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PLATFORM PRESENTATION ☒

ELF animal studies, mechanisms of interaction

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Animal studies can help answer the question about the possible greater health risk for children exposed to extremely low frequency (ELF) magnetic fields (MFs), mostly in terms teratological effects and cancer.
Teratology has been quite extensively studied in animals exposed to ELF MFs and experiments have not established adverse developmental effects, although minor skeleton alterations have been detected (Juutilainen 2005).
Childhood leukaemia has been the only cancer consistently reported as associated with exposure to ELF MFs. This association has been the basis for the classification as "possibly carcinogenic to humans" by the International Agency for Research on Cancer in 2002 (IARC 2002). However, animal experiments have provided only limited support for these epidemiological findings (IARC 2002, WHO 2007). One could argue, however, that studies did not used any animal model for acute lymphoblastic leukaemia (ALL), the main form of childhood leukaemia, and that in none of the studies early-life exposures to ELF-EMFs were carried out, when the first and/or the second hit of ALL occur.
Moreover, there is no generally accepted biophysical mechanisms that could explain carcinogenic effects of low-level MFs (IARC 2002, WHO 2007). However, the radical pair mechanism (RPM) and cryptochromes (CRY) have recently been identified in birds and some other non-mammalian species, as a sensor of the geomagnetic field, involved in navigation (Ritz et al. 2010). The hypothesis has still to be tested in mammalian models. CRY is an ubiquitous protein, part of the molecular circadian clock machinery, which have been suggested to be involved in cancer cell growth and DNA repair (Sun et al, 2010).
In summary, ALL still seems to be the only open question related to a possible association between ELF EMFs and children health. We now have some more clues to test for a better characterization of the interaction between ELF MFs and ALL.

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