

## **Third Paris Appeal International Congress**

# **Children's health and environment**

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Our present state of knowledge regarding the health risk from electromagnetic fields (EMF) is highly controversial. Confusion reigns in all aspects of research. This is mainly due to the fact that progress has been hindered for decades by the so-called industrial/military complex. Worldwide, it dominated research activities by selecting unscrupulous scientists, appointing them experts, and putting them - with the help of politicians - in national and international advisory boards where they followed its instructions. Thus, in the area of bioelectromagnetism science did not develop as in other fields of biological research, especially since independent scientists were almost totally excluded from funding [1,2]. The long-lasting blockade of scientific progress has led to the unacceptable position taken today by decision makers in industry, most European governments, and the European Union. With regard to the potential health risk of our children from EMF this position is outdated and, indeed, in contrast to the available knowledge acquired by independent researchers.

**EFHRAN 2010 - European Health Risk Assessment Network  
on Electromagnetic Fields Exposure**

**Official opinion on the state of knowledge in ELF-EMF research:**  
Epidemiological studies have shown a two-fold risk of childhood leukaemia with some degree of consistency after exposure to power frequency magnetic fields at above approximately 0.3/0.4  $\mu$ T.

a) The observed association alone is not sufficient to conclude a causal relationship, since there is no known mechanistic explanation for the observed association.  
b) A combination of chance, bias and confounding may well have produced a spurious association in the epidemiological studies.

Therefore:

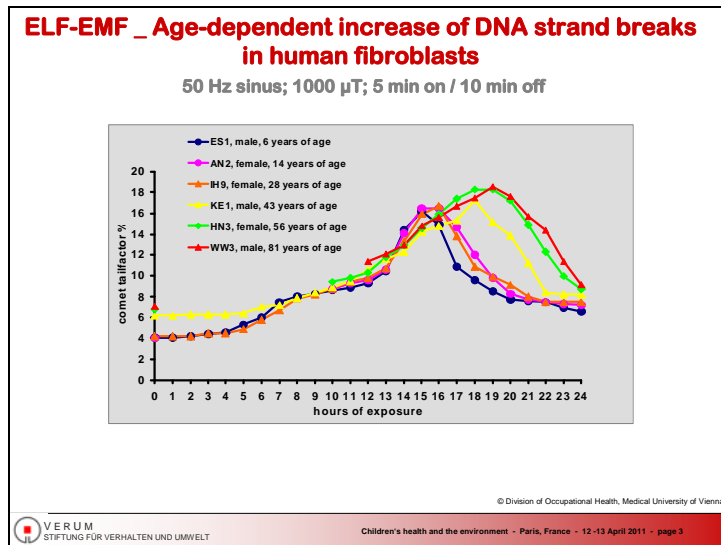
Leukaemia in children: **limited evidence**  
Brain tumours in children: **inadequate evidence**

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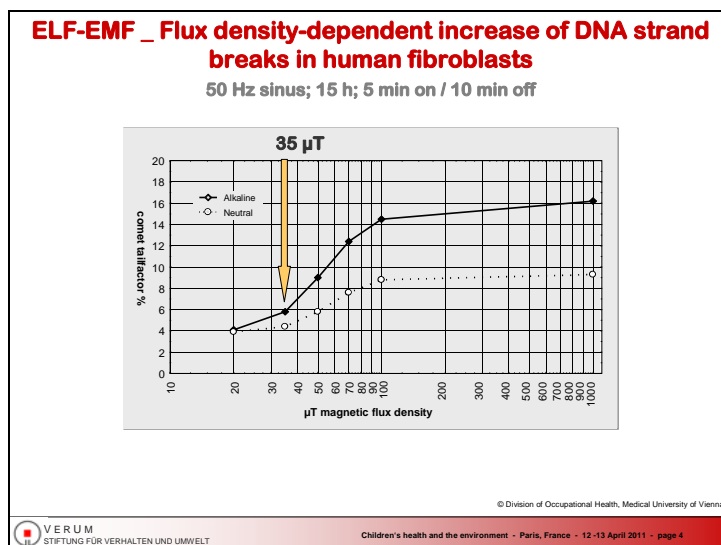
As shown in the EFHRAN Report 2010 a doubling of the risk for childhood leukaemia has been observed due to extremely low-frequency electromagnetic field (ELF-EMF) exposure in a series of epidemiological studies since 1979 [3]. This has prompted the IARC in Lyon in 2002 to state that ELF-EMF is a possible cause of leukaemia in children [4]. However, neither industry nor governments have taken this then scientific consent seriously. While the increase in leukaemia after exposure to power frequency electromagnetic fields was detected at a flux density as low as 0.3 - 0.4 microT, the safety limit for all of us is still 100 microT. To justify this anachronistic value and to prevent that further reaching conclusions are drawn from the IARC statement, it is claimed among others that no known mechanistic explanation for the epidemiological findings are available yet.

As shown on the graph below, this is not true. We and others have demonstrated that ELF-EMF owns a genotoxic potential, which is the prerequisite for a physical agent to generate cancer [5,6].

The figure shows the increase in DNA strand breaks in human fibroblasts from six persons differing in age after exposure to ELF-EMF over 24 hours.



And the next graph shows that a flux density of 35 microT - 1/3 of the safety limit - is good enough to generate a significant increase in DNA strand breaks.



As a consequence, data from basic research support the view that a leukaemia risk of children due to exposure to power frequency electromagnetic fields as observed in epidemiological studies may be real.

With regard to RF-EMF, the situation is a comparable one. The official view taken by industry and governments and again expressed in the EFHRAN Report 2010 [3] that an increased brain tumour risk is not to be expected can obviously not be brought in line for example with what Lennart Hardell in his preceding presentation stated [7,8].

## EFHRAN 2010 - European Health Risk Assessment Network on Electromagnetic Fields Exposure

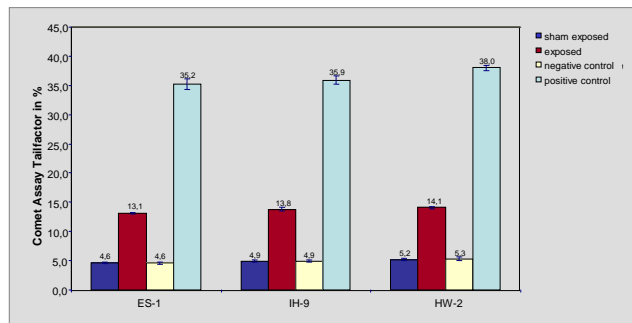
### Official opinion on RF-EMF:

Results from the international analyses of glioma and meningioma in the INTERPHONE study have not demonstrated an increased risk of these diseases in relation to mobile telephone use. There were, however, suggestions of an increased risk of glioma, and much less so of meningioma, observed among the heaviest users, but biases and errors prevent a causal interpretation.

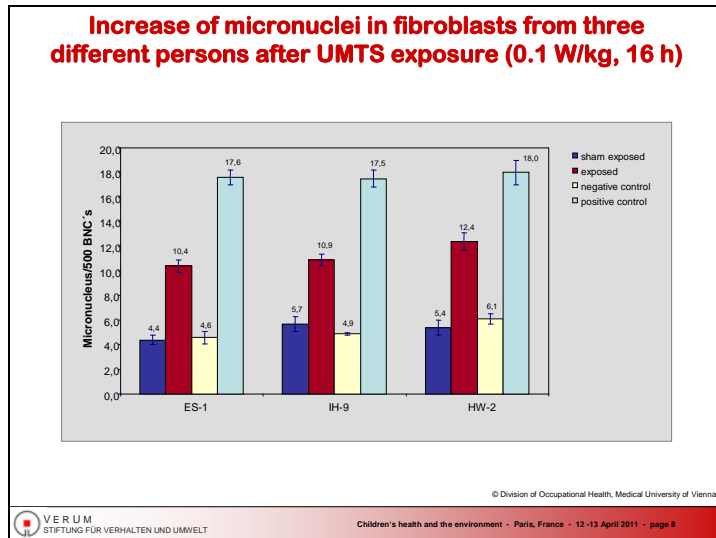
Leukaemia in children:	inadequate
Brain tumours in children:	inadequate
Other cancer (children or adults)	inadequate

The main reason why the data of Hardell and others, who observed in their studies an increased brain tumour rate in long-term mobile-phone users, are generally not acknowledged by the decision makers is again the assumption that no mechanisms are known yet that could explain cancerogenic effects generated through mobile phone radiation. As shown in the next two graphs, this is also not true:

### Increase of DNA strand breaks in fibroblasts from three different persons after UMTS exposure (0.1 W/kg, 16 h)

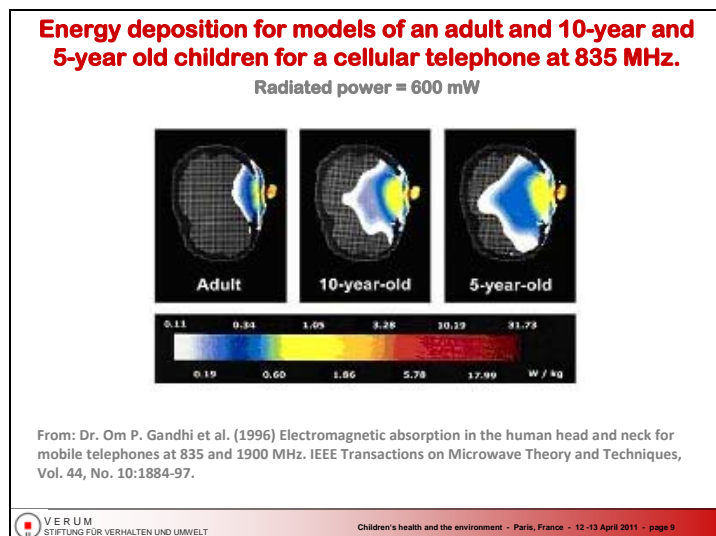


The red columns in the graph above show that a 16-hours exposure of human fibroblasts from three different persons to UMTS radiation significantly increased DNA strand breaks, and in the graph below the red columns show that this is valid for micronuclei, too [5].



UMTS is the 3rd generation of mobile phone technology that was introduced around 2002 without any preceding biological testing, and now the introduction of LTE, the next generation, is planned, again without any testing of the bio-tolerability.

Both, DNA strand breaks and micronuclei clearly demonstrate the genotoxic potential of the UMTS radiation. Findings of this kind which have been confirmed several times [9-13] by other research groups strongly support the assumption of a causal link between mobile phone radiation and the already observed increase in brain tumour frequency.



What does this mean for children who, in the meantime, belong to the heaviest users of mobile phones? Their brain tumour risk may by far exceed the risk of adults due to the anatomic and physiological conditions in childhood. Children have thinner skulls and smaller ears. Every millimetre of separation from the brain makes a big difference in the specific absorption rate (SAR). The conductivity of tissues is higher in children than in adults and the higher the conductivity, the higher the SAR [14,15] For example, in the bone marrow of children the SAR is about 10 times increased as compared to adults. The consequences are:

- 1) A deeper penetration of mobile phone radiation into children's brain as compared to adults.

- 2) A much higher SAR in children compared to adults which may even exceed the safety limit of 2 W/kg.
- 3) Enough time for the tumour to grow due to the high life expectancy of children.

The human organism that functions through electromagnetic mechanisms is treated by the physicists who created the safety limits as if it were a plastic container filled with electrolyte enriched water. It evolved in a particular electromagnetic environment (earth's magnetic field, terrestrial magnetism from lodestone, visible light, ultraviolet frequencies, lightning), and if we change the electromagnetic environment as we already did we either adapt or we will run into trouble [16]. In the latter case, this may result in electro-sensitivity from which about 3-5% of European people already suffer. Obviously, new exposure standards based on biology instead of physics that take into account long-term as well as non-thermal effects of mobile phone radiation are urgently needed to protect the health of people. Vigorous denial of the validity of the findings instead of adjusting the mobile-phone technology to the human organism is no solution. In my opinion, time has come to realize that something is going wrong with this technology, and the unreserved promotion by its advocates needs to be faced and dealt with openly.

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