

Conflicting EMF Breast Cancer Studies Resolved; Genetic Variability Is the Key, German Lab Reports

One of the most contentious—and nastiest—disputes over electromagnetic field (EMF) cancer risks may soon be resolved.

Members of Dr. Wolfgang Löscher's lab in Hannover, Germany, have shown that different substrains of the same strain of rats have very different responses to power-frequency EMFs.

In a presentation at the Bioelectromagnetics Society's (BEMS) annual meeting in Quebec City, Canada, on June 24, Dr. Maren Fedrowitz of the School of Veterinary Medicine in Hannover reported that two substrains of Sprague-Dawley rats had markedly different sensitivities to 50 Hz magnetic fields, as well as to DMBA, a known chemical carcinogen. One strain had significantly more DMBA-induced tumors than the other, which, for its part, had significantly enhanced growth of mammary tumors following EMF exposure.

Over the last decade, Löscher has conducted a large number of experiments showing that EMFs can promote the development of breast cancer in rats (see *MWN*, J/A93, J/F95 and S/O99). But these findings have been challenged by some American scientists.

Dr. Gary Boorman of the National Institute of Environmental Health Sciences (NIEHS) in Research Triangle Park, NC, has been Löscher's leading critic. After Drs. Larry Anderson and James Morris of the Battelle labs in Richland, WA, were unable to repeat the German experiments, Boorman, who had arranged for their replication effort under the congressionally mandated research program known as EMF RAPID, made it clear that he had no confidence in Löscher's work (see *MWN*, M/A98).

Relations between Löscher and the NIEHS deteriorated as the institute dismissed the German work in favor of Battelle's. Boorman and Dr. Jerry Williams of Johns Hopkins University in Baltimore publicly disparaged Löscher's studies as

being fundamentally flawed. Löscher responded with accusations that Boorman was waging a dirty tricks campaign against him (see *MWN*, N/D98).

In its final report to the U.S. Congress, the NIEHS tried to put the issue to rest by concluding that there is "strong evidence" that EMFs do not promote breast cancer (see *MWN*, J/A99 and S/O99). This report was largely written by Dr. Christopher Portier. Portier was later promoted to associate director of the National Toxicology Program, which is administered by the NIEHS.

But, at the same time, Löscher and Anderson began working together to see if they could explain the divergent results. They later published a joint paper citing genetic variability as one of a number of possible hypotheses. "The data from the two labs suggest that the rats used in the Battelle study might be more sensitive to the carcinogenic effect of DMBA than the European rats, but possibly less sensitive to any influence of magnetic field exposure," they wrote in the September 2000 issue of *Environ-*

mental Health Perspectives (see *MWN*, S/O00).

The new work "seems to go a long way to resolving the differences," Anderson said after Fedrowitz's presentation in Quebec. "It supports my and Wolfgang's suspicions about what was going on," he said in a later interview.

The lack of animal data to support the epidemiological evidence has cast doubt on the EMF-cancer link. "It would have been nice to have these results during the IARC deliberations," Anderson said, prompting Dr. Bernard Veyret of the University of Bordeaux to comment publicly, "This was a key element in the IARC decision."

Both Anderson and Veyret were members of the International Agency for Research on Cancer (IARC) panel that last summer unanimously concluded that EMFs are possible human carcinogens, largely based on epidemiological evidence (see *MWN*, J/A01). The panel might have classified EMFs as a "probable" or "known" human carcinogen with supporting animal data.

Löscher told *Microwave News* that he is now planning to repeat the DMBA breast cancer study using the same substrain of Sprague-Dawley rats used by Battelle.

More support for the significance of genetic makeup comes from a set of cellular experiments carried out by Dr. Anna Wobus's group at the Institute for Plant Genetics and Agricultural Research in Gatersleben, Germany.

Wobus's group found that 50 Hz fields caused changes in the expression of a number of different genes, Dr. Franz Adlkofer of the VERUM Foundation in Munich said at the BEMS meeting. "The genetic background may determine whether or not stem cells respond to ELF EMFs," he said. Wobus is part of the EC's REFLEX research group, which is coordinated by Adlkofer.

Adlkofer has previously reported that Wobus has found that RF/MW radiation at an SAR of 1.5 W/Kg could affect a number of different genes—but only in those cells that were p53 deficient (see *MWN*, N/D01). Wild type cells did not respond, however. He calls the p53 tumor suppressor gene "the guardian of the genome."

More generally, these two new sets of German findings may finally explain why so many biological experiments with electromagnetic radiation yield contradictory results. The inability of different labs to repeat studies has led many skeptics to dismiss the whole field of non-ionizing radiation health research. Some call them Cheshire cat effects, after the now-you-see-it-now-you-don't apparition in *Alice in Wonderland*.

Years ago, a multi-lab international effort called the Henhouse Project, sponsored by the U.S. Office of Naval Research, showed that pulsed magnetic fields could upset the development of eggs from some strains of chickens but not those from other strains (see *MWN*, M/A88).



DR. MAREN FEDROWITZ IS WORKING WITH PROF. WOLFGANG LÖSCHER



"This supports our suspicions"
—Dr. Larry Anderson