

#### **Session 4: STATIC AND LOW FREQUENCY EM FIELD EFFECTS**

##### **HYPOGEOMAGNETIC FIELDS AS ONE OF THE ADVERSE ENVIRONMENTAL FACTORS**

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Until recently the main attention of the researchers dealing with the problem of the biological effects and hygienic standardisation of non-ionising electromagnetic radiation (EMR), was concentrated on studying the EMR bioeffects of anthropogenic origin, whose levels essentially exceed the natural electromagnetic background of the Earth.

At the same time a major role played by EMR of natural origin in the inception of life on the Earth and its further development and regulation was convincingly proved in the past decades.

The interest in this problem arose as far back as the first half of this century after the appearance of Russian scientists' (A.L. Chizhevskiy's and V.I. Vernadskiy's) pioneer work. Since 1960s the stream of information on the influence of natural EMR on biological objects has been steadily increasing.

In the spectrum of natural electromagnetic fields one can conditionally single out several components - the static magnetic field of the Earth (geomagnetic field - GMF), the electrostatic field and variable electromagnetic fields in the frequency band from  $10^{-3}$  Hz up to  $10^{12}$  Hz.

While studying the influence of natural EMF on the living matter, special attention is paid to the geomagnetic field, as one of the major factors of the environment. It has been shown that different systems of various organisms (from bacteria up to humans) display a variety of reactions to changes of the geomagnetic field / Dubrov A.P, 1974, Chills Yu.A, 1976,1982, Moiseeva N.I, Lyubitskiy R.I, 1986/. Materials have been obtained which not only confirm the sensitivity of organisms to the geomagnetic field, but also do not exclude the probability that they are able to perceive the temporal and spatial information that it contains. It testifies that the geomagnetic field is an essential component of the environment.

Determination of the presence of biogenic magnetite in various living organisms (bees, pigeons, shellfishes, humans) allows to make the conclusion about a possibility of direct magnetoreception, as distinct from indirect, realised