

How the Mobile Communication Industry Deals with Science as Illustrated by ICNIRP versus NTP

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The development of mobile communication technologies starting with 1G up to now 5G is a success story rarely heard of previously. It has only been possible because industry experts in charge of the technology assumed that radiofrequency (RF) radiation and its modulations – similar to visible light – are biologically harmless. They believed in safety limits that reliably protect people only from the acute thermal effects of RF radiation inherent in the system. Biological effects below the safety limits were categorically ruled out because their existence allegedly contradicted the laws of physics. So, the technical use of RF radiation in mobile communication has experienced hardly any limitation. Doubts about the harmlessness of this radiation, just as old as the technique itself, have been countered by the mobile communication industry as wrong and without basis. Compliant scientists, whose preferred opinion was more important than their qualifications, were generously supported and, by using political connections, placed in national and international advisory and decision-making bodies.

A milestone in putting through the interests of the mobile communication industry was the establishment of the *International Commission on Non-Ionizing Radiation Protection (ICNIRP)* in 1992. It is a non-governmental organization. Michael Repacholi, then head of the WHO's EMF Project, managed to get official recognition for this group by the WHO as well as the EU and a series of its member states, among them Germany. Repacholi, first ICNIRP chairman and later *emeritus* - member, left the WHO after allegations of corruption in 2006 and found a new position as a consultant to an American electricity provider. ICNIRP's most important task is the establishment of safety limits for non-ionizing radiation including RF radiation. Its decisions are of utmost importance for the mobile communication industry's economic and strategic planning. The ICNIRP, whose members are convinced of the harmlessness of RF radiation, has never changed its attitude despite all research progress made in this field since 1992. To guarantee that the mobile communication industry can permanently rely on ICNIRP, the succession of a member who leaves is regulated by statute. The remaining members select the new one on the basis of mutual understanding. Together with the other groups mentioned above ICNIRP has ensured that mobile communication industry is not only dominating the technical research to which it is entitled to, but also the biological research – this at the expense of the human health.

Who against who?

The current status of the discussion between the mobile communication industry and independent science is illustrated by the following example. The industry is represented by ICNIRP and independent science by the National Toxicology Program (NTP) of the U.S. The NTP recently finished what is to date, the largest animal cancer study in this area and it provided evidence that mobile communication radiation has a carcinogenic potential. Yet, ICNIRP retains the opinion that the results of the NTP Study nevertheless provide no evidence that this radiation causes cancer.

Summary of the results of the NTP Study

The IEEE Microwave Magazine recently published a report by James C. Lin with the title "*Clear Evidence of Cell-Phone RF Radiation Cancer Risk*" (1). Prof. Lin is Professor *emeritus* of electrical engineering, bioengineering, physiology and biophysics at the University of Illinois, Chicago. Between 2004 and 2016 he was a member of ICNIRP, and between 2008 and 2012 he chaired its Standing Committee III. Together with 13 more scientists (two electrical engineers, ten pathologists and toxicologists and one biostatistician,) none of them working for the mobile communication industry,

he was invited by the National Institute of Environmental Health Sciences (NIEHS) to take part in a panel meeting, which was to carry out a peer-review of the NTP draft reports on cancer development through mobile communication radiation. Among others, these reports state that the life-long exposure of rats can cause malignant tumors, such as glioma in the brain and schwannoma in the heart of male rodents. NTP classified the reliability of results in five categories: "clear evidence" and "some evidence" for positive findings, "equivocal evidence" for uncertain results, "no evidence" for no observable effects, and "inadequate study" for results that cannot be evaluated because of experimental flaws. This scheme was also used by the panel members. The outcome was as follows:

1. The panel's pathologists and toxicologists recommended the conclusion that there is statistical significance and "clear evidence" that both GSM- and CDMA-modulated RF radiation led to the development of malignant schwannoma, a rare tumor, in the heart of male rats. Yet, the schwannoma risk in female rats was only "equivocal evidence". In addition, it was noted that in RF-exposed male and female rats were unusual patterns of cardiomyopathy, that is damage to heart tissue.
2. Furthermore, the panel recommended the conclusion, again based on statistical significance, that the pathological findings in the brain of male rats show "some evidence" of a RF-dependent carcinogenic effect, specifically glioma. Based on the findings of the development of malignant glioma in female rats it was concluded to be of only "equivocal evidence".
3. The panel also concluded that in the adrenal gland there is "some evidence" of carcinogenic RF effects. In male rats, the number of pheochromocytomas was significantly higher in exposed animals when compared to unexposed controls. Female rats showed significantly more tumor-like hyperplasia in the adrenal gland compared to unexposed controls.
4. The panel accepted the conclusion that the NTP results also point to carcinogenic effects on prostate, pituitary gland, liver, meninges, and pancreas in RF-exposed rats and on the lymphatic system, lung, skin and liver in RF-exposed mice, and the evidence was considered to be "equivocal".
5. As the panel considered the carcinogenicity from long-term RF exposure in rats to be definitely proven, one might assume, that the WHO's International Agency for Research on Cancer (IARC) would rethink its classification "possibly carcinogenic to humans", which is almost solely based on the results of epidemiological studies, and adjust it to reality in a not too distant future to "probably carcinogenic to humans".
6. According to the panel, the NTP results also refute the reliability of the current radiation protection guidelines that are based on short-term exposure and thermal radiation effects. The NTP Study showed that they are obviously not adequate to offer protection from health damage after long-term exposure with SAR values at or below 1.6 and 2.0 W/kg, respectively. It seems the time has come to judiciously reassess, revise and adjust these guidelines to reality.
7. The panel proposed that in future the U.S. Government stick to this research with its own independent program and not leave the topic solely to the mobile communication industry. Up to now, this industry has acted almost freely to develop and sell mobile phones together with the appropriate equipment just as they wanted. Therefore, the results of the NTP Study demonstrate that this should not be the completion or end of the U.S. Government's support of research into the biological effects of RF radiation, especially when increasing numbers of people are exposed to more and more of this radiation each day.

There is no doubt that the evaluation of the NTP Study results by the invited panel members met all scientific criteria. This is also proven by the fact that the scientists responsible for the NTP Study have been confronted with numerous mistakes and other flaws, which could have been avoided with a better planning and implementation. However, these mistakes and flaws are by far not enough to question the most important result of the NTP Study, the evidence of carcinogenicity from mobile communication radiation.

Note on NTP Study by ICNIRP

In its „*Note on recent animal carcinogenesis studies*“ (2) dated September 4, 2018, ICNIRP comes to the following conclusion:

Although the NTP study [and another Italian study] used large numbers of animals, best laboratory practice, and exposed animals for the whole of their lives, consideration of their findings does not provide evidence that radiofrequency EMF is carcinogenic. NTP reported that their strongest findings were of increased malignant cardiac schwannoma in male rats, however that is not consistent with the results of the Italian study, is not consistent with the NTP female rat nor male or female mouse results, and is not consistent with the radiofrequency EMF cancer literature more generally. While results from epidemiological studies suggest vestibular schwannoma is an outcome of interest, this is not true for malignant cardiac schwannoma. NTP found no increase in schwannoma overall or for vestibular schwannoma. Further, as multiple comparisons were not controlled for in the NTP study, there is no indication that the increased incidence of malignant cardiac schwannomas in male rats was more than what would be expected by chance alone. ICNIRP considers that the NTP and the Italian study do not provide a consistent, reliable and generalizable body of evidence that can be used as a basis for revising current human exposure guidelines. Further research is required that addresses the above limitations.

ICNIRP criticism lacks any insight into biological conditions

That ICNIRP's arguments lack a serious basis has been convincingly shown by Ronald L. Melnick, who for many years worked for the NTP, in his paper published in September 2018: *“Commentary on the utility of the National Toxicology Program study on cell phone radiofrequency radiation data for assessing human health risks despite unfounded criticisms aimed at minimizing the findings of adverse health effects”* (3).

Melnick notes that the aim of the NTP Study, that is, the study of the potential toxic and carcinogenic effects of mobile communication radiation, has been fully achieved. Besides a statistically significant increase of specific tumors in the heart and in the brain of male rats, there were additional hints that this radiation can also trigger cancer in numerous other organs in both rats and mice of either sex. That such findings are also relevant to assess the health risks of humans exposed to mobile communication radiation goes certainly not only for Melnick without saying. The NTP Study was necessary because the current safety limits protect from acute injury of thermal effects, but at the time the study was planned hardly anything was known about non-thermal effects expected on mobile phone users. Moreover it was agreed that because of the widespread use of mobile phones even a small increase in cancer risk would have a serious impact on human health.

Melnick sees his evaluation of the NTP Study fully confirmed by the report of the panel convened by NIEHS and NTP to assess the results. He sums up the obviously unfounded criticism of that study, with which ICNIRP among others, try to prevent negative consequences for the mobile communication industry in eight sections and refutes it with facts and scientific arguments. Also, a scientist from the Italian Ramazzini Research Institute, whose results correspond to a great extent with the NTP Study, rejects the criticism by ICNIRP as being unfounded, and points out in this argument that ICNIRP is not a public health agency such as IARC whose experts routinely evaluate carcinogens (4). Obviously she wants to make clear that criticism by ICNIRP is idle, because it is just not qualified to make it. For ICNIRP, it would probably have been better to remain silent than to express its intellectual limitations and deceptive intentions in this manner.

Sowing doubt is ICNIRP's business

From the NTP Study it must be concluded that the safety limits established by ICNIRP are unable to guarantee the intended purpose, which is the protection of people from harmful effects of the mobile communication radiation, and that therefore time has come for IARC to adjust the classification of RF radiation from “possibly carcinogenic for humans” (Group 2B) to “probably carcinogenic to humans” (Group 2A) or even “carcinogenic to humans” (Group 1). Casting doubt on

the NTP results, which threaten the business model of the mobile communication industry, as done by ICNIRP, is betrayal of science. If any further proof that ICNIRP is a public relations organization of the mobile communication industry would have been necessary, its *Note on recent animal carcinogenesis studies* (2) quoted above has finally adduced it.

ICNIRP argues that the NTP Study has no reliable basis to revise the current safety limits for RF radiation. Since its guidelines are solely based on acute thermal effects of the radiation, believing that other effects do not exist, the argument is not without logic to them. However, the NTP Study has clearly shown that this stand is absolutely unfounded, because the RF radiation unfolds its harmful effects also within the safety limits, when the exposure time is long enough. The NTP Study, up to now certainly the most ambitious and the most convincing one, has proven this with “clear evidence” (3,5). At the same time, it has refuted the reliability of the current safety limits. As always in such cases the robot-like answer by ICNIRP is that many questions must be answered until causality can finally be acknowledged.

ICNIRP wants the perfect study. The fact that this is impossible because of the nature of biological research, can obviously not be imparted to its members. So they show either incompetence in regard of their scientific qualifications or, most probably, the intention to help the mobile communication industry in a difficult situation. It looks as if ICNIRP is once again used by this industry to enforce its interests, and this time with a method copied from the tobacco industry. By sowing doubt for decades, the tobacco industry succeeded in keeping people unsure about the already certain fact that smoking causes lung cancer. Now the mobile communication industry uses the same tactic, and this with even more dire consequences: the addiction might be comparable, but the number of addicts is by far much higher.

(1) <https://ieeexplore.ieee.org/document/8425056/>

(2) <https://www.icnirp.org/cms/upload/publications/ICNIRPnote2018.pdf>

(3) <https://doi.org/10.1016/j.envres.2018.09.010>

(4) <https://www.ramazzini.org/comunicato/onde-elettromagnetiche-listituto-ramazzini-risponde-allicnirp/>

(5) http://stiftung-pandora.eu/wp-content/downloads/dariusz_ntp-studie_160902.pdf