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The True Effects of Mobile Radiation

Most people associate mobile phone radiation with brain cancer. However, there is plenty of evidence showing very negative effects on sperm! Most men keep their phone in their front or back trouser pocket, which is rather too close to the testes.

Simple science and common sense should tell you that emitting microwaves (the same kind of waves that you use in your microwave oven to cook food) into your incredibly delicate and sensitive testicles is not a good idea!

Should you be worried, and how great is the risk?

The science is clear - electromagnetic radiation from mobile devices damages sperm.

A large number of properly conducted, recent scientific studies have established beyond doubt that sperm exposed to radiation from mobile phones are less mobile, less viable, and are prone to genetic damage and mutation. Exposure to mobile radiation also causes hormonal changes that harm reproduction.

Mobile Radiation and Fertility

Mobile radiation is not only dangerous, it also reduces the chances of conceiving, and potentially could harm unborn children.

Mobile radiation reduces fertility in several ways. First, by harming the sperms' ability to swim. Secondly, by reducing sperms' vigour, and thirdly by causing chemical changes that make sperm less able to survive. Again, the higher the exposure, the greater the negative impact the radiation has. Together, these changes lead to decreased fertility.

How much exposure is needed to cause harm?

The scientific consensus is so strong now that the question isn't whether mobile radiation is harmful, but how much exposure is needed to produce that harm, and over what length of time?

It will take years for scientists to establish the precise danger threshold. In the meantime, it is likely that millions of men are sustaining long term, regular exposure to mobile radiation at a level capable of causing genetic damage.

If you regularly keep your mobile in your pocket, or anywhere else near a sensitive organ, you are at risk.

DNA Damage

There are several ways in which radiation damages sperm, but a key route is by causing oxidative stress. This leads to the fragmentation of the crucial DNA that sperm carry. The higher the dose of radiation, the greater the risk of damage.

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The Scientific Evidence

In recent years, there has been a growing awareness of the danger that electromagnetic radiation poses. As a result, scientists have looked at several areas of risk, and there are now multiple studies to support the conclusion that mobile radiation represents a significant threat.

The most severe consequence of exposure to electromagnetic radiation is the increased risk of infertility, cancer and genetic damage.

Sperm Motility

A 2009 study showed that exposure of semen samples to radiofrequency electromagnetic radiation significantly reduces the motility of sperm.

Sperm Viability

A 2014 study conducted using 1,492 samples shows that exposure to mobile phones is associated with reduced viability of sperm.

Sperm Count

A 2007 study carried out using 361 screened male subjects demonstrated a correlation between mobile phone usage and decreased sperm count.

Testosterone Levels

A 2010 study conducted on rats found that exposure to electromagnetic radiation for 60 minutes a day for 3 months reduced levels of testosterone.

Scientific Studies and Research Papers

Below are links to a number of published studies and research papers from scientists all over the world. The message from these and other studies is loud and clear: to protect your health, and to protect your ability to become a father, you need to avoid exposing your testicles to mobile radiation.

Mobile Phone Radiation Induces Reactive Oxygen Species Production and DNA Damage in Human Spermatozoa

This 2009 study shows that the exposure of semen samples to radiofrequency electromagnetic radiation significantly reduces the vitality and motility of spermatozoa. Radiation can also increase levels of oxidative stress, causing DNA damage and subsequent fertility issues. These problems can lead to miscarriage, offspring morbidity and childhood cancer.

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[Effect of mobile telephones on sperm quality: A systematic review and meta-analysis]

This 2014 study conducted using 1492 samples shows that exposure to mobile phones is associated with reduced motility and viability of spermatozoa. This could be due to increased levels of oxidative stress, causing DNA fragmentation, and also an increase in temperature of the testes, reducing spermatogenesis. [Read our summary of this study]

[Pathophysiology of cell phone radiation: oxidative stress and carcinogenesis with focus on male reproductive system]

This 2009 study found that exposure to radiofrequency electromagnetic radiation can cause increased levels of oxidative stress through uprated formation of reactive oxygen species. This can lead to accelerated neuronal and spermatozoal cell death, promoting the onset of neurodegenerative diseases as well as brain and testicular carcinogenesis. [Read our summary of the study]

[The influence of 950 MHz magnetic field (mobile phone radiation) on sex organ and adrenal functions of male rabbits]

This 2010 study conducted on rabbits suggests that exposure to mobile phone radiation can have negative effects on Follicle Stimulating Hormone and Testosterone levels. Both of these hormones are involved in the production of spermatozoa cells, and a reduction or disturbance of these could lead to a decrease in quantity and quality of spermatozoa.

[Hypospermatogenesis and Spermatozoa Maturation Arrest in Rats Induced by Mobile Phone Radiation]

This 2011 study conducted on rats shows that long-term exposure to mobile phone radiation (60 minutes per day for 3 months) can cause hypospermatogenesis and maturation arrest. A reduction in spermatozoa production and halted maturation could result in decreased semen volume and quality, and thus reduced fertility.

[The implications for the epidemiology of cancer and cardiac, neurological and reproductive effects]

This 2002 study suggests that electromagnetic radiation is genotoxic, meaning that it can damage DNA. Genotoxic repercussions can comprise of cancer, cardiac, neurological, and reproductive health effects. These can include miscarriage, depression, suicide, sleep disturbance, a multitude of cancer, cardiac and neurological effects and death.

[Effects of mobile phone radiation on serum testosterone in Wistar albino rats]

This 2010 study conducted on rats found that exposure to electromagnetic radiation for 60 minutes a day for 3 months reduced serum levels of testosterone. Low levels of testosterone can cause a number of health problems, including hypospermatogenesis.

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[Research on the Effects of Cell Phone Radiation on Human Sperm]

The comparisons of mean sperm count, motility, viability, and normal morphology among four different cell phone user groups were statistically significant. Mean sperm motility, viability, and normal morphology were significantly different in cell phone user groups within two sperm count groups. The laboratory values of the above four sperm parameters decreased in all four cell phone user groups as the duration of daily exposure to cell phones increased.

[Mobile phones affect multiple sperm quality traits: a meta-analysis]

As mobile phone usage is growing rapidly, there is a need for a comprehensive analysis of the literature to inform scientific debates about the adverse effects of mobile phone radiation on sperm quality traits. Therefore, we conducted a meta-analysis of the eligible published research studies on human males of reproductive age. Eleven studies were eligible for this analysis. Based on the meta-analysis, mobile phone use was significantly associated with deterioration in semen quality (Hedges's g = -0.547; 95% CI: -0.713, -0.382; $p < 0.001$). The traits particularly affected adversely were sperm concentration, sperm morphology, sperm motility, proportion of non-progressive motile sperm (%), proportion of slow progressive motile sperm (%), and sperm viability.

[Effect of cell phone usage on semen analysis in men attending infertility clinic: an observational study]

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.

[Effects of electromagnetic radiation from a cellular phone on human sperm motility: an in vitro study]

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 behavioural 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]

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

Cell phones and male infertility: dissecting the relationship

A recent study found that use of cell phones adversely affects the quality of semen by decreasing the sperm counts, motility, viability and morphology. Evidence of detrimental effect of mobile phones on male fertility is still equivocal as studies have revealed a wide spectrum of possible effects ranging from insignificant effects to variable degrees of testicular damage. Although previous studies suggested a role of cell phone use in male infertility, the mode of action of EMW emitted from cell phones on the male reproductive system is still unclear. EMW can affect the reproductive system via an EMW-specific effect, thermal molecular effect or combination of both. Studies performed on human males are scarce and therefore further studies with a careful design are needed to determine the effect of cell phone use on male-fertilizing potential.

Evaluation of the effect of using mobile phones on male fertility

The problem of the lack of offspring is a phenomenon concerning approximately 15% of married couples in Poland. Infertility is defined as inability to conceive after a year of sexual intercourses without the use of contraceptives. In half of the cases the causative factor is the male. Males are exposed to the effect of various environmental factors, which may decrease their reproductive capabilities. A decrease in male fertility is a phenomenon which occurs within years, which may suggest that one of the reasons for the decrease in semen parameters is the effect of the development of techniques in the surrounding environment. A hazardous effect on male fertility may be manifested by a decrease in the amount of sperm cells, disorders in their mobility, as well as structure.

Effects of cellular phone emissions on sperm motility in rats

Rats exposed to 6 hours of daily cellular phone emissions for 18 weeks exhibited a significantly higher incidence of sperm cell death than control group rats through chi-squared analysis. In addition, abnormal clumping of sperm cells was present in rats exposed to cellular phone emissions and was not present in control group rats. These results suggest that carrying cell phones near reproductive organs could negatively affect male fertility.

Is there a relationship between cell phone use and semen quality?

This study was conducted to determine a possible relationship between regular cell phone use and different human semen attributes. The history-taking of men in our university clinic was supplemented with questions concerning cell phone use habits, including possession, daily standby position and daily transmission times. Semen analyses were performed by conventional methods. Statistics were calculated with SPSS statistical software. A total of 371 were included in the study. 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.

Cell phones: modern man's nemesis?

Over the past decade, the use of mobile phones has increased significantly. However, with every technological development comes some element of health concern, and cell phones are no exception. Recently, various studies have highlighted the negative effects of cell phone exposure on human health, and concerns about possible hazards related to cell phone exposure have been growing. This is a comprehensive, up-to-the-minute overview of the effects of cell phone exposure on human health. The types of cell phones and cell phone technologies currently used in the world are discussed in an attempt to improve the understanding of the technical aspects, including the effect of cell phone exposure on the cardiovascular system, sleep and cognitive function, as well as localized and general adverse effects, genotoxicity potential, neurohormonal secretion and tumour induction.

Challenging cell phone impact on reproduction: a review

The radiofrequency electromagnetic radiation (RF-EMR) produced by cell phones can enhance the excitability of the brain and has recently been classified as carcinogenic. The suggested use of hands-free kits lowers the exposure to the brain, but it might theoretically increase exposure to the reproductive organs. This report summarizes the potential effects of RF-EMR on reproductive potentials in both males and females.

Mobile Phone Electromagnetic Waves and Its Effect on Human Ejaculated Semen: An in vitro Study

Mobile phones usage has seen an exponential growth recently. With this increasing demand, the amount of electromagnetic radiation (EMR) exposed is also increasing. Hence, we studied the effect of these radiations on ejaculated human semen and speculate the contribution of these harmful radiations in male infertility. Samples exposed to EMR showed a significant decrease in sperm motility and viability, increase in reactive oxygen species (ROS) and DNA fragmentation index (DFI) compared to unexposed group. We concluded that mobile phones emit electromagnetic waves which lead to oxidative stress in human semen and also cause changes in DNA fragmentation. We extrapolate these findings to speculate that these radiations may negatively affect spermatozoa and impair male fertility.

Effects of radiofrequency radiation from wifi devices on human ejaculated semen

This is an in-vitro pilot study which established the effect of radiofrequency radiation

(RFR) from 2.4 GHz laptop antenna on human semen. Ten samples of the semen, collected from donors between the ages of 20 and 30 years were exposed when the source of the RFR was in active mode. Sequel to the exposure, both the exposed samples and another ten unexposed samples from same donors were analysed for sperm concentration, motility and morphology grading. A test of significance between results of these semen parameters using Mann-Whitney U-test at 0.05 level of significance showed a significant effect of RFR exposure on the semen parameters considered.

Impact of radio frequency electromagnetic radiation on DNA integrity in the male germline

Concern has arisen over human exposures to radiofrequency electromagnetic radiation (RFEMR), including a recent report indicating that regular mobile phone use can negatively impact upon human semen quality. These effects would be particularly serious if the biological effects of RFEMR included the induction of DNA damage in male germ cells. In this study, mice were exposed to 900 MHz RFEMR at a specific absorption rate of approximately 90 mW/kg inside a waveguide for 7 days at 12 h per day. Following exposure, DNA damage to caudal epididymal spermatozoa was assessed by quantitative PCR (QPCR) as well as alkaline and pulsed-field gel electrophoresis. The treated mice were overtly normal and all assessment criteria, including sperm number, morphology and vitality were not significantly affected. Gel electrophoresis revealed no gross evidence of increased single- or double-DNA strand breakage in spermatozoa taken from treated animals.

The effect of pulsed 900-MHz GSM mobile phone radiation on the acrosome reaction, head morphometry and zona binding of human spermatozoa

Several recent studies have indicated that radiofrequency electromagnetic fields (RF-EMF) have an adverse effect on human sperm quality, which could translate into an effect on fertilization potential. This study evaluated the effect of RF-EMF on sperm-specific characteristics to assess the fertilizing competence of sperm. Highly motile human spermatozoa were exposed for 1 h to 900-MHz mobile phone radiation at a specific absorption rate of 2.0 W/kg and examined at various times after exposure. The acrosome reaction was evaluated using flow cytometry. The radiation did not affect sperm propensity for the acrosome reaction. Morphometric parameters were assessed using computer-assisted sperm analysis. Significant reduction in sperm head area (9.2 ± 0.7 μm2 vs. 18.8 ± 1.4 μm2) and acrosome percentage of the head area (21.5 ± 4% vs. 35.5 ± 11.4%) was reported among exposed sperm compared with unexposed controls.

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

Ejaculated, density purified, human spermatozoa were exposed to pulsed 900 MHz GSM

mobile phone radiation at two specific absorption rate levels (SAR 2.0 and 5.7 W/kg) and compared with controls over time. Change in sperm mitochondrial membrane potential was analysed using flow cytometry. Sperm motility was determined by computer assisted sperm analysis (CASA). There was no effect of pulsed 900 MHz GSM radiation on mitochondrial membrane potential. This was also the case for all kinematic parameters assessed at a SAR of 2.0 W/kg. However, 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. This result should not be ascribed to thermal effects, due to the cooling methods employed in the RF chamber and temperature control within the incubator.

Cell phones and male infertility: a review of recent innovations in technology and consequences

Cell phones have become a vital part of everyday life. However, the health risks associated with their usage are often overlooked. Recently, evidence from several studies supports a growing claim that cell phone usage may have a detrimental effect on sperm parameters leading to decreased male fertility. Nonetheless, other studies showed no conclusive link between male infertility and cell phone usage. The ambiguity of such results is attributed to the lack of a centralized assay for measuring inflicted damage caused by cell phones. Study design, ethics, and reproducibility are all aspects which must be standardized before any conclusions can be made.

Effects of the exposure to mobile phones on male reproduction: a review of the literature

The use of mobile phones is now widespread. A great debate exists about the possible damage that the radiofrequency electromagnetic radiation (RF-EMR) emitted by mobile phones exerts on different organs and apparatuses. The aim of this article was to review the existing literature exploring the effects of RF-EMR on the male reproductive function in experimental animals and humans. Studies have been conducted in rats, mice, and rabbits using a similar design based upon mobile phone RF exposure for variable lengths of time. Together, the results of these studies have shown that RF-EMR decreases sperm count and motility and increases oxidative stress. In humans, 2 different experimental approaches have been followed: one has explored the effects of RF-EMR directly on spermatozoa and the other has evaluated the sperm parameters in men using or not using mobile phones. The results showed that human spermatozoa exposed to RF-EMR have decreased motility, morphometric abnormalities, and increased oxidative stress, whereas men using mobile phones have decreased sperm concentration, decreased motility (particularly rapid progressive motility), normal morphology, and decreased viability. These abnormalities seem to be directly related to the duration of mobile phone use.

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Radio frequency electromagnetic radiation (RF-EMR) from GSM (0.9/1.8 GHz) mobile phones induces oxidative stress and reduces sperm motility in rats

One hour of exposure to the phone did not significantly change facial temperature in either group of rats. No significant difference was observed in total sperm count between controls and RF-EMR exposed groups. However, rats exposed to RF-EMR exhibited a significantly reduced percentage of motile sperm. Moreover, RF-EMR exposure resulted in a significant increase in lipid peroxidation and low GSH content in the testis and epididymis.

Mobile phone usage and male infertility in Wistar rats

A significant decrease in protein kinase C and total sperm count along with increased apoptosis were observed in male Wistar rats exposed to mobile phone frequencies (2 h/day × 35 days at 0.9 W/kg specific absorption rate). The results suggest that a reduction in protein kinase activity may be related to overproduction of reactive oxygen species (ROS) under microwave field exposure. Decrease in sperm count and an increase in apoptosis may be causative factor due to mobile radiation exposure leading to infertility.