

Summary

Mastbruch Project 2010/2011

Between March 2010 and June 2011 a pilot study was to find out, if possible adverse health effects of residents, who are exposed to an increased radiation from a base tower in their vicinity, can reliably be recorded. The small study clearly showed the prerequisites necessary to reach this goal within an extensive research project.

According to the German Federal Office for Radiation Protection the Government is convinced that the people are not exposed to any health risks through radiofrequency radiation emitted by base towers, because the currently valid exposure limits are not only observed but also by far not met. Still, part of the people is increasingly worried that their health could be damaged by base tower radiation.

Altogether, the scientific findings available on the question of a possible health risk through base tower radiation are rather poor. Based on the current state of research an all-clear signal is just as inappropriate as the claim that adverse effects of the radiation have already been proven. In addition, we have the largely unsolved problem of electrosensitivity from which up to 5% of the people suffer. This group is not considered at all.

In 2010 we had the last-minute opportunity to examine numerous residents in the vicinity of a base station in Mastbruch (a district of the German town of Paderborn), and this before and after the station was switched on. In close cooperation with the citizens' initiative *Gegenwelle e.V.* we started a pilot study with our own funds. This study was to create the prerequisites for an extensive follow-up research project, the results of which could offer a more reliable risk assessment of the health risks in the vicinity of base stations

Project description

For the pilot study we will now follow up the state of health of several hundred persons, children as well as adults, for the period of two years. A first examination is to take place before the just erected base station is switched on. Once it is switched on, further examinations will be carried out in the following 24 months. In detail we plan:

Measurement and recording of the people's exposition in the concerned area by the Ecolog Institute in Hannover before and after the base station has been switched on

Measurements will be done at fixed points so that typical constellations can be recorded. After the base station is switched on, measurements will be done in the housing of all persons involved in the study, to find out whether exposure is high or low. In addition, we plan to record in a subgroup also the exposure during stays outside.

Recording the subjective health problems with a questionnaire

All inhabitants of research area will fill in a questionnaire listing 36 different symptoms before the base station is switched on, and again in the following 4 to 6 examinations. The questionnaires will be evaluated by the Institute of Environmental Health at the Medical University of Vienna.

Recording of biological parameters

- a) To assess genotoxicity, the micronucleus test will be applied for cells of the buccal mucosa. In each examination cells will be taken from participants with a simple scrape. The test will be carried out by the Institute for Cancer Research and evaluated by the Institute of Environmental Health, both at Medical University of Vienna.
- b) To further assess genotoxicity, the DNA repair foci in human lymphocytes and/or fibroblasts obtained in each examination by either taking blood samples or a biopsy will be determined. With this highly sensitive new method we can record DNA double strand breaks. The tests will be evaluated by the Department of Genetics, Microbiology and Toxicology at the Stockholm University, further statistical evaluation will be done by the Institute of Environmental Health in Vienna.
- c) A measurement of the anti-oxidative capacity in the participant's serum will be carried out because this capacity might be lowered after a long-term stress exposure that theoretically may exist in the vicinity of base stations. A lower anti-oxidative capacity along with a higher oxidative stress is correlated with health

disturbances up to diseases of any kind. The test will be carried out by the Institute for Cancer Research and further statistical evaluation will be done by the Institute of Environmental Health, both in Vienna.

- d) For future investigations such as with the RNA micro array, we plan to deposit a blood sample from each participant using the up-to-date biomedical kryo-preservation. Thus, in years to come research will find a valuable sample bank that will allow further investigations with methods today already under development.

The following scientists will take part in the pilot study

Prof. Dr. med. Franz Adlkofer, Pandora Foundation, Berlin

Dr. Peter Neitzke, ECOLOG-Institut für sozial-oekologische Forschung und Bildung gGmbH, Hannover

Prof. Dr. med. Wilhelm Mosgoeller, Institut für Krebsforschung, Medizinische Universität Wien

Prof. Dr. med. Michael Kundi, Institut für Umwelthygiene, Medizinische Universität Wien

Dr. Igor Belyaev, Department of Genetics, Microbiology and Toxicology, Stockholm University

Start of the pilot study

In March 2010 Prof. Franz Adlkofer, Dr. H.-Peter Neitzke and Prof. Wilhelm Mosgoeller informed the about 70 gathered residents on the spot about the start of the study (first examinations before switching on the base station).

Informational talk

Prof. Adlkofer first thanked Mrs. Ellen Zajonz and her co-workers from the citizens' initiative *Gegenwelle e.V.* for their great personal commitment. He then described the status of the international research. He stressed that up to now there is no evidence of a health risk for humans living in the vicinity of base stations. Since today's knowledge of the biological effects of mobile phone radiation on humans is still very poor, it is not possible to definitely exclude such a health risk. In any case, the available scientific data recommend caution.

Dr. Neitzke explained to the attendees the planned measurements which he will carry out in order to determine how intensely each single study participant is actually exposed to radiation. Already today he can state that nearness to or – in other words – distance from the base station allows no reliable answer. Determining the individual exposure to radiation must also consider if - independent of the base station - other sources contribute.

Prof. Mosgoeller informed the attendees about the investigation he will carry out in the next days and about the questions that need to be answered. He explained the organisational structure of the examinations and asks for an active participation.

During the following nearly two hours of discussion in which no question was left unanswered, Prof. Adlkofer stated once more that conclusions from this pilot study remain open. None of the involved scientists starts his work with prejudice. He asked the attending local citizens - nearly all of them were ready to participate in the project - to persuade others who could not join this informational talk to enlist as test persons. The reason for this is that the study will gain more validity and more power the higher the supporting percentage of the exposed population is. For all questions not answered up to now or any new questions, Mastbruch citizens can turn to the practitioner Dr. med. Horst Schoell, who is a member of the research consortium and who will act as the local representative.

Examinations

During the first round of examinations carried out by Prof. Mosgoeller between March 22 and 24 more than 250 completed standardized questionnaires to determine the current subjective individual health status were filled out and handed in. In addition, we measured the activity of free radicals in the blood of 100 persons, and in case of high activity also the antioxidative reserve. From more than 250 persons we took buccal smears to examine genetic damages in cells. Altogether, the citizens' initiative succeeded in convincing enough persons in mastbruch to take part. However, due to lack of funds we had to refrain from investigating further important parameters.

The *Mastbruch Project* is a pilot study with which we want to test, if a full study to finally clarify the open questions is feasible. It is especially important to know if enough people can be motivated to take part in a study. This seems to turn out well. The results from the first examination before the base station was switched on will be compared with the follow-up examinations. In this way we want to find out if - in an extensive study - we can expect changes during the years in the well-being of residents in the vicinity of a base station, which can be explained with biological data. We will hardly reach this goal with the biological data we obtained so far from the Mastbruch project.

Outcome of the pilot study

In March 2011 - after the base station had been switched on - a second examination was carried out, and in June 2011 Prof. Franz Adlkofer, Dr. H.-Peter Neitzke and Dr. Voigt (both Ecolog-Institut) as well as Prof. Wilhelm Mosgoeller informed the about 45 gathered residents on the spot about the outcome of the study.

Informational talk

First, Prof. Adlkofer remarked that the state of research did hardly improve during the last year. Especially the question on the effects on humans through the radiation emitted by base stations is still open. He reported that radiofrequency radiation has been classified 'possibly carcinogenic' by the WHO's International Agency for Cancer Research in May 2011. With this decision, which is based on the vote of 30 scientists from all over the world and which is explained with the results from epidemiological research with long-term mobile phone users, the Agency ignored the view of other bodies responsible for radiation protection. This is certainly a call to national and international radiation protection to take its assignment to protect the people more seriously. The classification had one dissenting vote and this vote came from a member of the German Commission on Radiological Protection. Participation of the head of the Committee Non-Ionizing Radiation of this Commission was turned down by the Agency because of his ties to industry. Under these circumstances, German radiation protection might not win the people but surely the mobile communication industry.

Looking ahead, Prof. Adlkofer risked the statement that the recent classification of radiofrequency radiation as being 'possibly carcinogenic' will be graded up to 'probably carcinogenic' within 10 years, and that after 10 more years a causal link between radiofrequency radiation and cancer will be proven. Thus, we have to ask what are the consequences for humans exposed to radiation from base stations for 24 hours a day, no matter whether they use a mobile phone or not. If we find pathological changes this depends not only on the dose taken in but also on how our body deals with the strain, an ability that varies considerably from person to person. The pilot study in Mastbruch was to find out which prerequisites are needed to successfully clarify these links. Prof. Adlkofer thanked the citizen's initiative *Gegenwelle* and, especially, Mrs. Ellen Zajonz that the study - certainly an important one - could have been carried out and he thanked the Mastbruch residents, who took part in the study.

Results

a) Increase of radiation between March 2010 and March 2011 (Dr. Voigt)

Before the base station was switched on in March 2010 the mean values in the flats without any inside sources (WLAN, DECT) were 2.7 $\mu\text{W}/\text{sqm}$. In March 2011 they increased to 384.0 $\mu\text{W}/\text{sqm}$, that is more than a hundred times higher. In the same period peak values reached 1,012 $\mu\text{W}/\text{sqm}$. In rooms with active WLAN and/or DECT equipment emissions were in the same range as with the base station. While using a mobile phone the exposure of the user is considerably higher. When the planned UMTS is finally switched on emissions in the vicinity will still increase.

b) Results of the questionnaire (Prof. Mosgoeller)

The evaluation of the questionnaires from 96 persons who participated in both examinations showed that the well-being of the affected persons got significantly worse after the base station had been switched on. The trend was especially conspicuous with women. We clearly see that this concerns especially symptoms which - in a series of studies - are linked to the radiation emitted by base stations. Based on the selection necessary for the composition of the study collective, however, it does not seem justified to come to a reliable conclusion.

c) Results of the FRAS test (Prof. Mosgoeller)

With the *Free Radikal Analytical System* (FRAS) we can determine any free radicals in the human organism and the anti-oxidative capacity to protect against free radicals. In the pilot study we restricted the measurement on the concentration of free radicals, an increase of which generally speaks in favour of strain. The result after evaluating the data from 70 persons who participated in both examinations did - neither in women nor in men - show a relevant change in the concentration of free radicals as a consequence of a higher exposure.

As expected from a pilot study, the obtained results do not allow a statement on possible health effects being a consequence of increasing exposure after the base station had been switched on. We must notice that the intensity of the radiation is still rather low. This can also be attributed to the fact that the UMTS system has not been switched on contrary to the announcement of the provider.

The course of the pilot study did show that we can create the technical and organizational prerequisites for a complex study. However, the original plan needs several decisive adjustments when measuring the exposure and its possible health effects on humans. We could show that the individual radiation level differs very much, and this independent from exposure to the new base station. Reason is the fact we hardly find radiation-free areas in our daily life and, therefore, possible health effects from radiation cannot be recorded only by measuring the radiation emitted from one base station. This has to be adjusted accordingly in the design of a follow-up study.

We thank the residents for participating, the citizens' initiative *Gegenwelle e.V.* for its organizational support, and the donors for their willingness to fund the pilot study.