

Andrew Goldsworthy - Notes for Teleconference April 29th 2010

As cell phone usage grew, a whole series of **unexpected effects** on health began to appear, often just in **minorities** of the population.

The cell phone companies **had no idea what was causing them and still less how to stop them happening**. The only solution was to **deny their existence**.

The cell phone companies argue that, because the results are **not consistent**, this is due to experimental error and they can therefore be **ignored**.

This argument is flawed because it **does not take account of biological variability**

We are all the product of thousands of genes that interact with both each other and the environment in unpredictable ways.

Each individual is unique. Not every smoker dies of cancer, we do not all have the same side effects from taking medicinal drugs, and we cannot all expect to respond in the same way to electromagnetic insults.

Just because not everyone is affected does not mean that no one is affected.

They also say that there is **no plausible explanation for such diverse effects**.

In this presentation, I have explained just how these effects are produced and how modifications to the signal, we can put most of them right.

There are two mechanisms that explain nearly all of them.

The first is based on cryptochrome

Plants use it to measure light.

Animals use it to navigate in the Earth's magnetic field.

Both animals and plants use it to regulate their body clocks.

Ritz et al. (2004) found that bird magnetic navigation was disrupted by radio waves because of their effects on cryptochrome.

This is also true for insects and probably causes colony collapse disorder in the bees.

The radio waves don't break chemical bonds; they just interfere with the transport of an electron between two parts of the molecule that is essential for its function.

Cryptochrome is also controls circadian rhythms and the body clock, which regulates the **sleep-wake cycle and the immune system**, which works best at night.

This explains **the disturbance of the sleep-wake cycle in people living near cell towers** **It also increases their risk of cancer** by **reducing the ability of the immune system to cope with incipient cancer cells.**

It also contributes to the **decline of the bees**, which are **becoming increasingly susceptible to pathogens.**

The loss of the bees would have **devastating effects on all forms of agriculture.**

Fortunately, **we can do something about it.** According to Ritz et al. cryptochrome is sensitive to a **broad range of frequencies up to about 10MHz.**

These are well below the carrier frequencies used in mobile telecommunications, but are **generated when they are used to carry digital information.**

They are not essential and can be suppressed.

The cell phone companies should do this straight away.

Effects on Cell Membranes

Low frequency electromagnetic fields and radio frequencies that have been modulated with low frequencies can remove calcium ions from cell membranes.

This **weakens** them and makes them **more inclined to leak**, which explains most of the **other biological effects of electromagnetic radiation.**

Cardiac arrhythmia

The heart muscle **beats in response to electrical waves** propagating through it. These are generated **by ions moving across its cell membranes.**

If they leak, these movements are **less pronounced**, and **heart-beat becomes irregular.**

Inflammation

When the cells leak into the surrounding matrix, it can **cause inflammation.**

Early dementia

The brain is separated from the blood by a **“tight junction” barrier in which the gaps between the cells are sealed to prevent the entry of unwanted materials.**

Cell phone radiation makes this barrier leak to let in toxic materials that can lead to **early dementia.**

Allergies

All of our body surfaces, including the skin, lungs and gut have similar barriers.

When they leak, they let in **allergens and foreign chemicals**, which promote **allergies and multiple chemical sensitivities**.

Effects on nervous tissue

If a neuron membrane leaks, it can **cause the spurious release** of neurotransmitters, resulting in **brain hyperactivity and a reduced ability to concentrate**. (ADHD).

Electromagnetic hypersensitivity (EHS)

People with EHS, suffer **false sensations when exposed to electromagnetic fields**.

They include sensations of **heat, pain, pins and needles, pressure, crawling sensations, tinnitus, dizziness and nausea**.

They can all be **explained by their sensory cells leaking**.

This makes them to **release neurotransmitters** that trigger neighbouring nerve cells to **send false signals to the brain**.

Most are felt in the skin, but those of the **inner ear** give **false sensations of sound (tinnitus)**, feelings of **dizziness and symptoms of motion sickness, including nausea**.

DNA Fragmentation

Many experiments have shown **single and double stranded DNA breaks in living cells** exposed to **cell phone radiation for less than 24 hours**.

Living cells contain membrane-bound structures called **lysosomes that contain digestive enzymes, including DNase**, that normally digest waste for recycling.

Leakage **could damage the cell's DNA**, with **collateral damage to the rest of the cell**.

This could **cause a tumour** in later life and some **loss of cellular function**.

The effect of cell phone radiation on the thyroid gland may be **partly responsible for the current outbreak of obesity**.

Male fertility

Epidemiological studies link heavy cell phone use to a **reduced sperm count, loss of sperm motility and viability** and sometimes **DNA damage**.

Haploid sperm are particularly sensitive because **(unlike diploid cells) they are unable to repair double stranded DNA breaks**.

A sperm test

The **sensitivity of the sperm to cell phone radiation makes it an ideal test bed for the biological safety of new wireless technologies.**

Visible effects of cell phone radiation on of healthy donated sperm show up in about an hour.

This test is particularly relevant since anything that damages the sperm damages the future of the whole human race.

What can be done about to prevent membranes leaking?

One approach is to **change the method of signal modulation so that, when demodulated by cells, it does not generate biologically-active low frequencies.**

Another approach is to **transmit two mirror image signals simultaneously on slightly different carrier frequencies.**

Since it is **unlikely that a cell membrane can distinguish between the two carriers, the demodulated signals will cancel each other out and the signal will appear to be unmodulated and relatively harmless.**