.59. The overall odds ratio was slightly lower after it was controlled for prior fetal loss (OR = 1.26, 95% CI

1.00–1.59), but the exposure-response effect remained ($x^2 = 5.17$, $p < 0.01$). The risk of miscarriage was not associated with reported use of shortwave

diathermy equipment (OR = 1.07, 95% CI 0.91–1.24). The odds ratio in the highest exposure group was 0.87.

Athina

Pyrpasopoulou et al. 2003. Bone morphogenetic protein expression in newborn rat kidneys after prenatal exposure

to radiofrequency radiation

Findings suggest that GSM-like RFR interferes with gene expression during early gestation and

results in aberrations of BMP expression in the newborn.

Odaci E, Bas O, Kaplan S. Effects of prenatal exposure to a 900 MHz

electromagnetic field on the dentate gyrus of rats: a stereological and histopathological study. 2008.

The results showed that prenatal EMF exposure caused a decrease in the number of granule cells in the dentate gyrus of the rats

(P<0.01). This suggests that prenatal exposure to a 900 MHz EMF affects the development of the dentate gyrus granule cells in the rat

hippocampus. Cell loss might be caused by an inhibition of granule cell neurogenesis in the dentate gyrus.

Hiroyuki Nakamura a, Hirofumi Nagasea, Keiki Oginoa, Kotaro Hattab and Ichiyo Matsuzakic.

2000. Uteroplacental circulatory disturbance mediated by prostaglandin F2? in rats exposed to

microwaves.

These results suggest that microwaves (CW, 2 mW/cm2, 2450 MHz)

produce uteroplacental circulatory disturbances and ovarian and placental dysfunction during

pregnancy, probably through nonthermal actions. The uteroplacental disturbances appear to be due

to actions of PGF2? and may pose some risk for pregnancy.

Hiroyuki Nakamura, a, Ichiyo

Matsuzakib, Kotaro Hattac, Yoshitaka Nobukunia, Yasuhiro Kambayashia and Keiki Oginoa. 2003.

Nonthermal effects of mobile-phone frequency microwaves on uteroplacental functions in pregnant rats

These results suggest microwaves at 0.6 mW/cm2 at 915 MHz, equal to a specific

absorption rate (SAR) of 0.4 W/kg, which is the maximum permissible exposure level recommended by the American

National Standards Institute (ANSI), do not exert nonthermal effects on blood estradiol and progesterone,

on splenic natural killer cell activity, on the uteroplacental circulation.