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**Environmental Working Group Comments for the National Toxicology Program regarding the Report on the Peer Review of the Draft NTP Technical Reports on Radio Frequency Radiation Exposure to Rats (900 MHz) in TR-595 and Mice (1900 MHz) in TR-596**

**Submitted for the NTP Board of Scientific Counselors meeting, June 20, 2018**

**June 12, 2018**

The widescale use of wireless technologies in the home and in the workplace, and the potential impact of this technology on public health are of particular interest for Environmental Working Group (EWG). The research completed by the NTP demonstrated a clear evidence of health harm from exposure to cellphone radiation in laboratory animals. This research highlights the importance of careful consideration and detailed study of health risks of emerging technologies, and the need for a health protective approach towards the rollout and implementation of radiofrequency (RF) technologies.

EWG is a nonprofit public health research and advocacy organization headquartered in Washington, D.C. Since 2009, EWG has been analyzing the research on human health effects from cellphone RF radiation, and has been providing educational materials and information about these health effects to the public, elected officials, state and federal government agencies, and the media. In addition to our experience with cellphone research and regulation in the United States, EWG also has a detailed knowledge of regulatory approaches and recommendations on RF radiation made by government agencies in other countries.

The National Toxicology Program external peer review panel assessed both the study design and scientific interpretation of the study results, and recommended that NTP strengthen the language used to describe the association between RF exposure and numerous findings, including heart cancers in male and female rats. The external reviews also confirmed that the overall body of science around RF radiation raises justifiable concerns about the potential human health implications.

In the interest of public health, these studies should have been done before nearly all Americans, including children, started using RF-based technologies everyday for hours. While the findings are based on second-generation wireless technology, the results provide compelling evidence that third, fourth or even fifth generation cellphone transmission systems may cause health harms. NTP noted that additional studies have the potential to expand to newer technologies and we urge NTP to use 5G modulated cellphone RF radiation for future studies to provide the most relevant public results at completion.

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EWG comments below highlight four important aspects of the NTP peer review:

**(1) The peer reviewers fully agreed with the NTP study design and found that the data show clear evidence of RF carcinogenic activity.**

It is encouraging that the NTP study design received strong praise, as nearly two decades have passed since the FDA nominated cellphone exposure for study. The peer review panels confirmed that the RF exposure setup for the laboratory animals was methodologically robust and adequate, and that the RF radiation increased the incidence of cancerous lesions in the exposed animals. The external panel deemed the evidence clear in causing carcinogenic activity in the heart tissue of male rats. Additionally, the reviewers confirmed increases in adverse health effects in tissues throughout the bodies of both rats and mice. These studies are the most thorough to date on the impacts of cellphone radiation and indicate that health impacts cannot be ignored.

**(2) Public comments provided near universal support of the findings.**

In addition to the unanimous praise from the external peer review panel, the public commenters supported the NTP study methodology and findings. While any toxicology study deserves additional follow-up investigations, it is notable that among the public comments, not a single one questioned the evidence of carcinogenic activity of RF radiation observed in the NTP study.

**(3) Pooling data across three exposure doses may offer additional insights into the biological effects of RF radiation.**

During the panel review, panel participants and external experts gave serious consideration to the scientific possibility that the biological responses to RF radiation exposure may be nonlinear. It is striking that a large portion of the reported findings were equivocal evidence of biological activity across different organs. EWG urges the NTP reviewers and the NTP program scientists to conduct an analysis of the study data pooling the biological outcomes across the three exposure doses. In EWG's assessment, the overall body of scientific data on RF radiation effects on biological organisms suggests that biological effects may be observed at SAR exposure levels below the lowest dose tested by the NTP (which was 1.5 W/kg in rats and 2.5 W/kg in mice). EWG finds that significant adverse effects were observed at these lowest doses tested, suggesting that the lowest dose tested is not the "LOAEL" or Lowest Observed Adverse Effect Level dose, but rather a dose at which the effects may be approaching a plateau.



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In our assessment, this limitation of the study design that did not include a true LOAEL or NOAEL (No Observed Adverse Effect Level) does not constitute a critique of the NTP work. To the contrary, EWG applauds the NTP for having conducted the world's most rigorous laboratory animal study of RF radiation. The absence of the true LOAEL and NOAEL in the study points to the possibility that a statistical analysis of pooled exposure doses (1.5, 3 and 6 W/kg for rats and 2.5, 5, and 10 W/kg for mice) would provide a deeper understanding of the overall significance of the observed lesions and other health effects in exposed animals.

**(4) EWG supports the NTP research on RF exposures.**

The NTP research is critical for addressing the gaps in our scientific understanding of the biological impacts of cellphone radiation. Much more research needs to be accomplished to understand how RF exposure impacts people, particularly children. EWG staff use wireless technology devices in our daily lives and we recognize that the usage of this technology will most likely continue to increase. In the absence of protective federal regulations based on health effects, EWG will continue to advise that consumers take simple precautions such as using a headset for themselves and their children to reduce exposure. EWG also anticipates that the results of the NTP study will be helpful in guiding the design of safer technology alternatives that would benefit our entire society.

Presented on behalf of the Environmental Working Group,

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