*p less 0,05, **p less 0,01, ***p less 0,001

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ANALGESIC EFFECT OF CHRONIC, SIMULTANEOUS EXPOSURE TO WEAK VARIABLE MAGNETIC FIELD AND RED LIGHT IN RATS. G. Cieslar[1], J. Mrowiec[1], K. Sieron-Stoltny[1], A. Plech[2], S. Kasperczyk[3], A. Sieron[1]. [1]Chair and Clinic of Internal Diseases, Angiology and Physical Medicine, Silesian Medical Univ, PL-41902 Bytom, Poland, [2]Chair and Dept of Pharmacology, Silesian Medical Univ, PL-41808 Zabrze, Poland, [3]Chair and Dept of Biochemistry, Silesian Medical Univ, PL-41808 Zabrze, Poland.

Objectives. The aim of the study was to estimate the influence of chronic whole body simultaneous exposure to weak variable magnetic field used in magneto-stimulation and red light radiation on pain reaction in rats as well as the involvement of endogenous opioid system in the mechanism of this effect. Methods: Experimental material consisted of 32 male Wistar rats weighting 180-200 g. Weak variable magnetic field of saw-like shape of impulse, at a frequency of basic impulse 180-195 Hz and induction of 336-672 μT (depending on the position of magnetic field induction measuring points) and light radiation (wavelength - 630 nm, mean power - 0,35 W, energy density - 0,48 J/cm2) generated by magnetic-light applicator of device for magneto-stimulation Viofor JPS (Poland) were used. All animals were randomly divided into 4 groups (8 animals each). In first group whole body simultaneous exposure to magnetic field and light radiation lasting 12 minutes daily for 2 periods of 5 consecutive days with 2 days-lasting break between them, was made. In second, control group sham-exposure without generating magnetic field and light radiation inside of applicator was made. In order to estimate the involvement of endogenous opioid system in the mechanism of magnetic field and light radiation-induced analgesic reaction, in next 2 groups after prior (30 minutes before exposure) i.p. injection of Naloxone hydrochloride (1mg/1kg of body mass) antagonist of opiates - following 12 minutes lasting exposure to magnetic field and light radiation or sham-exposure respectively was made. During whole-body exposure animals were placed individually in a specially designed plastic chamber with cover made up by square magnetic-light applicator. The pain perception was determined by latency of foot-licking or jumping from the surface of a 56°C hot plate. The measurements were made at 5th, 15th, 30th, 60th, 90th and 120th minute after the end of a single exposure. Next the estimation of pain reaction was made at 24 hours after a single exposure, at 5th and 12th day of exposure cycle and at 7th and 14th day after the end of a cycle of exposures. On the basis of obtained measurements of pain reaction latency time an analgesic index was calculated according to special formula. In the statistical evaluation ANOVA analysis with subsequent post-hoc Mann-Whitney's U test were used. Summary of results: The mean values of analgesic index in all groups in particular time intervals after a single exposure and in particular days of exposure cycle are presented in table 1. As a result of repeated exposures both to weak variable magnetic field and red light irradiation a significant increase of pain reaction latency index persisting also after the end of a cycle of exposures as compared to sham-exposed group was observed. This magnetic field and light radiation–induced analgesic effect was inhibited by prior injection of opioid antagonist - Naloxone. Conclusion: Chronic simultaneous exposure of rats to weak variable magnetic field and red light radiation evokes strong, persistent analgesic effect in rats. In the mechanism of this effect is involved endogenous opioid system.

Table 1 Mean values of analgesic index [%] in all groups of animals in particular time intervals after a single exposure and in consecutive days of exposure cycle with statistical evaluation to control sham-exposed group < /td>

Time interval	Control sham-exposure mean ± SEM	Magnetic field and red light mean ± SEM	Magnetic field and red light and Naloxone mean ± SEM	Sham-exposure and Naloxone mean ± SEM
Before exposure	-0,2±0,9	-0,2±0,6	-0,9±0,3	-0,4±0,3
5 min.	-0,9±0,5	9,7±1,2***	1,1±0,9	-0,4±0,3
15 min.	-0,2±0,9	9,1±0,8***	-0,2±0,6	0,2±0,8
30 min.	0,4±0,8	9,7±1,0*	0,4±0,9	-0,4±0,3
45 min.	-0,2±0,7	9,7±1,3*	1,1±0,9	-0,4±0,3
60 min.	-0,2±0,7	11,1±0,7***	-0,2±0,6	0,2±0,5
90 min.	-0,9±0,5	9,7±0,9***	-0,9±0,3	-0,4±0,3
120 min.	-0,9±0,5	10,4±1,0*	-0,9±0,3	-0,4±0,3
2 day of exposure cycle	1,1±2,0	6,8±0,8*	-	-
5 day of exposure cycle	0,5±1,0	9,5±0,7***	-	-
12 day of exposure cycle	-1,6±0,9	8,1±1,4***	-	-
7 day after the end of exposure cycle	-2,3±0,8	6,1±1,2***	-	-
14 day after the end of exposure cycle	-3,7±1,1	5,4±1,1**	-	-
1 day of exposure cycle	1,1±2,0	6,8±0,8*	-	-

*p less 0,05, **p less 0,01, ***p less 0,001

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REVIEW OF 30 STUDIES INVESTIGATING CANCER IN LABORATORY ANIMALS EXPOSED TO RADIOFREQUENCY ENERGY. J. A. Elder. Motorola Florida Research Labs, 8000 W. Sunrise Blvd., Ft. Lauderdale, FL 33322.

Objective: To review long-term exposure studies examining whether radiofrequency (RF) energy