

References

1. Gins M. S., Gins V. K., Baykov A. A., Rabinovich A.M., Kononkov P. F., Solntsev M. K. Content of antioxidants in medicinal and vegetable plants showing antitumor activity // Questions of biological, medical and pharmaceutical chemistry. - 2013. - Vol. 11.- №2. - P. 010-015.
2. Sapozhnikova E. V., Dorofeeva L. S. Determination of ascorbic acid content in colored plant extracts by iodometric method // Canning and vegetable drying industry. - 1966. – No. 5. - C. 29-31.
3. Gins M. S. Biologically active substances of amaranth. Amaranthine: properties, mechanisms of action and practical use // Moscow: RUDN. - 2002. - 176 p.
4. Popov V. N., Antipina O. V., Trunova T. I. Peroxidation of lipids during low-temperature adaptation of leaves and roots of heat-loving tobacco plants // Plant Physiology. 2010. Vol. 57.P. 153-157.

THE ROLE OF POLYAMINE METABOLISM IN THE REGULATION OF MALE GAMETE APOPTOSIS

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Abstract: The content of polyamines in the seminal plasma of men of different fertility was compared and the relationship between the level of spermine and spermidine in semen and the presence of apoptosis markers in gametes were found. The content of seminal plasma polyamines (PA), the stability of sperm membranes, and the number of apoptotic gametes in the ejaculates of fertile and infertile men (n = 40) were compared before and after short-term exposure in the in vitro experiment of millimeter-wave electromagnetic radiation (MM EM range).

Keywords: polyamines, seminal plasma, sperm, apoptosis, millimeter-wave electromagnetic radiation.

Background: Spermine (SPM) and spermidine (SPD) are polyamines (PA) that are widely present in body tissues and body fluids, and are vital essential for cell growth, cell proliferation, and differentiation.

The ability of PA is well known to coordinate the process of cell apoptosis [1, P.143].

PA of human seminal plasma are poorly studied, it is only known that they are produced by prostate gland and participate in the regulation of seminal plasma pH.

The structures of sperm DNA to activate gamete motility are decapacitating factors, and during fertilization they participate in the regulation of integrity of sperm membranes [1, P.134].

The millimeter-wave electromagnetic radiation range (EMI MM-range) is often used in complex therapy of various diseases, including diseases of the male reproductive system.

For example, for the complex treatment of chronic prostatitis EMI there is MM-band with wavelengths of 7.1 or 5.6 mm, flow power of 1 mW / cm² and exposure time of 20 min.

However, there is no reliable data of influence of millimeter waves on human sperm [4, P.136].

It is known that the main targets for the action of millimeter waves on living organisms are membranes cells [3, P.167].

Predominant localization of various classes of phospholipids on the internal or the outer sides of the cytoplasmic membrane is one of the mandatory conditions of the viability of the cells.

When apoptosis begins in the cell and the cell loses its function there is a violation of phospholipid asymmetry in the membrane and transfer of phosphatidylserine (FS) to its outer side [2, P.176].

The aim of the study was to identify the participation of PA in the implementation of biological effects of microwaves and regulation of apoptosis of male gametes.

Materials and methods: Ejaculates of healthy fertile (n=20) and infertile men (n=20) aged from 22 to 38 years were studied, who agreed for researching.

Evaluation of standard indicators spermograms were produced in according to WHO standards [5, P.218].

The electromagnetic field had a wavelength of 7,1 mm, a frequency of 42,194 GHz, a power density of 0,1 mW/cm², the exposure time was 20 minutes. PA was determined by agar gel electrophoretic fractionation. The resistance of sperm membranes was determined by their resistance to hypertonic sodium chloride solution (Milovanov test).

Apoptosis was determined by the externalization of phosphatidylserine (FS) on the outer side of the sperm membrane.

Results:

In the sperm of infertile men (n=20), more apoptotic spermatozoa were detected in comparison with fertile donors (p<0.001).

Against the background of a general decrease in the concentration of polyamines in the ejaculates of infertile patients, there is a change in the ratio between polyamines with a predominance of spermine in the seminal fluid.

The connection between the externalization of PS in gametes and the concentration of spermine in the sperm plasma (r =0,5; p<0,01) was found.

It was shown by the peripheral blood lymphocyte apoptosis model of 20 donors, that spermine and spermidine in physiological concentrations reduce the ability of cells to apoptosis, and in large doses stimulate the development of apoptosis of these cells, and spermine has a more pronounced stimulating effect.

These effects are realized after a 24-hour incubation of cells with polyamines. the decrease in the concentration of PA, the increase in the resistance of sperm membranes, and the decrease in the number of apoptotic gametes after a short-term exposure to sperm of men of the EMM MM-band with the described characteristics were revealed.

Conclusion:

The results revealed the participation of PA in the implementation of bio-effects of microwaves on human semen and confirmed the role of PA in the regulation of male gamete apoptosis.

Thus, the change in the concentration of polyamines in the seminal fluid of men is one of the factors that regulates apoptosis of germ cells.

References

1. Ploskonos M.V., Evdokimov V.V. Polyamines of the urogenital tract of men as factors regulating sperm apoptosis. *Urology*. 2019; 4:74-79. (in Russian). Doi: [//dx.doi.org/10.18565/urology.2019.4.74-79](https://dx.doi.org/10.18565/urology.2019.4.74-79).
2. Ploskonos M.V. Externalization of phosphatidylserine and functional and morphological sperm disorders in men who have been in an infertile marriage for a long time. *Urology*. 2016; 4:87-91. (Ploskonos M.V. Phosphatidylserine externalization and functional-morphological impairment of sperm in men with long barren marriage. *Urologiia*. 2016; 4:87-91. Russian).
3. Presnyakova M.V., Polyakova A.G., Kostina O.V. Response of the hemostatic system in patients with burn injury to short-term extremely high-frequency electromagnetic radiation blood samples in vitro. *Thrombosis, Hemostasis and Rheology*. 2016; 2(66):73-78. (in Russian).
4. Subbotina T.I., Tkachenko V.N., Yashin A.A. Influence of high-frequency electromagnetic fields radiation on the reproductive function. System analysis and management in biomedical research systems. 2002; 4:391-394.
5. WHO laboratory manual for the examination and processing of human semen (2010) 5th ed., WHO (Geneva), Vol. 270/.

LUNG ULTRASOUND AS AN OPTIMAL INSTRUMENTAL METHOD OF HEMODYNAMIC CONGESTION ASSESSMENT IN PATIENTS WITH CHRONIC HEART FAILURE

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Abstract:

This article reviews various methods of hemodynamic congestion assessment of patients with chronic heart failure, emphasizes the role of lung ultrasound as the most optimal method for assessing congestion in these patients.

Keywords: heart failure, lung ultrasound, B - lines