LETTER TO THE EDITOR: WINDOW THEORY IN NON-IONIZING RADIATION-INDUCED ADAPTIVE RESPONSES

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I read with great interest an article by Jin et al. “The Effect of Combined Exposure of 900 MHz Radiofrequency Fields and Doxorubicin in HL-60 Cells,” published in the Sep 2012 issue of PLOS ONE Journal (Jin et al. 2012). The authors of the article reported some interesting findings on the induction of adaptive response by pre-exposure of HL-60 Cells to radiofrequency (RF) radiations. As summarized in Table 1, the viability of the cells exposed to DOX alone was 70.2 ± 0.2 while when cells were exposed to 900 MHz RF radiation at 12 µW/cm² before treatment with DOX, the viability was 82.8 ± 2.1 (P<0.01). RF exposure at higher power densities significantly decreased the viability (60.7 ± 0.5 and 58.6 ± 0.5 for 120 µW/cm² and 1200 µW/cm², respectively). On the other hand they reported that they had previously conducted a preliminary experiment to determine the minimum power density for RF pre-exposures to minimize the damage induced by subsequent exposure to DOX. We and other investigators have previously reported that radiofrequency radiation can induce adaptive response phenomena (Haghani et al. 2012; Jiang et al. 2012; Mortazavi et al. 2011; Mortazavi et al. 2012; Sannino et al. 2009; Zeni et al. 2012). Jin’s findings as well as findings obtained in our studies (Mortazavi et al. 2012) clearly support the dose window theory that is well discussed for adaptive responses induced by ionizing radiation. As discussed by RE Mitchel, “the adaptive response in mammalian cells and mammals operates within a certain window that can be defined by upper and lower dose thresholds, typically between about 1 and 100 mGy for a single low dose rate exposure” (Mitchel 2010). On the other hand, as indicated by investigators who worked on oxidative stress or ionizing radiation-induced adaptive responses (Bose Girigoswami and Ghosh 2005; Dimova et al. 2008; Yan et al. 2006), Jin’s findings on RF pre-exposures support this theory that the induction of adaptive response requires a
minimum level of damage to trigger this phenomenon. In this light, it seems that there are similar patterns for induction of adaptive response by ionizing and non-ionizing radiations.

REFERENCES


