

# Does the Use of Cell Phones Cause Brain Tumors?

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**Myth:** Cell phones and other similar technology increase the risk of brain tumors.

**Answer:** Lawsuits and news headlines have fueled the myth that cell phones cause cancer, particularly brain cancer. According to a survey by Gansler (2008), about 30% of Americans believe the myth.

Cell phones are clearly visible in society. Statistics show that 79% of the U.S. population and 90% of European and Asian teens own a cell phone (Infoplease, 2008; Janssens, 2005). Cell phones are convenient and can be used at almost any location. New technology such as cameras, computer data storage with downloads, and wake-up calling have led to increased use (Janssens).

A cell phone works like a radio, with both the portable phone and the ground antennae emitting nonionizing electromagnetic radiation in radiofrequency zone from 824–924 megahertz (MHz). Digital phones use frequencies up to 1,900 MHz. In comparison, the average household microwave uses 450 MHz of electromagnetic radiation (Janssens, 2005).

The primary concern of cell phone use has been the risk of cancer to exposed tissues close to the phone. Meninges, brain, parotid gland, and acoustic nerves all are exposed to nonionizing electromagnetic radiation (Auvinen, Tovio, & Tokola, 2006; Hardell et al., 2002).

Janssens (2005) questioned whether radiowaves or electromagnetic radiation in general cause biologic responses with detrimental effects on normal health. The evidence is complex and has to consider the biologic target as well as the length of

the wave, spectrum absorption rate, and density. The human body can tolerate an electromagnetic field up to 5 milliigauss. An electromagnetic field greater than 5 milliigauss can damage the body and cell constituents; ionizing gamma irradiation destroys DNA and large molecules. Electromagnetic fields are invisible lines of force that surround any electrical device, including power lines (National Institute of Environmental Health Sciences, 2008).

House (1999) contended that the increased use of cell phones has resulted in the installation of numerous radio transmitters to relay calls, therefore giving weight to concerns about radiofrequency radiation emissions. Klæboe, Blaasaas, and Tynes (2007) stated that radiofrequency does not have enough energy to break chemical bonds or damage DNA. For nonionizing radiation in lower frequencies, the health effect appears to be different. Living cells phenotypically adapt to environmental stimuli by metabolic alterations, including the induction of oxidates, stress, and heat shock (Janssens, 2005). Based on a study of mice exposed to radiofrequency irradiation, the calcium signal transmissions to the inner cell space were modified with exposure. Exposure was carried out using the antenna of a cell phone working at a frequency of 800 MHz in the center (Anghileri, Mayayo, Domingo, & Thouvenot, 2006).

## Worldwide Studies

According to the U.S. Food and Drug Administration (FDA, 2003), the research completed has produced conflicting results and many of the studies have suffered from flaws in their research methods.

The first large-scale epidemiology studies were conducted in the late 1990s (Auvinen et al., 2006). A study by Hardell et al. (2002) found an “increased risk of brain tumors associated with the use of analog cellular phones” (p. 380) over a 10-year period in 1,358 adults. The findings were similar to those of previous studies (Hardell, Nasam, Pahlson, Hallquist, & Mild, 1999; Hardell, Nasam, Pahlson, & Hallquist, 2000; Hardell, Mild, Pahlson, & Hallquist, 2001). Digital cell phone and cordless phone use, however, showed no significant increased risk for brain tumors overall with a five-year latency period (Hardell et al., 2002). Other studies have found no increase in brain tumors associated with the use of cell phones (Johansen, Boice, McLaughlin, & Olsen, 2001; Klæboe et al., 2007).

Auvinen et al. (2006) analyzed 15 epidemiologic studies on cell phone use and cancer published through 2005 and found that “overall there is substantial evidence indicating that ever or regular mobile phone use is not associated with the risk of intracranial tumors” (p. 517).

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