

**National Toxicology Program (NTP) Cell Phone Radiation 2-Year Study**

**Evaluation of Carcinogenicity of Cell Phone Radiation:  
NTP Draft Technical Reports (TR 595, TR 596) vs. Expert Panel Vote**

Joel M. Moskowitz, PhD, School of Public Health, UC Berkeley, March 30, 2018

[Electromagnetic Radiation Safety](#)

				Evidence of Carcinogenicity	
Animal	Sex	Cell Phone Modulation	Tumor Location and/or Type	NTP Draft Report	Expert Panel (vote)
Rat	Male	GSM	Heart: Schwannoma	some evidence	<b>clear evidence</b> (8-3)
Rat	Male	CDMA	Heart: Schwannoma	some evidence	<b>clear evidence</b> (8-3)
Rat	Male	GSM	Brain: Glioma	equivocal	<b>some evidence</b> (7-4)
Rat	Male	CDMA	Brain: Glioma	equivocal	<b>some evidence</b> (6-4-1)
Rat	Male	GSM	Brain: Granular Cell	equivocal	equivocal (11-0)
Rat	Male	GSM	Prostate gland	equivocal	equivocal (11-0)
Rat	Male	GSM	Pituitary gland	equivocal	equivocal (10-1)
Rat	Male	CDMA	Pituitary gland	equivocal	equivocal (11-0)
Rat	Male	GSM	Adrenal gland	equivocal	<b>some evidence</b> (6-4-1)
Rat	Male	GSM	Pancreas	equivocal	equivocal (11-0)
Rat	Male	CDMA	Liver	equivocal	equivocal (11-0)
Rat	Female	GSM	Heart: Schwannoma	no evidence	<b>equivocal</b> (9-2)
Rat	Female	CDMA	Heart: Schwannoma	no evidence	<b>equivocal</b> (9-2)
Rat	Female	CDMA	Brain: Glioma	equivocal	equivocal (8-3*) (4 voted earlier for "some evidence")
Rat	Female	CDMA	Adrenal gland	equivocal	equivocal (10-0-1)
Mouse	Male	GSM	Skin	equivocal	equivocal (8-3)
Mouse	Male	GSM	Lung	equivocal	equivocal (11-0)
Mouse	Male	CDMA	Liver	equivocal	equivocal (10-1)
Mouse	Female	GSM	Lymphoma	equivocal	equivocal (9-2)
Mouse	Female	CDMA	Lymphoma	equivocal	equivocal (11-0)

In addition to the results tabled above for neoplastic lesions, the expert panel voted unanimously (11-0) that GSM and CDMA exposures increased **nonneoplastic lesions** in the heart, brain, and prostate gland of male rats. In female rats, GSM exposure increased nonneoplastic lesions in the heart, thyroid gland, and adrenal gland, and CDMA exposure increased nonneoplastic lesions in the brain.

This summary is based upon NTP's official summary of actions:

[https://ntp.niehs.nih.gov/ntp/about\\_ntp/trpanel/2018/march/actions20180328\\_508.pdf](https://ntp.niehs.nih.gov/ntp/about_ntp/trpanel/2018/march/actions20180328_508.pdf)

### **Definition of Carcinogenicity Results (from [NTP web site](#))**

The National Toxicology Program describes the results of individual experiments on a chemical agent and notes the strength of the evidence for conclusions regarding each study. Negative results, in which the study animals do not have a greater incidence of neoplasia than control animals, do not necessarily mean that a chemical is not a carcinogen, inasmuch as the experiments are conducted under a limited set of conditions. Positive results demonstrate that a chemical is carcinogenic for laboratory animals under the conditions of the study and indicate that exposure to the chemical has the potential for hazard to humans. Other organizations, such as the International Agency for Research on Cancer, assign a strength of evidence for conclusions based on an examination of all available evidence, including animal studies such as those conducted by the NTP, epidemiologic studies, and estimates of exposure. Thus, the actual determination of risk to humans from chemicals found to be carcinogenic in laboratory animals requires a wider analysis that extends beyond the purview of these studies.

Five categories of evidence of carcinogenic activity are used in the Technical Report series to summarize the strength of evidence observed in each experiment: two categories for positive results (clear evidence and some evidence); one category for uncertain findings (equivocal evidence); one category for no observable effects (no evidence); and one category for experiments that cannot be evaluated because of major flaws (inadequate study). For each separate experiment (male rats, female rats, male mice, female mice), one of the following five categories is selected to describe the findings. These categories refer to the strength of the experimental evidence and not to potency or mechanism.

**Clear Evidence of Carcinogenic Activity** is demonstrated by studies that are interpreted as showing a dose-related (i) increase of malignant neoplasms, (ii) increase of a combination of malignant and benign neoplasms, or (iii) marked increase of benign neoplasms if there is an indication from this or other studies of the ability of such tumors to progress to malignancy.

**Some Evidence of Carcinogenic Activity** is demonstrated by studies that are interpreted as showing a chemical-related increased incidence of neoplasms (malignant, benign, or combined) in which the strength of the response is less than that required for clear evidence.

**Equivocal Evidence of Carcinogenic Activity** is demonstrated by studies that are interpreted as showing a marginal increase of neoplasms that may be chemically related.

**No Evidence of Carcinogenic Activity** is demonstrated by studies that are interpreted as showing no chemical-related increases in malignant or benign neoplasms.

Note: Although the definitions typically are applied to chemical agents, NTP also uses them with physical agents like cell phone radiation.