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Office of the Provincial Health Officer  
Ministry of Health  
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Dear British Columbia Provincial Health Officer

I am responding to the 3 supposed limitations in the NTP carcinogenicity study of cell phone radiofrequency radiation (RFR) you received from the provincial health office. I hope my responses are helpful to you.

***1) Lifespan of control male rats was less than that of exposed male rats making interpretation of the data difficult:***

This criticism lacks support for a couple of reasons. First, there was no statistical difference in survival between control male rats and the exposed group of male rats with the highest incidence of gliomas and heart schwannomas. At week- 93 of the 2-year study, survival was exactly the same in that exposure group and in control male rats. Second, no glial cell hyperplasias (potential pre-cancerous lesions in the brain) or heart schwannomas were observed in any control rat, even though glial cell hyperplasia was detected as early as week 58 and heart schwannomas were detected as early as week 70 in exposed rats. Thus, survival was sufficient to detect tumors or pre-cancerous lesions in control male rats.

***2) NTP studies typically demonstrate gliomas in approximately 2% in non-exposed male rats:***

This comment implies that the incidence of cancers in exposed groups is the same as in historical controls (i.e., cancer rates in control animals from previous studies). Comparisons between the concurrent control group and the exposure groups of experimental studies are the most valid for identifying chemical induced effects, though comparisons with historical control data may also be helpful in interpreting treatment-related effects. However, for meaningful comparisons, the conditions of the current study must be similar to those in the historical database; many factors can affect the historical tumor rate including strain of animal, route of exposure, animal housing condition, diet, etc. The NTP study on RFR was unique in that no other chronic study housed rats in individual cages (including controls) in reverberation chambers and only one other NTP study (but in a different strain of rats) was conducted in the laboratory where the RFR studies were performed. The reverberation chambers used in the NTP study were fully

shielded from external electromagnetic fields. No data are available to evaluate the impact of these unique circumstances on tumor rates in control animals.

**3) Whole body RFR exposure levels used in the NTP study (1.5, 3, and 6 W/kg) are considerably higher than Health Canada's Safety limit of 0.08 W/kg:**

While the exposure limit to RFR is 0.08 W/kg averaged over the whole body, the localized exposure limit is 1.6 W/kg averaged over any one gram of tissue. Body tissues located nearest to the cell phone antenna receive much higher exposures than tissues located distant from the antenna. Thus, when an individual uses a cell phone and holds it next to his or her head, exposure to the brain will be much higher than exposures averaged over the whole body. When considering organ-specific risk (e.g., risk to the brain) from cell phones, the important measure of exposure is the 1.6 W/kg value. Individual manufacturers provide values for their cell phone emissions. While some cell phones emit lower radiation levels, other phones emit radiation that can produce local doses near or above 1.5 W/kg. In the NTP study in which animals were exposed to 1.5, 3, and 6.0 W/kg RFR, exposures in the brain were within 10% of the whole body exposure levels. Therefore, with respect to exposures of RFR to the brain, exposures in rats were similar to or slightly higher than human exposures from cell phones held next to the head.

The findings of brain tumors (gliomas) and malignant Schwann cell tumors of the heart in the NTP study, as well as DNA damage in brain cells of exposed animals, present a major public health concern because these tumors occurred in the same types of cells that had been reported to develop into tumors (gliomas and acoustic neuromas) in epidemiological studies of adult cell phone users.

Respectfully yours,

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