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## **French and Israeli Teams Point to Non-Thermal RF Effects**

**January 9...** It's a new year and maybe, just maybe, it signals a new outlook at *Radiation Research*, a journal with a reputation for publishing negative findings (see, for instance, "[Radiation Research and The Cult of Negative Results.](#)")

The journal's January issue features two reports that point to non-thermal effects of RF radiation. The first [paper](#), from Israel's Tel Aviv University, shows that 800 MHz radiation at SARs of 2.9 W/Kg and 4.1 W/Kg can cause chromosomal aberrations in human blood lymphocytes following a 72-hour exposure. The second [paper](#), from a group in Limoges, France, implicates 900 MHz RF radiation in apoptosis (cell death).

The Tel-Aviv group includes [Rafi Korenstein](#), who has long been working on genotoxic effects of electromagnetic radiation. The Israelis advise that their new results "should be taken into consideration when assessing the health risk after continuous exposure to RF radiation at an SAR close to the current threshold set by [ICNIRP](#)."

## **Coming Soon: NAS Report On Wireless Research Needs**

**January 15...** On Thursday, January 17, the U.S. National Academy of Sciences-National Research Council (NAS-NRC) will release its report on what types of research, if any, are needed to address potential health effects of radiation used for wireless communications. The report, which was requested by the FDA's Center for Devices and Radiological Health ([CDRH](#)), marks the closing chapter of the cooperative research agreement (or [CRADA](#)) between the [CTIA](#), the trade association of the cell phone and wireless industries, and the CDRH. The CTIA sponsored the [project](#). [Frank Barnes](#) of the University of Colorado, Boulder, chaired the NAS-NRC [committee](#) that wrote the report. Back in June, the Center for Science in the Public Interest [criticized](#) the makeup of the panel for being too heavily weighted with physicists and engineers at the expense of biologists and for having ties to industry. The NAS-NRC hosted a workshop last summer to review gaps in knowledge of RF biological effects (see our [August 10 comment](#).)

(continued on p.2)

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## NAS-NRC Report: Priorities Left Out

**January 17...** The **NAS-NRC report**, released today (see **January 15** on p.1), presents a laundry list of research needs to better understand the possible health effects of RF radiation. What's missing is any sense of priorities. The NAS-NRC committee that prepared the report fails to indicate whether characterizing a child's exposure from a cell phone is more important than doing an epidemiological study of children who use them; or whether mechanistic studies are more important than laboratory toxicology experiments.

"We were told not to put priorities on the research needs," **Frank Barnes**, the chair of the NAS-NRC panel, told *Microwave News* in a telephone interview from his office at the University of Colorado in Boulder. "They were quite strict about this." When asked who "they" were, Barnes replied that he is not sure whether the order came from the NAS-NRC or from the FDA, which requested the report. "It does not make much sense to me," Barnes said, "I would have defined our mission differently."

Another notable omission is a discussion of the results from the **Interphone** project. Barnes explained that this was because the final Interphone paper is not yet available. But that's only part of the story. The report does comment on an Interphone methodological analysis—suggesting that selection bias would lead to underestimating the tumor risks—yet it does not acknowledge that published papers from a number of the participating countries, either alone or in a group, have found that long-term users of cell phones have higher rates of two types of tumors (acoustic neuromas and brain tumors). The **Israeli study** pointing to an increased risk of a third type of tumor, of the parotid gland, among heavy cell phone users came too late (December 6) to be included, according to Barnes.

The report does allow that, "The pending results of the Interphone study... are likely to have a major influence on the direction and scope of future research concerning the use of cel-

lular phones and cancer." But why did the NAS-NRC panel not address the disquieting findings published to date? They too would have prompted an imperative to do more research, especially if the panel had noted that the Interphone results are largely consistent with the Swedish studies of Lennart Hardell and Kjell Hansson Mild.

Most close observers now believe that the epidemiological data show that a health risk from mobile phones can no longer be dismissed. (That's what a senior and well-connected member of the bioelectromagnetic community told us recently.) No one involved with this new report, not the committee, not the NAS-NRC, not the FDA and certainly not the cell phone industry, which paid for it, had any interest in fostering a sense of urgency to step up the pace of health studies. This is especially true in the U.S., where RF research is moribund.

The NAS-NRC committee may not have wanted to highlight the epi findings but it was not reticent about dismissing the controversial and, for many still unresolved, field of RF genotoxicity. The panel favored Vijayalaxmi's and Joe Roti Roti's view that RF radiation cannot cause DNA breaks, and thereby rejected the work of Henry Lai, among others. "Most investigators in the field agree that no compelling body of evidence exists to support the hypothesis that RF fields are genotoxic," they wrote.

Other studies pointing to effects on DNA—such as those from Austria and China—are not cited. The only panel member with direct experience with the RF-DNA work is France's Bernard Veyret, who has openly feuded with the Austrian group, led by Hugo Rüdiger at the University of Vienna. Score one for Veyret.

Lai, Roti Roti and Vijayalaxmi each gave a talk at a workshop hosted by the NAS-NRC panel last August (see our **August 10 post**). Barnes told us that the report was "mostly" based on what was presented at the August workshop. Who at the NAS-NRC selected the workshop speakers is not known. Barnes could not shed any light on this but said that, "We tried to have as much diversity of opinion as we could."

Nor is it clear who picked the reviewers of the committee's report. What does come across is that the NAS-NRC was un-

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**Microwave News, 155 East 77th Street, Suite 3D, New York, NY 10021, USA**

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moved by those who urged it to limit industry influence. At the time the committee's membership was made public, some asked that Leeka Kheifets, a long-time associate of EPRI, the research arm of the electric utility industry, be removed from the panel. The NAS-NRC not only rejected this appeal but later sought advice from another EPRI staffer, Gabor Mezei. The other surprising choice for a reviewer is Teri Vierima of **Resources Strategies Inc.**, a consulting firm that lists EPRI and a host of wireless companies as **clients**.

Rick Jostes, the NAS-NRC study director, no doubt played a key role in selecting both the workshop speakers and reviewers of the panel's report. Jostes, widely viewed as a skeptic of low-level RF biological effects, retired on December 31.

## **Nancy Wertheimer, Pioneering Epidemiologist, Dies**

**January 23...** Nancy Wertheimer, who more than any other epidemiologist was responsible for identifying the association between magnetic fields and childhood leukemia, died at the age of 80 on Christmas day. The cause was complications following hip replacement surgery, according to Ed Leeper, her life partner and long-time collaborator.

In 1979, Wertheimer and Leeper **reported** that children living near high-current electrical wiring had a higher than expected rate of leukemia. At the time, the association was seen as a curiosity and was largely discounted and ignored. That all changed in 1988, when a **study** sponsored by the New York State Department of Health supported their hypothesis. Later work confirmed the link and extended it to measured power-frequency magnetic fields.

"Nancy was a real pioneer," said David Carpenter, the director of the Institute for Health and the Environment at the University of Albany, NY. In the 1980s, Carpenter ran the health department's New York Power Line Project. Wertheimer and Leeper's final vindication came in 2001 when the International Agency for Research on Cancer (IARC) **classified** power-frequency magnetic fields as a possible human carcinogen on the basis of a large body of epidemiological evidence, all stemming from Wertheimer and Leeper's 1979 landmark paper. "It is rare that a scientist opens a whole field of research, which is what Nancy Wertheimer did," Carpenter told *Microwave News*.

In her later years Wertheimer moved on to other projects. "She felt it was time for younger people to work out what it all really means, including understanding the biophysical mechanism," Leeper said. "Nancy always said that the risks we had found are small but that we may not have identified the real risks, which could, under certain circumstances, be larger, or that we may not be looking at the right end points." That is, we still don't understand what types of fields are responsible and

what are they doing.

"Nancy was fascinated by how the body reacts to magnetic fields," Leeper said. "She was a scientist not a public health advocate. People tried to portray her as a dedicated reformer, but that was not her style." Once we uncover the biophysical mechanism—the part of the EMF puzzle that remains unresolved—Wertheimer believed that new applications could be devised, Leeper said, and that medical benefits might follow.

## **Non-Thermal RF Effect— From Chair of NAS-NRC Panel**

**January 25...** "Are there any biological effects that are not caused by an increase in tissue temperature (nonthermal effects)?" That was one of the "overarching issues" considered by the NAS-NRC committee at the workshop it hosted last August (see p.11 of the its **final report**, as well as **January 17** on p.1 and our **August 10 post**). At the time, France's Bernard Veyret, the member of the committee who led the discussion, expressed skepticism that such effects had been reliably documented.

Now comes the February 2008 issue of the *IEEE Transactions on Biomedical Engineering* with a short **paper** describing such a non-thermal effect on human white blood cells. The applied 900MHz RF signal is quite weak—only 0.4 V/m. The research team, from the University of Colorado, Boulder, states, "The calculated temperature change resulting from the RF exposure was less than one microdegree [one-millionth of a degree]."

The corresponding author of the new paper is Frank Barnes, a member of the National Academy of Engineering and the chair of the NAS-NRC **committee** that wrote the report released last week.

## **Low-Power RF Alters Human Skin Proteins**

**February 12...** Dariusz Leszczynski has been applying the powerful new techniques of molecular biology (specifically, proteomics) to better understand EMF effects. A couple of years ago he **predicted** that they would "help in the discovery of the bio-

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physical and biochemical mechanisms.”

Now, Leszczynski and collaborators at Finland’s Radiation and Nuclear Safety Authority (**STUK**) in Helsinki have shown that relatively low-power mobile phone radiation can alter the production of proteins in human skin. Ten women volunteered to have their forearms irradiated with 900 MHz GSM radiation for one hour at an SAR of 1.3 W/Kg—well below the European cell phone exposure standard of 2.0 W/Kg. A small sample of skin was then removed and analyzed. The levels of eight different proteins (out of a total of 580) were found to be significantly changed.

Perhaps most tantalizing is that two of these proteins were changed in all ten subjects. This might one day lead to a marker for an EMF-specific response.

The function and significance of these altered protein lev-

els are at this point unknown. But, as Leszczynski pointed out in a **press release**, issued by STUK earlier today, this is the first time anyone has examined whether RF radiation can cause changes in protein expression in living people. “Mobile phone radiation has some biological effect,” he said. “Even if the changes are small, they still exist.”

“All this means that the human body recognizes this low-level radiation and reacts to it,” Leszczynski told *Microwave News*. These effects are similar to those Leszczynski has previously **observed** in human cells grown in the lab. The next step, he said, is to extend this pilot study to 50 or as many as 100 volunteers. But first, he has to find the necessary funding.

These new findings appear in *BMC Genomics*, an open access journal, which allows free downloads of both the **abstract** and the **complete paper**.

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## ‘Cancer Research UK’ Misleads on Long-Term Cell Phone Risks

**February 15...** If anyone is still not convinced that the completed Interphone study should be released as soon as possible (see **January 30**), they need look no further than how the Interphone results from Japan were handled last week.

A team led by Naohito Yamaguchi, Toru Takebayashi and Masao Taki reported that there was no increased risk of brain tumors among regular users of mobile phones in Japan. Well, actually, that’s not quite true. They found that the odds of developing one type of brain tumor (a glioma) was close to six times higher among especially heavily-exposed users, but they decided that this result was unreliable. Their **paper** will be published by the *British Journal of Cancer* and was posted on its Web site on February 5.

At the same time, Cancer Research UK, a charitable organization and the publisher of the *British Journal of Cancer*, issued a **press release** to help the media put the new findings into some kind of context. “So far, studies have shown no evidence that mobile use is harmful, but we can’t be completely sure about their long-term effects,” explained Lesley Walker, its director of cancer information.

Perhaps, director of cancer *misinformation* would be more appropriate. We will not go over—yet again—all the studies that point to a long-term tumor risk. We most recently spelled them out on **January 30**. But we repeat that when the Interphone data from five Northern European countries were analyzed together, they did point to a higher risk of two different types of tumors and that the U.K. was one of those five countries.

It’s true that Walker left open the possibility of long-term effects, but this is just her “get out of jail free” card. She’s ignoring the findings already published in peer-reviewed journals on what happens to people who use a cell phone for long periods of time, especially ten years or more. No one is saying there’s conclusive proof that cell phones lead to cancer, but to say that there is “no evidence” is nonsense.

Walker and others at Cancer Research must know better. Why is the cancer establishment—and Cancer Research UK lies at its summit—so intent on burying the possibility of a cell-phone cancer risk? Why is it behaving just like an industry lobby group?

We should note that despite all the reassuring headlines prompted by the new Japanese paper (and its accompanying press release), it adds practically nothing to our understanding of the long-term risks. For gliomas, the type of brain tumor found elevated in past studies, there were only seven cases who had used a cell phone for more than six-and-a-half years and only two cases for ten years or longer. Even the Japanese acknowledge that the ten-year numbers are “very small.” The total study population included 83 cases with a glioma.

We hear that some progress is being made towards breaking the deadlock and completing the final Interphone paper. Elisabeth Cardis, the Interphone study director, leaves IARC in just over a month. That’s not much time to maneuver if the paper is to be submitted before she decamps for Barcelona.