

## Genetic And Cytogenetic Aspects Of Rf-Field Interaction

### The aim of the workshop

The focus of attention is the question whether exposure of humans to electromagnetic radiation of mobile phones could result in an increase in cancer incidence or even in genetic defects leading to considerably increased malformation in the population of the developed industrial countries. Do existing limits of maximum exposure really guarantee safe use of modern techniques of communication, or are there genetic effects below intensities leading to measurable increases in body temperature?

The quantum energy of electromagnetic fields used in telecommunications is many orders of magnitude below 12eV which is considered to be the boundary to ionizing radiation. This means that in contrast to X-, or gamma rays, these fields are unable to disrupt covalent bonds of genetic molecules, and therefore to produce mutations. But, does this physical evidence really allow us to exclude genetic defects or cancer as a result of RF-field irradiation?

In fact, the stability of the genetic apparatus of a living organism is ensured only by a complicated system of mechanisms repairing permanently occurring spontaneous mutations within the cell. Each interference with this repair system therefore must automatically lead to an increase in genetic defects. Thus, it is thinkable that even electromagnetic fields with low quantum energy could lead to genetic effects. The actual question is: What is the threshold intensity of such effects? Is it above, or is it below hitherto set legal limits of maximum exposure?

These to-date unresolved questions explain why, over the last decade, many experimental studies were carried out to investigate possible genetic and cytogenetic effects of high frequency electromagnetic fields. In 1998, an international "Genetox Expert Panel" concluded:

*"The data from over 100 studies suggest that RFR is not directly mutagenic and that adverse effects from exposure of organisms to high frequencies and high power intensities of RFR are predominantly the result of hyperthermia; however, there may be some subtle indirect effects on the replication and/or transcription of genes under relatively restricted exposure conditions."*

This conclusion is correct even today! But what is behind these "subtle indirect effects on the replication and/or transcription of genes under relatively restricted exposure conditions" ?

There are some publications suggesting that RF-field irradiation possibly leads to an increase in the incidence of micronuclei, in cells showing chromosome damage, and even in DNA-strand breaks as indicated by comet assay techniques. Are these findings artefacts? Do these fields affect the life of the organism? Are effects just a result of heating? And do they exist only at intensities far above limits? Is it necessary to include those effects into our safety considerations yet? People using cellular telephones, or living near an antenna press for fast answers to these questions. Taking public concerns seriously, all these questions will be discussed during the workshop together with specialists doing active research in this field, and with geneticists who, on one hand, should be able to identify possible technical artefacts and pitfalls of methods applied, and, on the other hand, to assess biological relevance of effects considered realistic. Certainly, new ideas will be discussed pointing to new approaches for experimental research aiming to provide convincing answers to these questions.

### The character of the workshop

The workshop foresees presentations of invited speakers representing groups having played a significant part in research performed in this field in the last years. They will report on new experimental results and critically review present research standards. Further, the state of the art of

techniques used in experiment will be evaluated focussing on the following questions: How conclusive are methods applied by various investigations, and what would be the actual biological consequence of indicated alterations? Not only the influences of RF-fields as a single stressor will be discussed, but also possible synergistic combinations with other environmental factors. After considering the results of experimental investigations, discussion will seek answers to the biophysical question : What kinds of interactions would be conceivable.

The workshop foresees enough time for discussion; besides regular participants, there will be special disputants prepared for critically reviewing the contributions of the various speakers. At the end of the meeting, the main points of presentations will be summarized by referees for general discussion. Afterwards, a report from the workshop summarizing results will be prepared and published after being accepted by all invited speakers and disputants