



Some sleep studies have found biological responses but they do not impact human health say international health authorities

Some studies have found evidence of biological responses– such as changes in the brain’s electrical activity – during sleep and exposure to mobile phone signals but these have not been shown to affect the quality of sleep or length of sleep.

Biological effects are measurable changes in living cells or organisms in response to a stimulus that may or may not be associated with adverse health effects. Scientific findings of biological changes do not necessarily mean they will have a corresponding health effect. The contraction of the eye’s pupil when a person walks into a bright room is one of many examples in which a measurable biological change in response to stimulus does not cause a health effect.

Recent studies that monitored brainwaves during sleep have shown exposure to mobile phones did not affect the overall quality of sleep or length of time it took to get to sleep but the researchers consistently measured an increase in brainwave activity using electrodes on the scalp called an electroencephalogram (EEG) during the early stages of sleep.

However, ongoing comprehensive reviews of the latest research into mobile phones and health have always acknowledged these types of biological responses or short-term effects, but have consistently concluded they do not have any known relevance to human health.

The current World Health Organization (WHO) factsheet¹ on electromagnetic fields and health says:

A large number of studies have been performed over the last two decades to assess whether mobile phones pose a potential health risk. To date, no adverse health effects have been established as being caused by mobile phone use.

The WHO factsheet also specifically addresses short-term effects including sleep:

A number of studies have investigated the effects of radiofrequency fields on brain electrical activity, cognitive function, sleep, heart rate and blood pressure in volunteers. To date, research does not suggest any consistent evidence of adverse health effects from exposure to radiofrequency fields at levels below those that cause tissue heating. Further, research has not been able to provide support for a causal relationship between exposure to electromagnetic fields and self-reported symptoms, or ‘electromagnetic hypersensitivity’.

¹ <http://www.who.int/mediacentre/factsheets/fs193/en/index.html>

Recently (October 2013) the French National Agency for Health, Food and Environmental Safety (ANSES) announced² after a two-year review of the latest science by an expert panel that:

...the expert appraisal nevertheless shows, with limited levels of evidence, different biological effects in humans or animals, some of which had already been reported in 2009: these can affect sleep, male fertility or cognitive performance.

Biological effects corresponding to generally reversible changes in the inner functioning of the body can thus be observed, as is also found in the case of exposure to different stimuli of everyday life. However, the Agency's experts were unable to establish any causal link between the biological effects described in cell models, animals or humans, and any possible resulting health effects.

Another comprehensive review³ in 2012 by the UK Health Protection Agency's independent Advisory Group on Non-ionising Radiation (AGNIR) also considered the impact of mobile phones on sleep and concluded:

...the effects of RF field exposure on the EEG are small in those studies that have found them. For example, many perceptual and cognitive tasks produce EEG changes that are much larger than those recently reported to be associated with RF field exposure. Therefore, it remains unclear whether these RF effects, if they exist, are material to human health or not.

Nevertheless, the EEG studies published since 2003 do provide some evidence that RF fields could influence brain function, and this should remain an area of interest.

Further research is taking place. The Australian government recently announced a five-year research program that will include studies in this area, while other researchers⁴ have been studying whether the metallic electrodes used with the EEG machines can induce RF currents, thus offering an alternative explanation for some of the observed effects.

In September 2013 the WHO published an online Q&A⁵ on mobile phones and health which provides a good summary of where we are today, when they said

Scientists have reported other health effects of using mobile phones including changes in brain activity, reaction times, and sleep patterns. These effects are minor and have no apparent health significance. More studies are underway to try to confirm these findings.

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² <http://www.anses.fr/en/content/anses-issues-recommendations-limiting-exposure-radiofrequencies>

³ http://www.hpa.org.uk/webc/HPAwebFile/HPAweb_C/1317133827077

⁴ LM Angelone, G Bit-Babik, C-K. Chou. Computational electromagnetic analysis in a human head model with EEG electrodes and leads exposed to RF sources at 915 MHz and 1748 MHz. Radiation Research 174, 91-100 (2010).

⁵ <http://www.who.int/features/qa/30/en/>