# O.H.S.U. Doctor's Letter: "The Radiation Safety of 5G Wi-Fi: Reassuring or Russian Roulette?"

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**"The Radiation Safety of 5G Wi-Fi: Reassuring or Russian Roulette?"**

**To the Editor**: The impending rollout of fifth-generation (5G) Wi-Fi in mobile phones, augmenting the current fourth-generation (4G) technology toward making global interconnectivity between devices a reality, has been touted as a significant improvement of speed compared to current and previous wireless signaling (1). Less well explored are the potential consequences associated with this need for speed: namely, the substantial increase in biologic exposure to radiofrequency electromagnetic fields from the 1900- 2100 MHz associated with 4G to the 3500 MHz estimated median bandwidth of 5G (2).

While studies of human lymphocytes have indicated no impact of short-term (30-minute) 900 MHz exposure on DNA integrity, animal studies have demonstrated that long-term exposure to 900-1800 MHz via second-generation mobile phone radiation (48 min/d for 30-180 days) induces hippocampal damage. In fact, a recent investigation of human neuroblastoma cells revealed **enhanced susceptibility to oxidative stress even after 1800 MHz exposure for only 10 minutes**, with concomitantly increasing reactive oxygen species levels at 30- and 60-minute exposures (3-5). Due to safety concerns of the doubling of dosage from these levels associated with 5G adoption, a worldwide consortium of physicians and scientists from more than 35 countries has recommended a moratorium on 5G rollout pending further safety investigation (1).

What is the role of the medical community (particularly radiation oncology) in this arena? **Are we to remain silent while focusing only on optimizing care of our immediate patients, or do we have a responsibility to utilize our clin-ical knowledge of radiation safety and efficacy to aid in preventing corporate profit from being the primary determinant of acceptable radiation exposure from wireless networks?**

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1. Hertsgaard M, Dowie M. How big wireless made us think that cell phones are safe: A special investigation. Available at: https://www .thenation.com/article/how-big-wireless-made-us-think-that-cell-phones -are-safe-a-special-investigation/. Accessed April 2, 2018.

2. GSMA. Considerations for the 3.5 GHz IMT range: getting ready for use. May 2017. Available at: https://www.gsma.com/spectrum/wp-content/uploads/2017/06/Considerations-for-the-3.5-GHz-IMT-range-v2.pdf. Accessed April 2, 2018.

3. Danese E, Lippi G, Buonocore R, et al. Mobile phone radiofrequency exposure has no efect on DNA double strand breaks (DSB) in human lymphocytes. Ann Transl Med 2017;5:272.

4. Mugunthan N, Shanmugasamy K, Anbalagan J, et al. Efects of long term exposure of 900-1800 MHz radiation emitted from 2G mobile phone on mice hippocampusea histomorphometric study. J Clin Diagn Res 2016;10:AF01-AF06.

5. Marjanovic Cermak AM, Pavicic I, Trosic I. Oxidative stress response in SH-SY5Y cells exposed to short-term 1800 MHz radiofrequency radiation. J Environ Sci Health A Tox Hazard Subst Environ Eng 2018; 53:132-138.

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