

Comments on the National Toxicology Program Study on Cell Phone Radiation and Cancer

Toxicology Comments on Peer Review of NTP/RF Bioassay

Devra Davis PhD MPH

President, Environmental Health Trust

Visiting Professor Hebrew University, Hadassah Medical Center

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Overview of Comments on Exposure System (1)

- This is a positive study well-executed under difficult conditions
- Exposure system of NTP/IT'IS
 - State of the art system with controlled exposures
 - Delete historical controls & only use controls in this study
 - P 29 .08 W/kgm over whole body with 1.6 W/kgm for 6 minutes, excepting 20w/Kgm averaged over 10 grams for the ears, hands, wrists, feet, ankles.

N.B. as NTP, 2018 draft notes: Base station antennas on rooftops and lamp poles 'can exceed FCC guideline's (p. 27)

EHT adds: Cannot approximate simultaneously operating multiple antennas and devices, including cell and cordless phones, base stations/in & out of home, baby monitors, baby iPhone teething rattle cases and other wireless transmitting devices (see device)

Overview of Comments on Exposure System (2)

- Occupational guidelines not enforced or monitored
- FCC website: In 1971, OSHA issued a protection guide for exposure of workers to RF radiation [29 CFR 1910.97]. However, this guide was later ruled to be only advisory and not mandatory. ...At the present time, OSHA uses the IEEE and/or FCC exposure guidelines for enforcement purposes under OSHA's general duty clause (for more information see: www.osha.gov/SLTC/radiofrequencyradiation/).
- Cannot approximate exposures to newer systems such as 5G and combined exposures from simultaneously operating antennas and devices, i.e., cordless&cell phones, iPads, white boards, projectors, and PCs
- Value of whole body approach
 - French 'Phonegate' study of radiation confirms the NTP exposures = below normal use exposures Marc Arazi MD confirms that U.S. phones emit equivalent to ~20 Watts/Kgm for 6 minutes
 - Ramazzini 2018 tested environmental levels, i.e., base-station antenna emissions that are 60 to 6,000 lower than NTP

Report of final results regarding brain and heart tumors in Sprague-Dawley rats exposed from prenatal life until natural death to mobile phone radiofrequency field representative of a 1.8 GHz GSM base station environmental emission

L. Falcioni, L. Bua, E. Tibaldi, M. Lauriola, L. De Angelis, F. Gnudi, D. Mandrioli, M. Manservigi, F. Manservigi, I. Manzoli, I. Menghetti, R. Montella, S. Panzacchi, D. Sgargi, V. Strollo, A. Vornoli, F. Belpoggi*

Cesare Maltoni Cancer Research Center, Ramazzini Institute, Castello di Bentivoglio, via Saliceto 3, Bentivoglio, 40010 Bologna, Italy

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ABSTRACT

Background: In 2011, IARC classified radiofrequency radiation (RFR) as possible human carcinogen (Group 2B). According to IARC, animals studies, as well as epidemiological ones, showed limited evidence of carcinogenicity. In 2016, the NTP published the first results of its long-term bioassays on near field RFR, reporting increased incidence of malignant glial tumors of the brain and heart Schwannoma in rats exposed to GSM – and CDMA – modulated cell phone RFR. The tumors observed in the NTP study are of the type similar to the ones observed in some epidemiological studies of cell phone users.

Objectives: The Ramazzini Institute (RI) performed a life-span carcinogenic study on Sprague-Dawley rats to evaluate the carcinogenic effects of RFR in the situation of far field, reproducing the environmental exposure to RFR generated by 1.8 GHz GSM antenna of the radio base stations of mobile phone. This is the largest long-term study ever performed in rats on the health effects of RFR, including 2448 animals. In this article, we reported the final results regarding brain and heart tumors.

Methods: Male and female Sprague-Dawley rats were exposed from prenatal life until natural death to a 1.8 GHz GSM far field of 0, 5, 25, 50 V/m with a whole-body exposure for 19 h/day.

Results: A statistically significant increase in the incidence of heart Schwannomas was observed in treated male rats at the highest dose (50 V/m). Furthermore, an increase in the incidence of heart Schwann cells hyperplasia was observed in treated male and female rats at the highest dose (50 V/m), although this was not statistically significant. An increase in the incidence of malignant glial tumors was observed in treated female rats at the highest dose (50 V/m), although not statistically significant.

Conclusions: The RI findings on far field exposure to RFR are consistent with and reinforce the results of the NTP study on near field exposure, as both reported an increase in the incidence of tumors of the brain and heart in RFR-exposed Sprague-Dawley rats. These tumors are of the same histotype of those observed in some epidemiological studies on cell phone users. These experimental studies provide sufficient evidence to call for the re-evaluation of IARC conclusions regarding the carcinogenic potential of RFR in humans.

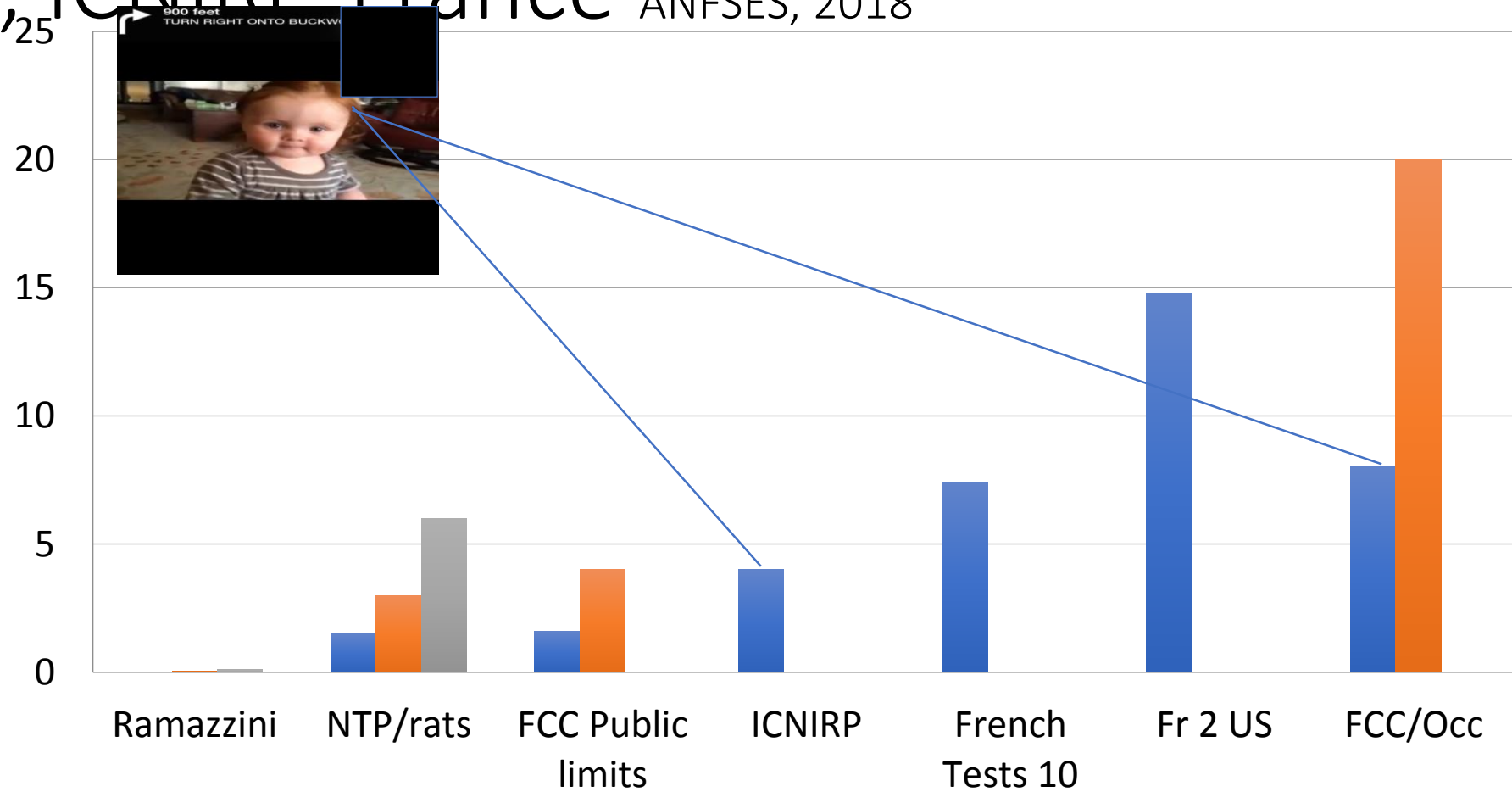
From Falcioni et al, Environmental Research, online, 2018

Table 2
Long-term bioassay on 1.8 GHz base station RFR, administered at various doses to male (M) and female (F) Sprague-Dawley rats (Experiment BT 1CEMRF): results on pre-neoplastic and neoplastic lesions of the heart.

Group	Dose	Animals		Hyperplasia		Endocardial		Intramural		Total	
No.	GSM-RFR			Schwann cells		Schwannoma		Schwannoma		Schwannoma	
	1.8 GHz (V/m)	Sex	No.	No.	%	No.	%	No.	%	No.	%
I	0 (control)	M	412	3	0.7	0	0.0	0	0.0	0	0.0
		F	405	2	0.5	0	0.0	4	1.0	4	1.0
		M + F	817	5	0.6	0	0.0	4	0.5	4	0.5
II	5	M	401	2	0.5	2	0.5	1	0.2	3	0.7
		F	410	0	0.0	2	0.5	7	1.7	9	2.2
		M + F	811	2	0.2	4	0.5	8	1.0	12	1.5
III	25	M	209	1	0.5	1	0.5	0	0.0	1	0.5
		F	202	0	0.0	0	0.0	1	0.5	1	0.5
		M + F	411	1	0.2	1	0.2	1	0.2	2	0.5
IV	50	M	207	5	2.4	2	1.0	1	0.5	3	1.4*
		F	202	2	1.0	1	0.5	1	0.5	2	1.0
		M + F	409	7	1.7	3	0.7	2	0.5	5	1.2

* Statistically significant $p \leq .05$ using Fisher exact test.

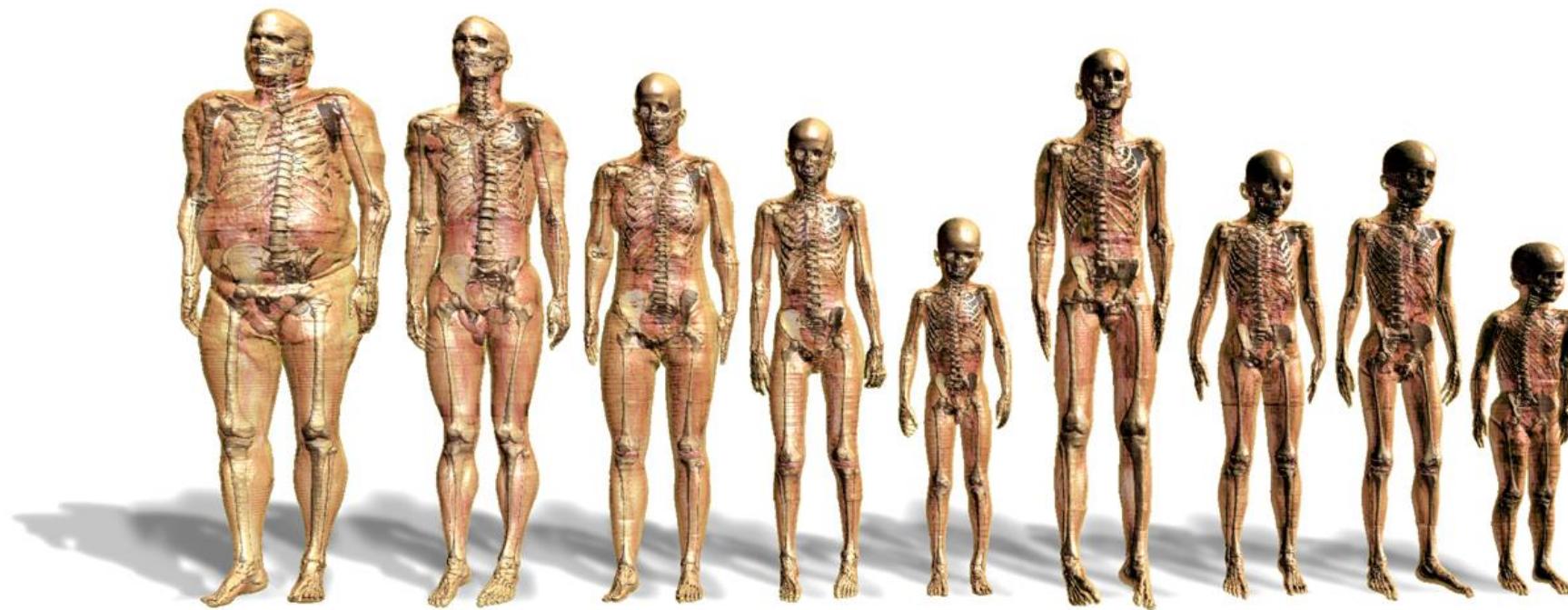
SAR Levels from Ramazzini, 2018, U.S. 1996 FCC, U.S. OSHA, ICNIRP France ANFSES, 2018



European 2.0 W/Kgm for 10 gram volume

U.S./Canada 1.6 W/Kgm for 1 gram volume

4.0 W/kgm for 10 gram volume for ear & extremities



The Virtual Population: from left to right: Fats (male, 37 years, 1.82 m, 120 kg), Duke (male, 34 years, 1.77 m, 72 kg), Ella (female, 26 years, 1.63 m, 59 kg), Billie (female, 11 years, 1.47 m, 35 kg), Thelonious (male, 6 years, 1.17 m, 19 kg), Louis (male, 14 years, 1.69 m, 50 kg), Eartha (female, 8 years, 1.36 m, 31 kg), Dizzie (male, 8 years, 1.40 m, 26 kg), Roberta (female, 5 years, 1.09 m, 18 kg)

From IT'IS, 2016



Pregnant models (3rd, 7th and 9th gestational month) based on the Ella model of the Virtual Population. (From IT'IS, 2016, and EHT, Fernandez et al, in preparation)