

## **Letter of Concern, addressed to the decision-makers of the City of Brussels**

I understand that you at present are concerned about the fast deployment of 5G wireless systems in Brussels, without adequate sharing of information with the public.

Before my retirement, I have worked as an associate professor at the Karolinska Institute, world-famous for its Nobel Prize in Physiology or Medicine. I also upheld a professorship at the Royal Institute of Technology; it being closely tied to the Nobel Prizes in Physics and Chemistry. For many years I have been studying health effects of wireless gadgets, such as cell phones, WiFi, and similar.

Wireless communication is now being implemented in our daily life in a very fast way. At the same time, it is becoming more and more obvious that the exposure to electromagnetic fields may result in highly unwanted health effects. This has been demonstrated in a very large number of studies and includes cellular DNA-damage (which may lead to an initiation of cancer as well as mutations that carry down generations), disruptions and alterations of cellular functions like increases in intracellular stimulatory pathways and calcium handling, disruption of tissue structures like the blood-brain barrier (which may allow toxins to enter the brain), impact on vessel and immune functions, and loss of fertility. It should be noted that we are not the only species at jeopardy, practically all animals and plants may be at stake.

The consequences on health and environment can be all the more serious because:

- exposure is ubiquitous, repeated and/or prolonged,
- radiation from wireless technologies is modulated, pulsed, polarized,
- some individuals may be more vulnerable (foetuses, children, the elderly, the ill, the genetically and/or immunologically challenged, and persons with the functional impairment electrosensitivity), and/or the effects may be much more prolonged over time (foetuses, children),
- exposure is combined with other pollutants (e.g. chemical pollutants).

Damages on health and environment are already noticeable at exposure levels similar to those that are currently met in Brussels. In spite of this, Brussels exposure limits are about to be released from 6 V/m to 14,5 V/m (at 900 MHz). When comparing power densities, this means a multiplication factor of nearly 6 times.

It is clearly not enough just to ensure exposure levels are below WHO recommended levels. WHO recommendations are designed to protect cells from excessive temperature increase successive to a 30 minutes exposure to radiofrequency/microwave radiations. The bases for these recommendations were established in the late 1990s and have not been revised since then, even though:

- wireless technologies have developed very rapidly over the past 20 years,
- exposure pattern has completely changed (ubiquitous, repeated, prolonged exposure, exposure of children, foetuses, etc.)
- considerable scientific progress has been made in identifying biological and health effects.

Not everyone agrees on the question of absolute proof of damage because a certain number of unknowns remain, even at the scientific level. But there is no point using the fact that not all the grey areas have yet been dispelled to assert that there would be no health and environmental effects caused by the widespread deployment of wireless devices and networks. To date, we can no longer deny that thousands and thousands of studies indicate very real effects. The

unbridled development of wireless systems is, in the more or less short term, conflicting with health and protection of ecosystems. Observations and return on experience indicate that damages are already acting.

I would like to remind you that, in 2011, the World Health Organization classified the radiofrequency and microwave emissions of wireless technologies as possible carcinogens. However, cancer is only one of the long-term consequences of prolonged exposure. Radiofrequency radiation affects our cells long before cancer develops. Our body reacts with oxidative stress and inflammatory processes. When the exposure is repeated or prolonged, these mechanisms are maintained and may cause sleep disorders, disturbances in cognitive and reproductive functions, damage to cells and DNA. In the long run, the body's defence systems are being exhausted and diseases are threatening: repeated infections, infertility, developmental disorders (e. g. embryonic), neurological and neuropsychiatric disorders, cardiovascular diseases, neurodegenerative diseases including Alzheimer's disease, cancers. foetuses and children, are particularly affected because they may be more vulnerable, and/or the effects may be much more prolonged.

Every generation of wireless technology also swells the ranks of electrohypersensitive people who are physically suffering from being exposed to electromagnetic radiations, whether or not they are aware of their electrohypersensitivity. Nocebo or psychological explanations are clearly not sufficient to explain the phenomenon.

Deploying 5G in addition to existing technologies, for sure, will increase the exposure of Brussels' population. But beyond the additional layer of electromagnetic pollution it will constitute, there is strong suspicion that 5G, because of its technological specificities (frequencies, modulations, pulsations, narrowly focused and directional beams, more base stations), will present even more serious health and environmental risks than existing technologies.

Engineers and the telecom industry readily argue that there is nothing to worry about because the high-frequency radiation of 5G will be absorbed mainly at the periphery of the body. This is based on the presumed skin characteristic that the higher the frequency of radiation, the shallower the depth of radiation penetration. In other words, most of the electromagnetic absorption (and heating) would occur over the first few millimetres of the body's surface.

Concluding that there is no risk is forgetting that surface effects can be significant on external cells and tissues (skin, eyes for example), as well as on all blood cells which will pass the outer portion of the skin each five minutes. There are reasons to suspect that the deployment of 5G may be accompanied by an increase in the number of melanomas and other skin cancers, and eye disorders.

But not only surface effects are of concern. From practical tests, no such shielding effect has been demonstrated. Instead there is strong suspicion that 5G radiation can have impacts far beyond the peripheral layers of the body. Living materials are not just homogeneous and inert conductive materials. It is a major mistake to omit the complexity of biological systems capable of responding to external electromagnetic stimuli in many other ways than just through heating. Electromagnetic disturbances and chemical mediators (e.g. inflammatory mediators) can be spread throughout the body and induce biological (non-thermal) effects deep into the body. If also the molecular cascade effects of the Nobel Laureate professor Paul Greengard is taken into consideration, then very superficial and minute impacts still can produce molecular avalanches

affecting the entire body. Such disturbances will also have an ideal avenue of spread via the peripheral nerves, the latter being found as superficial as 20-40  $\mu\text{m}$  from the outer surface. Then penetration is, after all, total.

All living beings are electrosensitive! And given the extraordinary electromagnetic sensitivity of living systems, it is not a surprise that they can be affected even at lower exposure levels, especially if the exposure is ubiquitous and prolonged. While reading this letter, you may be sitting in 10-25 V/m, partly originating from your wireless handheld gadgets and various fixed installations, whereas sharks in their final attack sequence sense 0.000000005 V/m.

Because the effects are reproducibly observed and links to pathology can not be excluded, the precautionary principle should be in force in the implementation of this new technology within the society. Therefore, policy makers immediately should strictly control exposure by defining biologically-based maximal exposure guidelines also taking into account long-term, non-thermal effects, and including especially vulnerable groups, such as the elderly, the ill, the genetically and/or immunologically challenged, children and foetuses, and persons with the functional impairment electrohypersensitivity (which in Sweden is a fully recognized functional impairment, and therefore receives an annual governmental disability subsidy).

As a result, I support ondas.brussels in its demand for taking all necessary measures to halt the deployment of 5G and reduce the overall exposure levels from other artificial wireless communication systems.

Stockholm, December 13, 2018  
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