

# Mobile phones electromagnetic radiation and NAD<sup>+</sup>-dependent isocitrate dehydrogenase as a mitochondrial marker in asthenozoospermia

Dear Editor

With great interest, we have read the article by Hagraš et al. entitled “Mobile phones Electromagnetic radiation and NAD<sup>+</sup>-dependent Isocitrate Dehydrogenase as a mitochondrial marker in Asthenozoospermia”, published in the journal *Biochimie Open* (2016), <http://dx.doi.org/10.1016/j.biopen.2016.07.003> [1]. Hagraš et al. investigated the possible relationship between mitochondrial NAD<sup>+</sup>-IDH activity in human seminal plasma and sperm motility among asthenozoospermic cellular phone users. The authors showed that IDH activity was increased in patients with prolonged cell phone daily use  $\geq 4$  h/day. Over the past several years, our team has conducted several studies on the possible association of mobile phone use and radiofrequency electromagnetic fields (RF-EMFs) health hazards [2–14]. Although the paper authored by Hagraš et al. addresses a very challenging issue, it has some shortcomings. The first major shortcoming of this paper is due to lack of data about the basic parameters of exposure to RF-EMFs such as the specific absorption rate (SAR) of the mobile phones used by the participants or the average distance between the users' homes/workplaces and the nearest base stations (people who live in rural areas or remote locations with weak mobile phone signal strength will be exposed to higher levels of RF-EMFs because a much higher intensity of radiation is then emitted by the mobile phone to compensate the weak signal strength). SAR is the measure of the rate at which the energy of radiofrequency radiation is absorbed. SAR levels for mobile phones usually range from a minimum of about 0.20 to the maximum of 1.54 W/kg (The FCC limit for public exposure from mobile phones is 1.6 W/kg).

The second shortcoming of this study comes from this fact that the authors have not assessed whether the mobile phones were connected to the Wi-Fi network. It is worth noting that today mobile phones are much more frequently used for message exchange (texting) and surfing the Internet than for calling.

## Conflict of interests

The authors declared no conflict of interest.

## References

- [1] A.M. Hagraš, E.A. Toraih, M.S. Fawzy, Mobile phones Electromagnetic radiation and NAD<sup>+</sup>-dependent Isocitrate Dehydrogenase as a mitochondrial marker in Asthenozoospermia, *Biochim. Open* 3 (2016) 19–25.
- [2] S. Mortazavi, J. Ahmadi, M. Shariati, Prevalence of subjective poor health symptoms associated with exposure to electromagnetic fields among university students, *Bioelectromagnetics* 28 (2007) 326–330.
- [3] S. Mortazavi, M. Rouintan, S. Taeb, N. Dehghan, A. Ghaffarpanah, Z. Sadeghi, et al., Human short-term exposure to electromagnetic fields emitted by mobile phones decreases computer-assisted visual reaction time, *Acta neurol. Belg.* 112 (2012) 171–175.
- [4] M. Movvahedi, A. Tavakkoli-Golpayegani, S. Mortazavi, M. Haghani, Z. Razi, M. Shojaiie-Fard, et al., Does exposure to GSM 900 MHz mobile phone radiation affect short-term memory of elementary school students? *J. Pediatr. Neurosci.* 9 (2014) 121.
- [5] M.E. Parsanezhad, S.M.J. Mortazavi, T. D. Exposure to radiofrequency radiation emitted from mobile phone jammers adversely affects the quality of human sperm, *Int. J. Radiat. Res. (IJRR)* (2016) (in press).
- [6] F. Shekooi Shooli, S.A. Mortazavi, S. Jarideh, S. Nematollahii, F. Yousefi, M. Haghani, et al., Short-Term exposure to electromagnetic fields generated by mobile phone jammers decreases the fasting blood sugar in adult male rats, *J. Biomed. Phys. Eng.* 6 (2016) 27–32.
- [7] S.M. Mortazavi, S. Rahimi, A. Talebi, A. Soleimani, A. Rafati, Survey of the effects of exposure to 900 MHz radiofrequency radiation emitted by a gsm mobile phone on the pattern of muscle contractions in an animal model, *J. Biomed. Phys. Eng.* 5 (2015) 121–132.
- [8] M.M. Movvahedi, A. Tavakkoli-Golpayegani, S.A.R. Mortazavi, M. Haghani, Z. Razi, M.B. Shojaiie-fard, et al., Does exposure to GSM 900 MHz mobile phone radiation affect short-term memory of elementary school students? *J. Pediatr. Neurosci.* 9 (2014) 121–124.
- [9] S.A.R. Mortazavi, A. Tavakkoli-Golpayegani, M. Haghani, S.M.J. Mortazavi, Looking at the other side of the coin: the search for possible biopositive cognitive effects of the exposure to 900 MHz GSM mobile phone radiofrequency radiation, *J. Environ. Health Sci. Eng.* (2014) 12.
- [10] S.M.J. Mortazavi, M.A. Mosleh-Shirazi, A.R. Tavassoli, M. Taheri, A.R. Mehdizadeh, S.A.S. Namazi, et al., Increased radioresistance to lethal doses of gamma rays in mice and rats after exposure to microwave radiation emitted by a GSM mobile phone simulator, *Dose Response* 11 (2013) 281–292.
- [11] M. Haghani, S.M.J. Mortazavi, D. Sardari, M.A. Mosleh-Shirazi, A. Mansouri, Assessment of the role of specific absorption rate of mobile phones on the induction of microwave-induced survival adaptive responses after exposure to lethal doses of gamma radiation, *Int. J. Radiat. Res.* 11 (2013) 167–173.
- [12] S.M.J. Mortazavi, A. Mahbudi, M. Atefi, S. Bagheri, N. Bahaedini, A. Besharati, An old issue and a new look: electromagnetic hypersensitivity caused by radiations emitted by GSM mobile phones, *Technol. Health Care* 19 (2011) 435–443.

- [13] S.M.J. Mortazavi, M. Atefi, F. Kholghi, The pattern of mobile phone use and prevalence of self-reported symptoms in elementary and junior high school students in Shiraz, Iran. *Iran. J. Med. Sci.* 36 (2011) 96–103.
- [14] S.M.J. Mortazavi, A. Habib, A.H. Ganj-Karimi, R. Samimi-Doost, A. Pour-Abedi, A. Babaie, Alterations in TSH and thyroid hormones following mobile phone use, *OMJ* 24 (2009) 274–278.

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