

### *Materials of the Conferences*

#### **THE INFLUENCE OF ELECTROMAGNETIC FIELDS ON THE RATE OF AGEING OF THE WORKERS IN THE REGION OF KURSK MAGNETIC ANOMALY**

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Different electromagnetic fields (EMF) are widely distributed and used in industry, science, engineering and medicine. Some electromagnetic factors are potentially dangerous for human organism, such as the Earth's natural magnetic field, constant EMF, alternating EMF from 1 Hz to 300 GHz, especially it is distinguished EMF with industrial frequency (50 Hz) and EMF with the frequency from 10kHz to 20 GHz.

Now the population of many countries is exposed to electromagnetic waves with the physical characteristics of industrial EMF. It determines the topicality and importance of the integral assessment of the environmental and occupational EMF influence on the health of people in general and of the workers in different branches of industry.

Acute or chronic organism affection depends on intensity and duration of EMF exposure.

Acute damages develop as a result of the serious violation of the safety precautions (sanitary-hygienic standards) or in industry accident. Chronic disturbances manifest by astenic, astenovegetative syndromes, peripheral angiovegetative syndrome, abnormalities in gonad gland function etc. The remote signs of the affection are early development of atherosclerosis, ischemic heart disease, arterial hypertension, vascular encephalopathy, oncology processes, Alzheimer illness etc.

Kursk magnetic anomaly (KMA) is the region near city Kursk and unique territory in the Earth with abnormal high level of natural Earth's magnetic field. It is linked with the great amount of iron-ore in underground. Intensive development of ore extracting and ore processing industry are associated with the increase of exposure to diverse EMF, at first – due to

uncovering of the layers of magnetic ore and at second – as a result of using the ore concentration technique with the considerable generation of artificial electromagnetic waves (magnetic separators).

The scientific researches of M.P.Travkin with co-authors (1969), A.A.Plemenov with co-authors (1990), V.V.Belskij and P.V.Kalutskij (1997), A.M.Chernich (2004) proved that prolonged exposure of EMF in KMA is the serious risk factor for the health of the people living in this region and especially, working in the local ore mining and ore processing.

Our previous investigations revealed that different occupational harmful factors led to the abnormalities in systemic organization of the organism function, provoke the general and occupational diseases and therefore premature ageing (V.I.Babkina, A.V.Zavialov, 2005). The interrelation of premature ageing with influence EMF of various frequency is established in investigations of scientist's research institute of Medicine of labour of Russian Medical Science Academy (N.F.Izmerov and co-authors, 2001-2006) and Kursk state medical university (N.K.Gorshunova and co-authors, 2005).

The influence of EMF in Kursk magnetic anomalous territory on the ageing is still unknown.

The aim of this research is to define the rate of ageing among workers exposed to diverse EMF in KMA for the substantiation of the principles of the assessment of the work ability and occupational suitability of the industrial workers.

Seventy one men lived in KMA and engaged in the local ore mining and ore processing enterprise (the basic group) and seventy workers of rubber production plant (Kursk city)(the control group) were examined. Both groups had no considerable differences in the patient's age ( $50,5 \pm 1,7$  years) and total work experience ( $24,2 \pm 0,9$  years). All workers contacted at workplace with similar harmful industrial factors (dust, noise and vibration exceeding top permitted level). Control group consist of persons living and working in normal natural magnetic field' conditions. The persons of the experimental group which had been living in

natural anomalous region more than 20 years were divided into two subgroups. The first subgroup included the workers of open-cast mine (they contacted with the uncovered magnetic ore), the second subgroup consisted of the operators, which serviced magnetic separators (the source of industrial EMF).

The general (BA) and proper biological age PBA has been defined by the method of V.P.Voitenko et al., 1984 as the integral index of the functional state in dependence on age-related disturbances. The difference between BA and PBA determined the rate of the person ageing. The significance of it is equal  $\pm 5$  years estimated as physiologic (normal) ageing, more than 5 years - accelerated ageing. The delayed ageing was characterized by the low level of BA (proper BA was considerably more than BA).

Rates of ageing at workers of experimental group have made  $13,4 \pm 1,8$  years, and were authentically above, than in control group ( $7,1 \pm 0,4$  years;  $p < 0,05$ ). At quarry' workers and the persons serving magnetic separators of concentrating factory, authentic differences in rates of ageing it is not revealed: accordingly  $15,3 \pm 2,9$  years and  $12,1 \pm 1,6$  years.

59% workers from experimental group and 11% workers of rubber production plant had premature rate of ageing. 64,5% of quarry' workers and 55% of men serving magnetic separators had accelerated rate of ageing.

The most frequent pathology was arterial hypertension (AH) in the both workers' groups (35% workers from the ore concentrating factory, 16,1% from quarry' workers). Only 12% workers in control group suffered AH. Majority of workers (83%) had the premature ageing.

Conclusion. Prolonged exposure of abnormal natural magnetic field and industrial EMF in KMA region often lead to the acceleration of ageing processes. One of the main reasons of worker's premature ageing was AH.

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### **PRIORITY OF GLUTATIONPEROXIDASE AND GLUTATIONTRANSFERASE ACTIVITY CHANGES AT CHRONIC ADENOIDITIS AND THEIR REVERSIBILITY**

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High percentage of chronic adenoiditis (CA) among children, comparative resistance, and, in vivid cases, – little reversibility of the pathological process afflicting almost only children, - all this adds great significance to the problem of CA prophylaxis and treatment.

Aim: testing the state of antioxidant system at chronic adenoiditis among children, the optimization of remedial measures.

Materials and Methods: during randomized, prospective, controlled, simple blind clinical research the content of cytosolic enzymes of the antioxidative system – superoxide dismutase (SOD), catalase, glutationperoxidase (GPO) and glutation-S-transferase (GST) in the erythrocytes of 72 children with authentic diagnosis 'chronic adenoiditis' before and after care with a complex homeopathic preparation "Tonsilotren" (DHU, Germany). The control group consisted of 16 donors who had no chronic, somatic or ENT-pathology in the anamnesis and hadn't got any drug therapy for the previous month because of acute respiratory viral infection or any other nosology.

Results: GST enzymes' activity decrease ( $(1,100 \pm 0,118)$  mmol/min\*ml cells ( $P < 0,05$ )) and GPO ones' ( $(4,36 \pm 1,00)$  mmol/min\*ml cells ( $P < 0,05$ )) in erythrocytes of the children with chronic adenoiditis was established, that affords ground for supposing their priority at the given nosology. The results of SOD and catalase activity in the erythrocytes had no authentic differences.

The reversibility of the showings after the therapy with "Tonsilotren" reflects functional recovery activity of the enzymatic antioxidative system when the adaptation tension at chronic adenoiditis is developed.