



Radiofrequency radiation emitted from Wi-Fi (2.4 GHz) causes impaired insulin secretion and increased oxidative stress in rat pancreatic islets

Ali Masoumi^a, Narges Karbalaeei^{a,b} , S. M. J. Mortazavi^c  and Mohammad Shabani^d

^aDepartment of Physiology, Faculty of Medicine, Shiraz University of Medical Sciences, Shiraz, Iran; ^bHistomorphometry and Stereology Research Center, Shiraz University of Medical Sciences, Shiraz, Iran; ^cMedical Physics and Medical Engineering Department, Faculty of Medicine, Shiraz University of Medical Sciences, Shiraz, Iran; ^dNeuroscience Research Center, Neuropharmacology Institute, Kerman University of Medical Sciences, Kerman, Iran

ABSTRACT

Purpose: There is a great concern regarding the possible adverse effects of electromagnetic radiation (EMR). This study investigated the effects of EMR induced by Wi-Fi (2.45 GHz) on insulin secretion and antioxidant redox systems in the rat pancreas.

Materials and methods: Adult male Sprague–Dawley rats in the weight range of 230–260 g were divided into control, sham, Wi-Fi exposed groups. After long-term exposure (4 h/day for 45 days) to Wi-Fi EMR, plasma levels of glucose and insulin during intraperitoneal glucose tolerance test were measured. Islet insulin secretion and content, lipid peroxidation, and antioxidant status in pancreas of rats were determined.

Results: Our data showed that the weight gain in the Wi-Fi exposed group was significantly lower than the control group ($p < .05$). Wi-Fi (2.45 GHz)-exposed group showed hyperglycemia. Plasma insulin level and glucose-stimulated insulin secretion from pancreatic islet were significantly reduced in the Wi-Fi-exposed group. EMR emitted from Wi-Fi caused a significant increase in lipid peroxidation and a significant decrease in GSH level, SOD, and GPx activities of the pancreas.

Conclusions: These data showed that EMR of Wi-Fi leads to hyperglycemia, increased oxidative stress, and impaired insulin secretion in the rat pancreatic islets.

“Wi-Fi leads to hyperglycemia, increased oxidative stress and impaired insulin secretion”

Salah, M. B., Abdelmelek, H., & Abderraba, M. (2013). Effects of olive leave extract on metabolic disorders and oxidative stress induced by 2.45 GHz WIFI signals. *Environmental Toxicology and Pharmacology*, 36(3), 826-834.

Masoumi, A., Karbalaeei, N., Mortazavi, S., & Shabani, M. (2018). Radiofrequency radiation emitted from Wi-Fi (2.4 GHz) causes impaired insulin secretion and increased oxidative stress in rat pancreatic islets. *International Journal of Radiation Biology*, 94(9), 850-857.

Effects of olive leaf extract on metabolic disorders and oxidative stress induced by 2.45 GHz WIFI signals



Myriam Ben Salah^{a,b,*}, Hafedh Abdelmelek^a, Manef Abderraba^b

^a Faculté des Sciences de Bizerte, Laboratoire de Physiologie Intégrée, Jarzouna, Bizerte 7021, Tunisia

^b Institut Préparatoire aux Etudes Scientifiques et Techniques, Unité de Recherche Physico-Chimie-Moléculaire, La

“RF Exposure induced a diabetes like status”

Article history:

Received 28 March 2013

Received in revised form

16 July 2013

Accepted 23 July 2013

Available online 3 August 2013

Keywords:

We investigated the effect of olive leaves extract administration on glucose metabolism and oxidative response in liver and kidneys of rats exposed to radio frequency (RF). The exposure of rats to RF (2.45 GHz, 1 h/day during 21 consecutive days) induced a diabetes-like status. Moreover, RF decreased the activities of glutathione peroxidase (GPx, -33.33% and -49.40%) catalase (CAT, -43.39% and -39.62%) and the superoxide dismutase (SOD, -59.29% and -68.53%) and groups thiol amount (-62.68% and -34.85%), respectively in liver and kidneys. Indeed, exposure to RF increased the malondialdehyde (MDA, 29.69% and 51.35%) concentration respectively in liver and kidneys. Olive leaves extract administration (100 mg/kg, ip) in RF-exposed rats prevented glucose metabolism disruption and restored the activities of GPx, CAT and SOD and thiol group amount in liver and kidneys. Moreover, olive leaf extract administration was able to bring down the elevated levels of MDA in liver but not in kidneys. Our investigations suggested that RF exposure induced a diabetes-like status through alteration of oxidative response. Olive leaves extract was able to correct glucose metabolism disorder by minimizing oxidative stress induced by RF in rat tissues.

© 2013 Elsevier B.V. All rights reserved.