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COMMENTS ON “ICNIRP NOTE” – 2018, Health Physics, accepted May, 2019

The RF fields in the NTP (2018a) were high enough to cause thermal effects

“The NTP (2018a and b) studies were not designed to mimic RF EMF {radio frequency electromagnetic fields} levels that people in the community might be exposed to. But rather exposure levels were chosen to be as high as possible without causing gross thermal damage.

..neither study {NTP(2018a and b) and Falcioni et al.} is able to comment on whether, if effects were found, they would have been due to thermal or non-thermal mechanisms.”
(Unless stated otherwise, all quotations herein are from the ICNIRP Note.)

In fact, *the NTP (2018a) study resulted in exposures that ranged from 625% to 5000% of the maximum recommended time-averaged WBA SAR prescribed in IEEE standard C95.1-2005.* (From a discussion by R. Kavet and R. A. Tell, June 9, 2016)

Thus, RF exposures in the NTP (2018a) study are far from being “*non-thermal*” in nature and also are of such an intensity that they “...are thus not directly relevant to those encountered in the community”.

The incidence of schwannomas in the study was low enough to be caused by chance

“Malignant cardiac schwannomas are extremely rare tumors in humans...”

The lifetime incidence of malignant cardiac schwannomas in humans is 0.001%.

As John P. A. Ioannidis of Tufts University School of Medicine states in “**Why Most Published Research Findings Are False**,” “The smaller the effect sizes in a scientific field, the less likely the research findings are to be true... if the true effect sizes are very small in a scientific field, this field is likely to be plagued by almost ubiquitous false positive claims.”

The reported effects in the study were far from robust

“The magnitude of the reported effects is very small.... the control group exhibited lower malignant cardiac schwannomas than has been reported historically (NTP 2018a) and [given that] an increase of only 1 schwannoma in the control group would have importantly affected the *p* values.” Thus, if the control group had fewer schwannomas than normal and the exposed group had a number of schwannomas in the normal range, it is difficult to claim an effect.

There was a good chance of bias in the pathology assessment

“...the first steps of the pathology review are done by an open, or non-blinded, evaluation by the pathologists involved...This does not follow best-practice data analysis procedures and gives substantial potential for biases in the original pathology assessment to affect the study outcomes.”

The control group rats did not live long enough to develop schwannomas

“An important confounder in the NTP study was that survival was lower and mortality faster in the male rat controls than in the exposed groups. ...there remains a strong possibility that the decrease in survival resulted in underrepresentation of late-developing tumors in the controls that importantly affected the statistical results.” In other words, had the controls lived as long as the exposed, and had there had been one single additional schwannoma in the control group, there would have been no positive result.

The longer survival of the exposed groups in comparison to the control groups has been seen historically in some animal studies. Following the NTP 2018a study findings to a logical conclusion could suggest that RF exposure is good for male rats.

With no defined objective a study can get random results

“...no primary end points were described as a priori end hypothesis. ...A large number of statistical comparisons were conducted in each study without controlling for multiple comparisons...It is therefore not possible to determine whether any of the results are due to RF- EMF exposure, as opposed to chance.” By way of underlining the problems implied here, Ioannides has observed: “The greater the number and the lesser the selection of tested relationships in a scientific field, the less likely the research findings are to be true. ... the post- study probability that a finding is true depends a lot on the pre study odds.”

In 2000 Peter C. Austin, a medical statistician at the University of Toronto conducted a study of all 10,674,945 residents of Ontario aged between 18 and 100. They were classified according to astrological signs. Leos had a higher probability of gastrointestinal hemorrhage while Sagittarians had a higher probability of fracture of the upper arm compared to all other signs combined. It is thus relatively easy to generate statistically significant but spurious correlations when examining a large number of potential variables.

The results of the studies discussed are not consistent with the weight of evidence

Returning to the ICNIRP Note, “...the focus of the NTP approach is, for public health reasons, to try to identify potential harmful agents even if this results in false positives[.]”

Further, “...their [(NTP(2018a) and Falcioni et al. (2018)] results are not consistent with each other, nor with the NTP(2018b) mouse or female rat results, nor with the RF cancer literature generally.”

As stated in Joe Elder’s Review of 44 Animal Studies:

The scientific weight of evidence in 44 cancer studies in laboratory animals shows no adverse effect of RF exposure up to two years in duration at dose rates up to 10 times the occupational limit (0.4 W/kg) on a) survival, b) body mass, an indicator of general health status, and c) carcinogenic processes (initiation, promotion, and co-promotion). ...the results offer a strong challenge to studies reporting potential health effects from RF exposure in vitro.

Again, as concluded In **Experimental Studies on Carcinogenicity of Radiofrequency Radiation in Animals** by Juutilainen et al.: "...the results of these studies are rather consistent and indicate no carcinogenic effects at exposure levels relevant to human exposure from mobile phones. This finding is consistent with the results of the majority of epidemiological studies on mobile users, and suggests that RF field exposure below the present guidelines is not likely to cause cancer."

CONCLUSION

As the ICNIRP Note concludes: "The NTP's outlying finding is further complicated by important methodological limitations including the effect of the greater life spans of the exposed rats on the statistical analysis, lack of blinding in the pathological analyses, and a failure to account sufficiently for chance in the statistical analyses. Collectively these two studies' limitations preclude drawing conclusions about carcinogenicity in relation to RF EMFs."

In summary, based on the ICNIRP critical evaluation of the NTP(2018a and b) and Falcioni et al. studies, the following conclusions can be drawn -

1. The lifetime incidence of malignant cardiac schwannomas is very low (0.001%)
2. The study's results were weak, and the NTP(2018a and b) and Falcioni et al. studies were not consistent with each other.
3. The intensities of the RF fields to which the rats were exposed in NTP study where schwannomas were observed were in the thermal effects range.
4. There was substantial potential for bias in the original pathology assessment.
5. The small effect size is likely to yield false positive claims.
6. The large number of total experimental result comparisons versus the selected (schwannomas) comparisons leads to the likelihood of a chance result.
7. The results of these weak studies are inconsistent with the weight of evidence of the RF cancer literature generally.

Finally, it must be re-stated, that the evidence of the NTP(2018a and b) and Falcioni et al. studies, taken together, cannot be counted upon as a basis for determining the carcinogenicity of mobile telephone radio frequency electromagnetic fields, as is shown above in the critical evaluation by ICNIRP, an expert group with vast experience evaluating the health effects research on radio frequency electromagnetic fields.

Respectfully Submitted,
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