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Research Article

Action of Polarized Light on the Organism of Mice Infected by the Death Dosage of the Influenza Virus A, through the Acupuncture Points

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Abstract

The purpose of this study was to study the effectiveness of polychromatic polarized light on the body's protective forces of mice infected with a lethal dose of the influenza A/PR/8/34 virus through exposure to acupuncture points. It was found that when infecting mice with a lethal dose of the influenza A virus, a rapid accumulation of infectious and hemagglutinating activity occurred, which resulted in 100% death of animals on the 6th day after infection (control). Light therapy through acupuncture points of infected mice, delayed the reproduction of the influenza A virus for a day. Infectious and hemagglutinating activity were lower compared to the control group. The use of polarized light in influenza through acupuncture points did not have a significant protective effect on animals, only 20% of the experienced mice survived (the surface area of the irradiation and its dose decreased).

Keywords: Influenza A Virus; Polarized Light; Acupuncture Points; Mice

Introduction

Any living organism is a system consisting of atoms, molecules and energy fields where matter and energy are not separate discrete states and form continuity from lower frequencies (matter) to higher frequencies (energy) and energy can be transformed into matter. It is proved that living organisms perform their functions both through chemical reactions between their atoms and molecules, and thanks to flows of different forms (chemical, mechanical, thermal, electric, magnetic) energy within complex functional systems. The main mechanism for the interaction of electromagnetic fields in living structures is the movement of electrons and changes in the synthesis of new compounds [1-3].

Studies have shown that elements of classical acupuncture have a material basis. Acupuncture points are polymodal structures that are activated by adequate stimuli, as well as by electromagnetic and magnetic fields, the effect on them has a curative effect [4].

Despite the widespread use of the acupuncture system in modern clinical practice, the clinical effectiveness of this method of treatment of patients continues to be a contentious issue [5,6].

Due to the deep penetration of polarized light, its transcutaneous penetration occurs - non-invasive positive photomodification of the formed blood elements (erythrocytes, leukocytes and platelets) is observed. The anticoagulant activity of blood inhibitors (antithrombin III) and the content of the tissue activator of plasminogen are increased, the aggregation activity of platelets decreases and the rheological properties of blood (its viscosity) are improved [7-11].

The purpose of this study was to study the effectiveness of polychromatic polarized (PILER) light on the body's protective forces of mice infected with a lethal dose of the influenza A/PR/8/34 virus through exposure to acupuncture points.

Materials and Methods

White mice, Balb-s lines weighing 13-14 g, chick embryos (10 - 11 days old), influenza A/PR/8/34 (H1N1) with an infectious titer of 10-1 LD_{50}/0,1 ml. The flu virus was used in breeding 10^{-1}. The dose of the virus - 10-1 LD_{50}/0.1 ml was lethal for white mice. For the treatment of animals we used PILER light with a wavelength of 400-2000 nm, with every minute light energy of 3.4 J/cm^2.

The animals were divided into 5 groups of 10 pieces each. in each (Table 1). 1st group of animals - control of the influenza virus, 3rd group - control of the action of the PILER light, 4th group - control of the action of the physiological solution used to dilute the virus, the 5th group - control of the animals. Groups 1 and 2 were infected intranasally with a lethal dose of the influenza A/PR/8/34 virus (1 LD_{50}/0.1 mL). The 2nd group after infection received 14 sessions of light therapy (see table 1) for 6 minutes. on the session. 4 acupuncture points on the back were irradiated with polarized light - DA-UZHUY, T/XH1/14; MINIM-MEN T/HN1/4; GAO-JUAN U/VI 11/43. DA-UZHUY, T/XH1/14 is not a symmetrical point, located on the posterior midline between the spinous process of the 7th cervical and 1st thoracic vertebrae.

No	Name of group	Number of mice in a group	The dose of the influenza virus in LD50/0.1 ml	Time after infection (day)							
				1	2	3	4	5	6	7	8
1.	Influenza A virus	10	1	-	-	-	-	-	-	-	-
2.	Influenza virus A + PILER light	10	1	6	6	6 x 2	6 x 2	6 x 2	6 x 2	6 x 2	6 x 2
3.	Control PILER light	10	-	6	6	6 x 2	6 x 2	6 x 2	6 x 2	6 x 2	6 x 2
4.	Physiologist. solution	10	-	-	-	-	-	-	-	-	-
5.	Healthy animals	10	-	-	-	-	-	-	-	-	-

Table 1: Treatment of polarized light in mice infected with the influenza A/PR/8/34 virus.

Note: 6 x 2 - for 6 minutes irradiation 2 times a day with an interval of 6 hours.

GAO-JUAN, V / VII / 43 - the symmetrical point is 0.5 cm away from the posterior midline between the spinous process of the 4th and 5th thoracic vertebrae. MIN6-MEN6, T/XH1/43 is not symmetrical, located on the posterior midline, between the spinous processes of the 2nd and 3rd lumbar vertebrae (Figure 1).

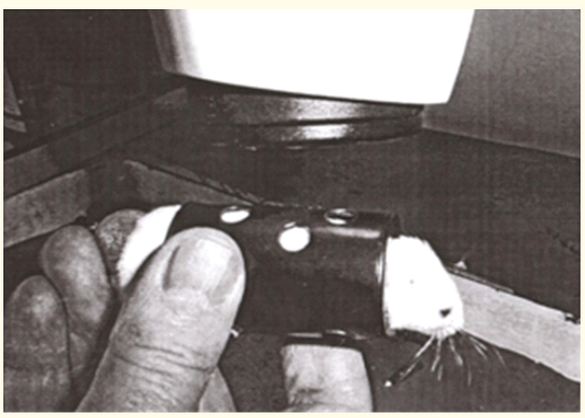

Figure 1: The effect of polarized light on white mice (through acupuncture points).

On the 15th day after infection, all animals that survived were opened under deep ether anesthesia, fetched lungs and blood. The dead animals were taken away with lungs. The lungs were washed three times in 0.01M phosphate buffer (pH 7.5), cut with scissors and triturated with sterile glass in a porcelain mortar, then they were sonicated at 18 kHz for 75 seconds. on the Soniprep 150 MSE. All work was done in the cold (+ 40C). Lung homogenate was dissolved in 0.01 M phosphate buffer (pH 7.5) 1: 1 (1 light per ml). Subsequently, the homogenate was centrifuged at 7000 rpm 15 minutes. Lung supernatant and serum of white mice were used to determine proteinase and inhibitory activity, influenza virus hemagglutinin, protein, and infectious activity of the virus.

The infectious titre of influenza A virus in the lungs and serum of infected mice was determined by infecting 10 - 11 day old chick embryos and expressed in EID50/0.2 ml (dose of influenza A virus, at which 50% of chick embryos died).

In this work we used 160 pcs. chicken embryos (10 - 11 day old), lungs, serum of infected white mice (70 pieces) and influenza A/PR/8/34 (H1N1). Infected lungs and blood serum were pooled into groups of animals and on the day of infection. To determine the infectious titer of the influenza A virus, the lungs of the dead mice of the 1st group were taken on the 4th, 5th and 6th day after infection. In the second group of animals, the lungs were taken on the 5th, 6th, 7th and 14th days after infection; blood - only in animals on the 14th day after infection. From each pool of lungs or blood serum, from 10-1 to 10-8, two chicken embryos were used for each dilution. Under sterile conditions, the studied material in a volume of 0.2 ml was introduced into the allantoic cavity of chicken embryos. The hole in the chick embryos was sealed with paraffin and incubated for 48 hours at t + 37^{0}C for the incubation of the influenza virus. After 48 hours, the embryos were transferred to a refrigerator for cooling for 48 hours at t + 40°C. At the same time, the blood vessels narrowed, and we received a clean, blood-free al-

lantoic fluid in which hemagglutinating activity was determined to determine the infectious titer.

Proteinase activity was determined from the hydrolysis of protamine by the method of K.M. Veremeenko in the modification of S.V. Vovchuk. Determination of proteinase inhibitors in lung homogenate, serum and allantoic fluid was carried out by the casein method. Levitsky. Infectious influenza virus titre in lungs, infected mice, and allantoic fluid was determined by infecting 10-11 day-old chick embryos and mice, expressed in lg EID_{50}/0.2 ml and LD_{50}/0.1 ml. The hemagglutination reaction was carried out according to the generally accepted method with a 1% solution of chicken red blood cells. The protein was determined by the method of O. Lowery.

Results and Discussion

As shown by the results of the studies (Table 2), 100% of the animals of the 1st group infected with the lethal dose of the influenza A virus were attacked on the 6th day. In the second group, which underwent a course of irradiation with polarized light, after infection with a lethal dose of the influenza A virus, 80% of the animals died. Mortality stopped on the 7th day after infection. On the 14th day, 20% of the mice remained alive.

No	Name of the group	Number of mice in the group	The dose of LD_{50} virus in 0.1 ml	Number of sessions	Time after infection (hours, days)													
					24c.	48c.	3c.	4c.	5c.	6c.	7c.	8c.	9c.	10c.	11c.	12c.	13c.	14c.	% of you-living
1.	Influ-enza A virus	10	1	-	0/10	0/10	0/10	3/7	3/4	4/0	0	0	0	0	0	0	0	0	0
2.	Influ-enza virus + PILER light	10	1	18	0/10	0/10	0/10	1/9	2/7	3/5	2/2	0/2	0/2	0/2	0/2	0/2	0/2	0/4	20
3.	PILER light	10	-	18	0/10	0/10	0/10	0/10	0/10	0/10	0/10	0/10	0/10	0/10	0/10	0/10	0/10	0/10	100
4.	Physiol. solution	10	-	-	0/10	0/10	0/10	0/10	0/10	0/10	0/10	0/10	0/10	0/10	0/10	0/10	0/10	0/10	100
5.	Healthy Mice	10	-	-	0/10	0/10	0/10	0/10	0/10	0/10	0/10	0/10	0/10	0/10	0/10	0/10	0/10	0/10	100

Table 2: Accounting for the death of animals infected with the influenza virus A /PR /8/34 and undergoing light therapy.

Notes: Numerator: Dead Mouse; Denominator: Surviving Mouse; 1 LD_{50} in 0.1 ml is the lethal dose of the influenza A virus.

Animals of the 3rd, 4th and 5th groups (control of PILER light, saline, healthy mice) remained alive after 14 light therapy sessions.

As shown by the results of the study (Figure 2), the hemagglutinating activity (HA) in the lungs of the 1st group of mice infected with the lethal dose of the influenza A virus increased sharply, and reached the maximum value (1: 512) by the 2nd day. Later GA slowly decreased, and by the 6th day, when all the animals died, it was 1:20.

Infectious titre (IT) of influenza A virus in the lungs of infected mice (1st group) reached the maximum value (10-6) by the 2nd day. In the following terms, the titer slowly decreased. When there was a 100% death of mice on the 6th day after infection, IT was 10-2. From the 4th day after the infection, the IT of the influenza virus was higher than the GA titer.

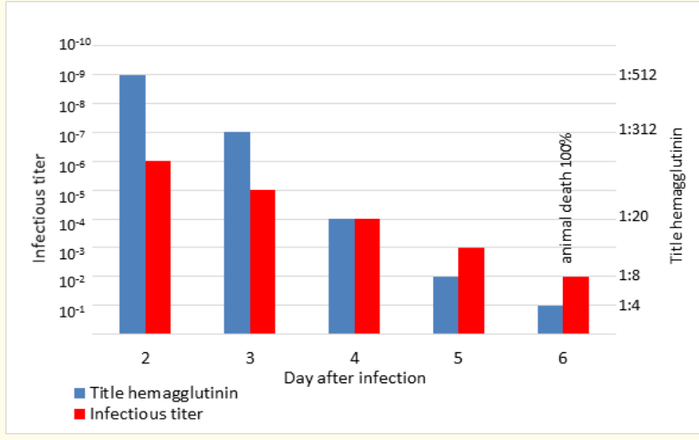

Figure 2: Infectious and hemagglutinating activity in lungs of mice infected with a lethal dose of the influenza A virus (in chick embryos).

Thus, when mice were infected (Group 1), a lethal dose of influenza A/PR/8/34 caused a rapid accumulation of infectious and hemagglutinating activity, which resulted in 100% death of animals on the 6th day after infection.

In figure 3 the results of studies for the second group of animals infected with a lethal dose of influenza A virus and treated with polarized light are presented.

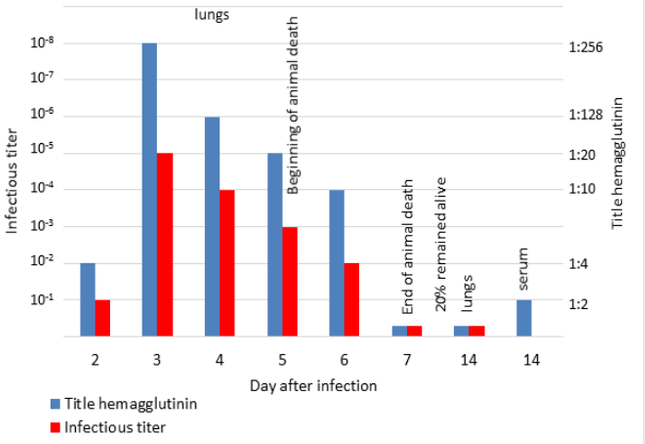

Figure 3: Infectious and hemagglutinating activity in the lungs and blood serum of mice infected with a lethal dose of influenza A virus and undergoing irradiation with polarized light (in chick embryos).

As can be seen from the results of the study, HA and IA of the maximum value (1: 256) reached the 3rd day after infection. On the 5th day after infection, when animals began to die, the GA and IA remained at the same level as in the 1st group.

On the 7th day GA and IA were not determined. Since that time, animals have ceased to die. On the 14th day after infection in the lungs of mice, GA and IA were not detected.

When determining the protein content in the lungs of animals of the 1st group, a sharp increase was observed on the 4th day after infection, in comparison with the control group 5. On the 6th day, the protein content decreased sharply, and the animals died (Figure 4). In the second group, the increase in protein content was noted on the 5th day after infection (Figure 5). Later the amount of protein was constantly decreasing. In surviving animals, the amount of protein on the 14th day after infection in the lungs and serum was restored to normal. In animals of the third group (control of polarized light), the protein content in the lungs and serum was increased in comparison with the control group 5 (Figure 6).

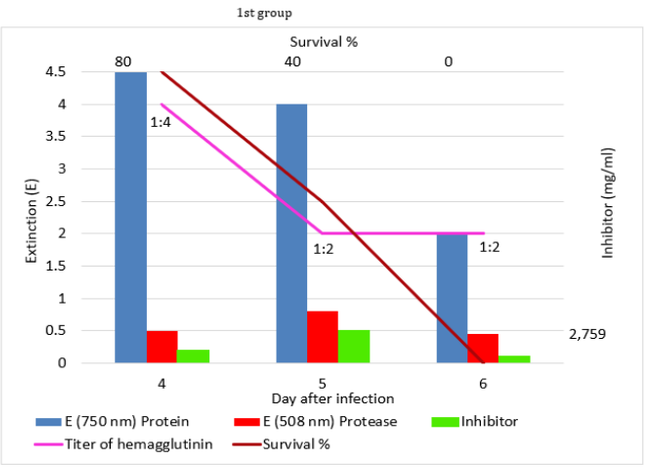

Figure 4: Effect of the influenza virus A/PR/8/34 on the body of mice.

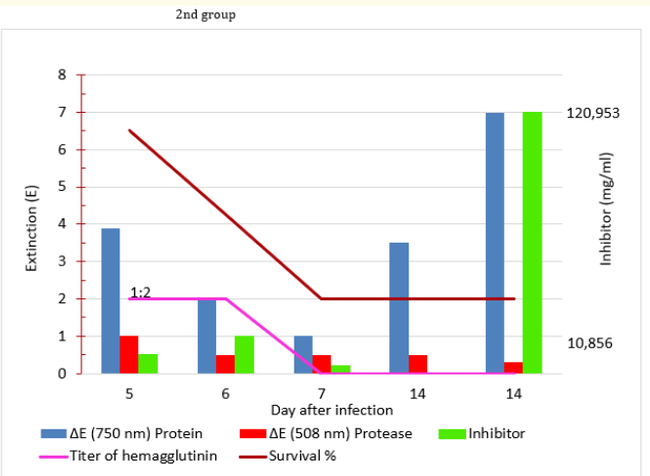

Figure 5: Influence of irradiation with PILER light on the organism of mice infected with a lethal dose of the influenza A/PR/8/34 virus.

In the fourth group of animals (control of physiological solution), a slight increase in the protein content in the lungs was noted, while in the serum the amount of protein did not change (control group 5).

Proteinase activity in the lungs of mice of the 1st and 2nd group was constantly decreasing. In the third and fourth groups, the proteinase activity corresponded to the amount of proteinase in the control group 5.

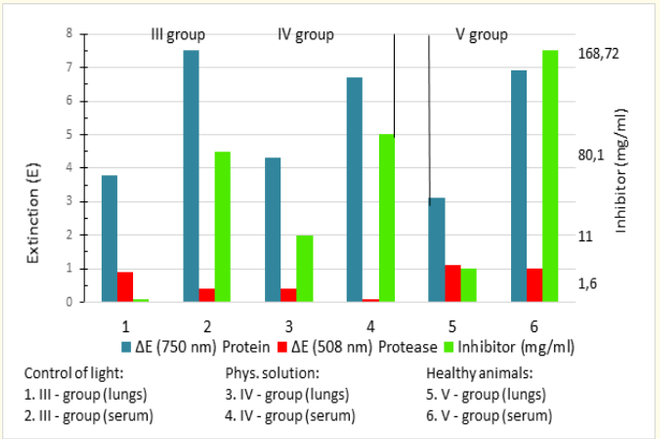

Figure 6: The effect of PILER light and saline on the body of healthy mice 14 days after the start of the experiment.

In healthy animals of the 5th group, the inhibitor activity in the lungs was 1.16 ± 0.88 mg/ml, in the blood serum - 168.7 ± 15.9 mg/ml. In the first group, an increase in inhibitor activity was noted 5 days after infection. In the second group of animals, the survival of the inhibitor of trypsin-like proteinases to 120.95 ± 10.40 mg/ml was observed in the surviving mice on the 14th day after infection in the blood.

In the 3rd group, the inhibitor activity in the lungs of mice was completely suppressed by PILER light and by 50% in serum (80.12 ± 8.84 mg/ml). In the fourth group, an increase in inhibitor activity in the lungs to 11.00 ± 9.53 mg / ml and a decrease in inhibitor activity in the blood serum of mice to 99.38 ± 8.22 mg/ml were observed under the action of physiological solution.

Thus, light treatment by PILER light of animals infected with a lethal dose of the influenza A virus, delayed the reproduction of the influenza virus for a day. Infectious and hemagglutinating activity was lower in comparison with the control group 1. 20% of animals remained alive and on the 14th day after infection, while in the control group 100% of animals died on the 6th day after infection.

After light treatment, PILER light showed a decrease in proteinase activity and an increase in inhibitor activity. Infectious and hemagglutinating activity was determined in a small amount, it can be assumed that the influenza A virus did not die, but its multiplication in the mice was inhibited. During this period, the inhibitory (protective) activity was restored and the animals survived. The effect of PILER light on the entire surface of the mouse and separately on the acupuncture points differ from each other. When the entire surface of the back of the mice was irradiated with PILER light, the protective forces of the animal's organism were restored, and they recovered, while irradiation through the 4 acupuncture points reduced the surface area and dose, which increased the death of animals, only 20% of the mice recovered.

Conclusion

1. When mice were infected with a lethal dose of the influenza A/PR/8/34 (H1N1) virus, a rapid accumulation of infectious and hemagglutinating activity occurred, which resulted in 100% death of animals on the 6th day after infection.
2. The effect of polarized incoherent polychromatic light on the acupuncture points of mice had an insignificant protective effect on them. Only 20% of the experimental animals survived (the surface area and dose of irradiation decreased in comparison with previous study when all back surface was irradiated).
3. If irradiate only acupuncture points may need to increase irradiating intensity.

Bibliography

1. Limanskiy YP., *et al* "Scientific bases akupunktury". *Alternative Medicine* 1 (2012): 61-76.
2. Blank M and R Goodman. "Electromagnetic fields may act directly on DNA". *Journal of Cellular Biochemistry* 75.3 (1999): 369-374.
3. Goodman R and M Blank. "Insights into electromagnetic interaction mechanisms". *Journal of Cellular Biochemistry* 192.1 (2002): 16-22.
4. Mayer DJ. "Biological mechanisms of acupuncture". *Progress in Brain Research* 122 (2000): 457-477.
5. Y Zhuang., *et al*. "History of acupuncture research". *International Review of Neurobiology* 111 (2013): 1-23.
6. Ernst EJ. "Acupuncture - a critical analysis". *Internal Medicine* 259.2 (2006): 125-137.
7. Gulyar SO and AL Kosakovsky. "Zastosuvannya Bioptron-Pilar svitla in meditsini. By: IFB NAS of Ukraine is the Ministry of Health of Ukraine KMAPE (2006): 152.
8. Zhevago NA and KA Samoĭlova. "Modulation of proliferation of peripheral blood lymphocytes after irradiation of volunteers with polychromatic visible and infrared light". *Tsitologiia* 46.6 (2004): 567-577.
9. ON Bogacheva., *et al*. "Enhancement of fibroblast growth promoting activity of human blood after its irradiation in vivo (transcutaneously) and in vitro with visible and infrared polarized light". *Tsitologiia* 46.2 (2004): 159-171.

10. Zhevago NA and KA Samoilova. "Pro- and anti-inflammatory cytokine content in human peripheral blood after its transcutaneous (in vivo) and direct (in vitro) irradiation with polychromatic visible and infrared light". *Photomedicine and Laser Surgery* 24.2 (2006): 129-139.

11. JH Lim., *et al*. "The effects of daily irradiation with polychromatic visible polarized light on human lymphocyte populations". Photomedicine and Laser Surgery 26.4 (2008): 361-366.

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