Would You Believe… Specific Frequencies Block Growth of Cancer Cells

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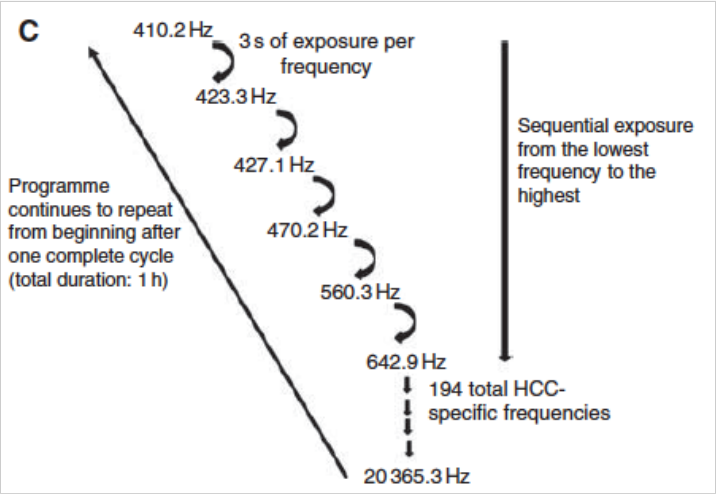
A couple of months ago, the *British Journal of Cancer* published a paper detailing some extraordinary results: very specific types of weak electromagnetic (EM) fields were able to stabilize and shrink liver tumors in advanced cancer patients who had exhausted other treatment options. A press release was issued describing how the EM treatment was far more effective than the only available FDA-approved drug. It was pretty much ignored. No one believed it.

Today, the *British Journal of Cancer* is releasing a follow-up paper by the same research group, led by Boris Pasche of the University of Alabama medical school in Birmingham. It might help convince skeptics that EM cancer therapy is more than pie in the sky.

The new paper shows that the same signals that were effective in patients disrupted cancer cells in the laboratory. It reports on a series of experiments in which 27 MHz RF radiation, amplitude modulated at specific frequencies between 100 Hz and 21 kHz, inhibited the growth of two types of liver cancer cells, and a different set of modulation frequencies inhibited breast cancer cells. Strikingly, the liver tumor frequencies had no effect on the breast cancer cells and vice versa, i.e., the breast cancer frequencies had no effect on the liver cancer cells. This type of selective action is new and noteworthy. Pasche writes that the observed anti-proliferative effect of the EM signals is "robust" — and "exciting."

Pasche concedes that there is no known biophysical mechanism to explain what they are seeing. On the other hand, his team can pinpoint what the EM fields are doing to the cancer cells: They observed "pronounced disruption" of the mitotic spindle, a bundle of fibers that help guide genetic material through the process of cell division (watch this video to see how it works). A few years ago, a group led by Israel's Elion Kirson reported that kHz EM signals used to treat brain tumors affected the mitotic spindle (see the

paper in *Proceedings of the National Academy of Sciences* and, more generally, our 2007 article).



Another striking aspect of the work is how little RF radiation is needed to cause such a profound effect on the cancer cells. Pasche found the effect at specific absorption rates (SARs) of 0.03 to 1.0 W/Kg. This is up to one hundred times lower than the 4 W/Kg threshold used for RF-induced effects in most human exposure standards. For comparison the SAR limit for cell phones is between 1.6 and 2 W/Kg. Admittedly, those limits protect only against heating, not the type of changes detailed in the studies discussed here.

Microwave News asked Pasche whether he had any doubts that what he is reporting as having seen in his lab is not a real effect. "None," he replied. "These experiments have been repeated multiple times in a blinded fashion by at least four different members of my lab." Pasche went on to disclose that his team has recently found that a third set of frequencies blocked ovarian cancer cells. "So, we now have *in vitro* findings showing modulation frequency specific effects of hepatocellular carcinoma (liver cancer), breast cancer and ovarian cancer," Pasche stated.

Pasche's closing sentence in the *British Journal of Cancer* describes what's at stake: "These findings uncover a new alley to control tumor growth and may have broad implications for the treatment of cancer."

We're waiting to see if anyone pays attention this time.

Additional resources:
• A commentary on the Pasche paper by Carl Blackman of the U.S. EPA will appear soon in the *British Journal of Cancer*;
• "UAB Researchers Find New Path To Control Tumor Growth," University of Alabama press release;
• "Treatment of Advanced Hepatocellular Carcinoma with Very Low Levels of Amplitude-Modulated Electromagnetic Fields," *British Journal of Cancer,* August 9, 2011 (open access);
• "Very Weak RF Signals Show Promise For Treating Inoperable Liver Cancer," *Microwave News,* August 15, 2011;
• E.D. Kirson, et al., "Alternating Electric Fields Arrest Cell Proliferation in Animal Tumor Models and Human Brain Tumors,"

Proceedings of the National Academy of Sciences, June 12, 2007 (open access);

• "Kilohertz Electric Fields Kill Tumor Cells," *Microwave News,* June 15, 2007.

• "Very Weak RF Signals Show Promise for Treating Inoperable Liver Cancer," *Microwave News,* August 15, 2011.

cancer, Boris Pasche, British Journal of Cancer, Frederico Costa, cancer therapy, TheraBionic,

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