

- Noteworthy is the most comprehensive epidemiological study until now on a possible correlation between cancer diseases and mobile phone use recently performed in Denmark. Following the inspection of 723,000 registrations of Danish mobile phone participants between 1982 and 1995 and after eliminating those registrations assigned to companies, etc., 420,095 persons were registered as a cohort, of which 7.1% had used their mobile phone for at least three years. Evaluation was made using the Danish cancer registry. In this cohort, in total 3,391 cases of cancer occurred compared with the 3,825 cases to be expected. The decrease in part resulted from a decrease of lung cancer cases (do mobile phone users smoke less?). Still, the incidence rate of salivary gland cancer (0.72), leukemia (0.97), brain and other neuronal tumours (0.95) was below 1.0, though not significantly so. The authors conclude: this first national incidence rate study does not support the hypothesis claiming that the use of a mobile phone promotes an increased incidence of tumours in the brain or in the salivary glands as well as of leukaemia or other cancer types. Of course, we must add that technical properties of the mobile telephones and therefore the nature of the user exposure have changed during this time period [Johansen, C., Boice, J.D., McLaughlin, J.K., and Olsen, J.H.: Cellular telephones and cancer - A nationwide cohort study in Denmark. *J. National Cancer Institute* 93 (2001) 203-207].

- In a short overview, M.H. Repacholi of the WHO dealt with health risks of mobile radio also referring to a WHO publication of the year before. His summary is: "None of the recent assessments concludes that exposure to radio frequencies of mobile phones or base stations leads to disadvantageous health consequences." However, he admitted that there still are knowledge gaps that will have to be closed during the following 3-4 years. The author warned emphatically against undermining internationally-recommended scientifically-verified limit values by unnecessarily introducing precautionary values. In his view, the presently-valid limit values fully suffice to ensure a riskfree use of mobile radio [Repacholi, M.H.: Health risks from the use of mobile phones. *Toxicology Letters* 120 (2001) 323-331].

Report from the „XVIIt

June 1 - 6, 2001, Bratislava, Slovakia

I. Organisation and topics

In 1979, the "Bioelectrochemical Society" (BES; <http://bes.mit.edu/>) was founded with the aim to promote

activities at the interface of "life sciences" and electrochemistry. The official journal of the society is "Bioelectrochemistry" (Elsevier). Every year the society organises an international symposium, the latest of which, the "XVIth International Symposium on Bioelectrochemistry and Bioenergetics," took place on June 1-6, 2001, in Bratislava, Slovakia, with about 170 participants (<http://dmpc.dbp.fmph.uniba.sk/beb2001/>). The chairman of the local organisation committee was Professor T. Hianik from the Faculty for Mathematics, Physics and Information Technology of Comenius University. The conference was very well-organised, and local facilities were efficiently used. Thus, for most participants it was the conference of "convenient access." It was particularly thanks to the local organisers that the conference, compared to previous events, was of higher quality.

The meeting was divided into lectures, shorter oral presentations, and three poster sessions. As no parallel sessions took place, there was sufficient time for discussion.

During the five days of the conference, the oral and poster contributions dealt in

13th International Symposium on Bioelectrochemistry and Bioenergetics

parallel with the following principal topics (responsible organisers in brackets):

Electron transfer in Biomolecules (K. Niki, USA; F. Armstrong, UK)

Photobioelectrochemistry (M.A. De la Rosa, Spain; J. Barber, UK)

Bioenergetics and signal transduction (D. Walz, Switzerland; B.A. Melandri, Italy)

Biomembranes and model membranes (E. Evans, Canada; H.G.I. Coster, Australia)

Electrified interfaces (P.N. Bartlett, UK; R. Guidelli, Italy)

Biosensors and bioelectronics (F. Hong, USA; J. Wang, USA)

Electric and magnetic field effects (E. Neumann, Germany; J. Weaver, USA)

Biomedical and biotechnological application (L. Mir, France; D.P. Rabussay, France).

Responsible for issuing invitations and assigning lectures for the sessions were the individual members of the International

Advisory Committees being in charge. One particular problem was the diversity of topics, on one side ranging from the basics of electron transfer processes in membrane proteins to medical application protocols, e.g. in electrochemotherapy, and on the other hand from pure basic research to near-presentations and promotion of medical devices by company representatives.

This year the Galvani Award, presented annually by the BES, was awarded to Dr.

T. Kotnik from the Faculty of Electrical Engineering at the University of Ljubljana, Slovenia, who presented a study on the topic "Increased efficiency of cell membrane electropermeabilisation by symmetrical bipolar rectangular pulses." The study was clearly aimed at issues of electrochemotherapy and of the presently-developing gene therapy via electrically-induced DNA/RNA so as to avoid the use of viral vectors. Though his well-presented lecture was based on comprehensive experiments, the scientific interpretation was behind the state of knowledge of the 1980s. The reason for this probably was both BES policy and quality and quantity of the submitted applications.

2. Contributions relevant for the Research Association

Despite or perhaps because of the wide range of topics, several contributions were of immediate interest for the work of the Research Association for Radio Applications. In the following, they will be summarised:

- E. Neumann (Bielefeld) and his co-worker S. Kakorin presented concepts on the electrically-induced membrane passage of DNA or ionic bindings as well as on the modelling of frequency and conductivity of electropores dependent on poration conditions.

- J. Weaver (USA) reported on calculations on the frequency-dependent field distribution in a skin tissue sample. However,

during discussion the criticism was made that the material properties at frequencies in the GHz range that he adopted were wrong.

- S. Kwee (Denmark) spoke about results meant to confirm a specific non-thermal induction of heat shock proteins (in particular Hsp-70) by 960-MHz fields as well as an association with an altered cell proliferation rate.

- M. Blank (USA) presented the hypothesis that EMF effects originate from interaction with moving electrons. As a consequence, all processes comprising electron transfer reactions would be directly affected.

- J. Pokorny (Czech Republic) reported on tests in yeast cells performed in a shielded measurement chamber. In the region around the cells, electric fields at the measurement apparatus noise limit were detected using microstructured electrodes. He described a correlation between measured "electromagnetic cell activity" with the process of microtubuli polymerisation.

- in his lecture, H.G.I. Coster (Australia) dealt in general with possible electrical field effects on electrostriction of membrane proteins and a resulting geometric "misadaptation" between protein and lipid phase.

- The group of J. Teissié (France) has been very active. From this group, M.P. Rols examined the asymmetry of electropermeabilisation in single cells. Whereas the dye propidium iodide was absorbed preferably at the side directed to the anode,

fluorescent DNA showed an exclusive absorption via the cathode side. B. Gabriel presented additional detailed results of high temporal and spatial resolution on propidium iodide absorption. For tests on thermal EMF impact at 900 MHz a special microscopic TEM cell was designed allowing the recording of local temperature variations via the temperature-dependency of the pH value of Tris buffer by means of a pH-sensitive dye in a solution at 0.3° C. For a SAR of 2 W/kg (approximate mobile phoning conditions in the brain) under CW conditions – however not for the GSM pulse protocol – and under otherwise identical conditions, clear temperature effects could be found. During a further test over 20 min. at 3 W/kg under GSM conditions, the glioma cell adhesion of the rat brain to the surface of a petri dish was measured. Compared to that of control cells, the adhesion was significantly diminished.

- E. Kovacs (Rumania) presented tests measuring membrane fluidity of the photoreceptor membrane under irradiation from a 2.45-GHz field using a fluorescence method. Surprisingly, at 15 $\mu\text{W}/\text{m}^2$ there was found to be an increase, as compared to a strong decrease of fluidity at 15 mW/cm².

- In his poster, L. Strasak (Czech Republic) described how E. coli bacteria under exposure to magnetic fields (5 Hz < f < 5000 Hz; 2.7 mT < B < 10 mT) show degradation of colony development.

- The author of this contribution presented a survey lecture on dielectric single-cell spectroscopy and on AC electrokinetic effects. In posters, his co-workers, D. Wachner and M. Simeonova, presented new characteristic equations and first approaches to describe the energy absorption for a simple cell model with subcellular solution.

3. Orientation of the BES

In recent years the reputation of the BES and therefore the impact factor of its journal “Bioelectrochemistry” have suffered, due to the diversity of topics dealt with and the presence of too many published contributions of low quality. In this context, during the conference several participants (e.g. H.G.L. Coster, T. Hianik, F.T. Hong, I.I. Katkov, T. Kotnik, E. Neumann, S. Kakorin, V.I. Passechnik, J. Teissié, D. Walz) agreed on the necessity for the society to re-orientate itself strongly towards bioelectrochemistry as a basic science which considers electrochemical phenomena in biological systems. To this end, aspects of application, instrumentation, epidemiology as well as medical or therapeutic aspects and “electrosmog” research need to become less important to the society. These latter aspects should instead be covered mainly by the sister journal “Bioelectromagnetics.”

4. Conclusive remarks

A special issue of “Electrochemistry” devoted to the conference is in preparation. All congress participants are invited to submit short contributions. The special issue will probably be published at the end of 2001. In the view of the author, the congress in Bratislava on the whole was encouraging, and is hopefully the starting point of a more successful era for the BES.

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