



## Wi-Fi adversely affects our Health

With the Freiburg Appeal, we- the undersigned physicians- went public for the first time in 2002. Based on our observations and experience as physicians, we strongly oppose the worldwide use of wireless communication technologies—irrespective of whether the applied electromagnetic fields are pulsed or not.

Over these last years, we have seen a rapid increase in the use of wireless Internet networks (WLAN or Wi-Fi) and we are very concerned about this development. These wireless hot spots can be found in many private homes, public buildings (e.g. schools, libraries, hospitals, hotels, airports, train stations), at Internet cafés, and in public places of big cities. International passenger trains are equipped with Wi-Fi. Companies can allow other companies or home offices to connect to their network.

In Germany, wireless networks operate at a frequency of about 2450 MHz; frequencies between 5000 and 6000 MHz can also be used. In standby, when no data are transmitted, the beacon signal is switched on and off at a frequency of 10 Hz. This frequency falls within the brain's alpha wave activity. The outdoor range is up to 200 meters; though with some attenuation, walls let the radiation pass. The actual exposure level of a given place depends on various factors, including the distribution of so-called access points (transmitters), the characteristics of the indoor space (e.g. reflexions, shielding effects of building components), and the distance to other laptop users.

Alarming levels of radiation have been measured in the vicinity of Wi-Fi routers, Wi-Fi access points, and Wi-Fi-enabled laptops: for instance at 2-m distance, up to 3,000  $\mu\text{W}/\text{m}^2$  were reported by W. MAES<sup>1</sup>; in 2010 the ECOLOG INSTITUTE<sup>2</sup> reported, at 0.2 m from a Wi-Fi router 8.8 V/m = 205,000  $\mu\text{W}/\text{m}^2$ , from a Wi-Fi access point 7.5 V/m = 149,000  $\mu\text{W}/\text{m}^2$ ; the IMST STUDY<sup>3</sup> measured 27,000  $\mu\text{W}/\text{m}^2$  at 0.5-m distance from a laptop. According to the Building Biology Evaluation Guidelines<sup>4</sup>, these levels (above 1,000  $\mu\text{W}/\text{m}^2$ ) are classified as an "extreme concern." Due to the multitude of users (e.g. 20 students in a classroom), the exposure levels are even higher.

It is very concerning that people normally place the laptop on their laps while using the mobile Internet in public places and on public transport. This may lead to defects in the reproductive organs. You should also take into account that strong magnetic fields may occur at the keyboard and at the touchpad- irrespective of whether you use a cable connection, or not. That exposure can easily be reduced by using an external keyboard or an external mouse when at home.<sup>5</sup>

Wi-Fi radiation seems to be perceived as particularly stressful. Not only electrohypersensitive people say so, but also healthy people report their discomfort in the presence of Wi-Fi radiation.

They complain of numerous symptoms and health problems, especially headaches, heart rhythm irregularities, difficulties concentrating, nausea and dizziness, tiredness. Even spontaneous muscle twitching, asthenia, and other symptoms can occur, according to the individual condition.

## Studies on animals/animal cells

**Atasoy, H.I.** et al. (2012) found alterations at the testes of growing rats (DNA defects and changes of the enzymes)<sup>6</sup>

**Ballardin, M.** et al. (2011): The object studied were cells of the Chinese hamster. Under the influence of short-term continuous 2.45 GHz radiation cultures of V-79-fibroblast cells were analysed. Result: malfunction of the mitosis and rise of the rate of apoptosis.<sup>7</sup>

**Chaturverdi, C.M.** et al. (2011): Mice were exposed to unpulsed 2.45 GHz radiation for 2 hours daily over a period of 30 days. Results: increased blood counts [red and white cells], increase in DNA-single strand breaks of brain cells, disturbances of the spatial memory and the circadian regulation (without exposure the activity is the highest in the dark period).<sup>8</sup>

**Jorge-Mora, T.** et al. (2011): Study on rats: The production of the c-Fos protein, part of a transcription factor, in a hypothalamus nucleus increases under the influence of continuous 2.45 GHz exposure.<sup>9</sup>

**Sinha, R.K.** (2008) found changes of the thyroid hormones and of the behaviour of male rats exposed to modulated 2.45 GHz microwaves (hyperactivity and aggressiveness).<sup>10</sup>

## Studies on humans/human cells

**Avendano, C.** et al. (2010) in vitro study: Sperm defects were found when a WiFi-enabled laptop was placed at a distance of 3 cm from a petri dish containing a sperm suspension. This suggests that human sperms will be damaged when males place a laptop on their thighs.<sup>11</sup>

**Grigoriev, Y.** (2011): General statement about the effects of wireless communication devices on children: In a study of children between the ages 7 and 12, it was observed that over a 4-year period the quality of important markers of their brain performance increasingly declined.<sup>12</sup>

**Havas, M.:** unpublished study from 2010.<sup>13</sup>

**Maganioti A.E.** et al. (2010) observed that the EEG activity in young women exposed to Wi-Fi radiation was altered during a cognitive skill test.<sup>14</sup>

**Papageorgiou C.C.** et al. (2011) found that both the electrical activity and attention level in young men was reduced in the presence of Wi-Fi.<sup>15</sup>

## Warnings regarding Wi-Fi radiation have been issued for years:

**2003:** Swisscom developed a Wi-Fi device that turns off the pulsed signal of 10 Hz in standby mode. In the patent specification (published 2004), Swisscom mentions as a rationale for the patent application that the genetic material be damaged due to nonthermal effects.<sup>16</sup>

**2006:** The school district of Frankfurt am Main rejects the use of Wi-Fi in schools at the urging of the Education and Science Workers' Union.<sup>17</sup>

**2007:** The Federal Government of Germany recommends avoiding the use of Wi-Fi. <sup>18</sup>The Commission of Education and Consumer Protection of the Bavarian Parliament recommends that schools favor wired solutions over wireless ones.<sup>19</sup>

**2007:** The City of Paris turns off the newly installed Wi-Fi networks in its libraries after complaints were filed by employees.<sup>20</sup>

**2008:** The teachers' union in the UK warns against installing Wi-Fi in schools.<sup>21</sup>

**2009:** The Federal Office for Radiation Protection of Germany: "The most powerful sources of electromagnetic radiation in private homes are cell phones, DECT cordless phones, and Wi-Fi. For precautionary reasons, it is recommended that consumers use their cell phones as little as possible and prefer to use wired landlines."<sup>22</sup>

**2009:** The French City of Hérouville-St.Claire decides to remove Wi-Fi from schools; this action is based on the precautionary principle.<sup>23</sup>

**June 2012:** Yuri Grigoriev from the Russian National Committee on Nonionizing Radiation (RNCNIRP) calls the radiation given off by wireless networks, cell phones, and cell towers a danger to the health of children; the WHO and national health agencies must put regulations into place.<sup>24</sup>

Warnings about wireless networks were issued and such networks removed because complaints of people who were exposed to this radiation were acknowledged and not labeled—as is often the case when following the WHO recommendation<sup>25</sup>—as a personal psychological weakness.

There is sufficient scientific evidence by independent research that indicates harmful effects of wireless technologies.<sup>26</sup>

For precautionary reasons, we physicians urgently recommend foregoing the use of wireless applications. Though often considered harmless, PLC or dLAN is no alternative because it uses a building's wiring to transmit data. As a result, the entire home wiring with all its cables, lamps, and other appliances will emit—at lower power levels than Wi-Fi networks— RF radiation and in the near-field zone electric and magnetic fields, whose exposure occupants cannot escape.<sup>27</sup>

Children, besides sick, disabled, and old people, are at particular risk from artificial electromagnetic fields. Since their bodies and brains are still developing, especially children are susceptible to unphysiological environmental conditions. Acting out their joy of discovery and following their drive to play, children perceive these wireless electronic devices as attractive toys—completely oblivious to any risk. As parents and guardians, we have the responsibility to safeguard the children who embody our future.

We therefore recommend foregoing the use of Wi-Fi and instead choosing wired solutions, certainly at home as well as at schools and preschools; in short, in all places where children spend extended periods of time.

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