

Mobile Phones, Wifi and Electromagnetic fields.

Andrew Goldsworthy. Oct. 2008

We are constantly being led to believe by elements of the mobile phone and electronics industries (who have a huge financial stake in the infrastructure) that the pulsed microwaves used in mobile phones and Wifi are harmless. Their sole justification for this is that the radiation is too weak to generate significant heat when they are absorbed by living tissues.

However, they are seemingly oblivious to the fact that living cells depend on electricity and electrically charged atoms and molecules (ions) to maintain their healthy functioning. They can therefore be damaged **electrically** by electromagnetic radiation, even if it is far too weak to generate significant heat.

For example, our cells use the energy from food to pump ions out of mitochondria (the cells' power stations). They are then let back in through an ATPase (an enzyme not unlike a molecular water wheel). Each turn of the wheel generates a molecule of ATP, which is the main energy currency of the cell. In effect, an electric current flowing into and out of these tiny structures provides virtually all of our bodily energy.

Some of this ATP is then used to pump ions out of the cell. When they return via special enzymes (called transporters) in the cell membrane, they can carry with them essential nutrients that the cell needs to absorb. So we use electricity to absorb our food too.

Another example is in our nerve and brain cells. They use ATP to pump sodium and potassium ions across their external membranes. Nerve impulses are generated when these ions are suddenly let back again to give sharp spikes of current.

Last but not least, the membranes themselves (which are only two molecules thick!) are held together electrically. They consist mostly of negatively charged molecules bound together by positively charged ions (mostly calcium), which act as a kind of cement.

Unfortunately, weak electromagnetic fields gently tease out some of these calcium ions, which weakens the membranes and makes them more inclined to leak. As a result, our bodies become less efficient at generating energy and our nerve and brain cells are more likely to generate false impulses.

False impulses generated in sensory cells can give symptoms of electrosensitivity, whereas those generated in the brain can affect mental function and may also lead to stress headaches. Even people who do not regard themselves as electrosensitive, frequently get headaches and other unpleasant

symptoms when exposed for long periods to the radiation from Wifi, cordless phones and mobile phones.

Other reported effects from prolonged exposure to pulsed microwaves include an increase risk of cancer and a loss of fertility. This seems to be associated with observable damage to cellular DNA, probably as a result of the leakage of digestive enzymes from lysosomes (tiny particles in living cells that digest and recycle waste) whose membranes have been damaged by the radiation.

Pulses carried by *microwaves* are particularly dangerous. This is probably because their very short wavelength allows the transmission of pulses with extremely rapid rise and fall times, and it is the **rate of change** of the fields (rather than their total energy) that does most of the biological damage; it catapults vital calcium ions away from cell membranes, which in turn makes them leak. This leakage can explain the great majority of the observed adverse health effects of prolonged exposure to electromagnetic radiation (for more on this, together with references, please visit <http://tinyurl.com/55286a>).

It is therefore unwise and arguably dangerous to be exposed for long periods to the radiation from Wifi transmitters, cordless phones and mobile phones (especially their base stations, which run 24/7). They should certainly not be deployed in public places until all the risks have been independently evaluated. Any claims that they are harmless because they do not generate significant heat are completely unwarranted.

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