Research Activity Worldwide on Mobile Telephony and Health

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Review of international research on RF bioeffects

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Scope of research

- EMF Portal database (2012)
  [www.emf-portal.de](http://www.emf-portal.de)

<table>
<thead>
<tr>
<th>Type of studies</th>
<th>Number of published papers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biology/health</td>
<td>781</td>
</tr>
<tr>
<td>Epidemiology</td>
<td>159</td>
</tr>
<tr>
<td>reviews, dosimetry, interference with implants</td>
<td>1481</td>
</tr>
<tr>
<td>Total</td>
<td>2421</td>
</tr>
</tbody>
</table>
The new European call: 6 M€

- ENV.2013.6.4-2 Closing gaps of knowledge and reducing exposure to EMF
- better understand the possible mechanisms generating biological effects through the use of novel approaches,
- the role of RF exposures in cancer risk, neurodegenerative diseases, reproductive problems, behaviour and ageing, and exposure and health effects from intermediate frequency (IF) fields.
Reports: HPA (AGNIR)

• Most recent and comprehensive report

Health Effects from Radiofrequency Electromagnetic Fields
Report of the independent Advisory Group on Non-ionising Radiation
Reports: HPA (conclusions)

• Cell studies
  – At present there is no known pattern of exposure conditions that has been shown consistently to cause a biological effect from exposures below guideline levels.

• Animal studies
  – There is no clear evidence of harmful effects with low level exposures, although some studies have continued to report subtle biological changes, often following single, acute exposures.
Reports: HPA (conclusions)

• Human CNS studies
  – EEG studies have also produced mixed results. Small increases in alpha-band EEG power have been reported during or after exposure.
  – However, the effects are small and inconsistent between studies, so the reliability and biological significance of these findings still remain unclear.
• Non-cancer human studies
  – Overall, since 2003 there is no new evidence from human exposure studies that indicates any other non-cancer morbidity resulting from RF field exposure below current guideline levels.
Reports: HPA (conclusions)

- EHS
  - The overall evidence from the numerous experimental studies that have been conducted suggests that **no causal link exists for short-term exposures**.
  - At present, **insufficient good quality evidence is available** to draw conclusions as to the **role of long-term exposure to RF fields** in causing symptoms.
United States Government Accountability Office

GAO
Report to Congressional Requesters

July 2012

TELECOMMUNICATIONS

Exposure and Testing Requirements for Mobile Phones Should Be Reassessed

GAO
Accountability * Integrity * Reliability
“Studies we reviewed suggested and experts we interviewed stated that laboratory research has not demonstrated adverse human health effects from RF energy exposure from mobile phone use, but the research is not conclusive because findings from some studies have observed effects on test subjects.”
<table>
<thead>
<tr>
<th>Description</th>
<th>NIH institute</th>
<th>Funding</th>
<th>Completion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Examining effects of cell phones on brain glucose</td>
<td>National Institute on Alcohol Abuse and Alcoholism (NIAAA)</td>
<td>0.6 M$</td>
<td>2012</td>
</tr>
<tr>
<td>Effects of exposure to cell phones on the CNS using children in the Danish National Birth Cohort</td>
<td>National Institute of Environmental Health Sciences (NIEHS)</td>
<td>0.4 M$</td>
<td>2012</td>
</tr>
<tr>
<td>Toxicology and carcinogenic effects of RF in lab animals (National Toxicology Program)</td>
<td>National Institute of Environmental Health Sciences (NIEHS)</td>
<td>25.6 M$</td>
<td>2015</td>
</tr>
</tbody>
</table>
Reports: GAO (recommendations)

• long-term prospective (epi) cohort studies
• case-control (epi) studies on children
• non-thermal cell (lab) studies
• human volunteer studies “determine if possible observed changes in neurological functioning from RF are adverse effects.”
• re-evaluation of existing studies to determine whether additional research in certain areas is warranted.
NTP study in Chicago

- Exposure to RF in reverberation chambers
  Intermittent exposure (10 min on / 10 min off) for 18.3 hours/day
- 900 MHz, GSM & CDMA – Rats
- 1900 MHz, GSM & CDMA – Mice
- Thermal pilot studies at SAR of 4–12 W/kg
  Subchronic studies at 3, 6, 9 W/kg in rats, and 5, 10, 15 W/kg in mice
- Chronic studies based on results from subchronic studies
NTP study in Chicago
Monte Verita meeting
Monte Verita

- Organized by ITIS
- 120 participants
- ELF and RF
- Mechanisms
- Challenges studies that are reproducible
- No new findings in the RF range
The Glore initiative

- GLORE =
  - Global Coordination
  - RF Communications
  - Research and Health Policy

- Started in 1997 between Japan and Korea
- Now includes also EU and USA (+ Australia, New Zealand, and China)
GLORE: some key issues

- Funding is decreasing everywhere except for...
  - France,
  - Korea,
  - China (2011-15, 4.5 M$),
  - Australia, and
  - possibly US in the future
- Use of the precautionary principle in various countries including EU being debated
- Increasing concern Re Wireless Power Transfer
- Extrapolation to new signals
  - Text in available “signed” by GLORE and COST 704
- Japan: Research Supporting the 2010 WHO RF EMF Research Agenda
GLORE: some key issues

• LTE?
  – Korea: Exposure level of LTE BTS > other BTS
  – DK: time profile of power resembles that of GSM
  – Renewed fears?
  – Need for laboratory investigations?
Conclusion

• Lack of international coordination in research
• Awaiting the outcome of the “big” study in Chicago
• Race behind the introduction of new signals = the battle is lost unless extrapolation is possible (thermal vs. non thermal mechanisms)

• See you all next year for the 20th edition!