

BIBLIOMETRICAL ANALYSIS OF NEUROPHYSIOLOGICAL INVESTIGATIONS OF ACTION OF ELECTRIC FIELDS IN THE SECOND HALF OF THE XX CENTURY

R.A. Chizhenkova

Institute of Cell Biophysics of PAS, Pushchino, Moscow region, Russia 142290;

E-mail: chizhenkova@mail.ru

Biological effects of non-ionizing radiation (NIR) of different kinds interested humanity for many centuries [5]. Undoubtedly the nervous system is of great significance in reactions of organism to NIR [1-3, 6, 7]. Our pioneering investigations revealed predominant role of direct action of non-ionizing radiation of different kinds on brain structures [1].

Bibliometrical analysis of published material on neurophysiological aspects of action of MIR was not carried out up to our investigation. We began bibliometrical analysis on this problem [4, 5].

The present work is devoted just to bibliometrical examination of published works, specifically on action of electrical fields upon neurophysiological objects of different kinds.

MATERIALS AND METHODS

Information accumulated in world on neurophysiological effects of electrical fields during 35-year period in the later half of the XX-th century (1966-2000) was considered. The state of investigations of this trend was analyzed on the base of the database "Medline" accessible through Internet. Bibliometrical data concerned investigations performed in neurophysiological objects (the brain, the cortex, neurons, nerves) with application of electric fields were represented.

RESULTS AND DISCURSION

During 35-year period the general numbers of published works on biological effects of electrical fields reached value - 3369. From them 699 works were carried out in different neurophysiological objects. They included 232 researches of action of electrical fields on the brain, 70 - on the cortex, 176 - on neurons, 221 - on nerves, that corresponded 33.19%, 10.01%, 25.18% and 31.62% from general totality. Distinctions between indicated events were mathematical certain ($U=2.67-10.92$; $p<0.05$).

Dynamics of the numbers of considered published works was studied. Design of this dynamics had exponential character.

Positive correlation between the numbers of papers made in different neurophysiological objects with application electrical fields was found ($r = 0.44-0.92$; $p<0.01$).

The prevalence of researches in the brain is result of increased interest of specialists in sphere of medicine and ecology to action of NIR. However exactly study on neuronal level is necessary for understanding of origin of reaction of organism on electrical fields [2, 3, 6, 7].

Undoubtedly neurophysiological investigation of action of electrical fields will hold a leading position at in future.

CONCLUSION

Results of bibliometrical investigations of neurophysiological published works on action of electrical fields are presented. The special features of quantitative characteristics of works, carried out in different neurophysiological objects (the brain, the cortex, neurons, nerves) are described. Analysis of neurophysiological effects of electrical fields will have further development in XXI century [5].

REFERENCES

1. Chizhenkova R.A. Role of different cerebral structures in electroencephalographic reactions of the rabbit to constant magnetic field and UHF and EMF electromagnetic fields // Zh. Vyssh. Nev. Deyat. - 1967. - V. 17. - No.2. - P. 313-321 (in Russian).
2. Chizhenkova R.A., Slow potentials and spike unit activity of the cerebral cortex of rabbits exposed to microwaves // Bioelectromagnetics. -1988.- V. 9.-. No. 4.- P. 337-345.
3. Chizhenkova R.A., Pulse activity of populations of cortical neurons under microwave exposures of different intensity // Bioelectrochemistry. - 2004.- V. 63.- No. 1/2. - P.343-346.
4. Chizhenkova R.A. Bibliometrical review of neurophysiological investigation of action of non-ionized radiation in second half of the XXth century // Biophysics. - 2005. - V. 50. - Supplement. - No. 1. - P. 163-172.
5. Chizhenkova R.A. Dynamics of neurophysiological investigations of action of non-ionized radiation in second half of the XXth century. M.: Publ. House of Acad. of Natural Sciences, - 2012. - 88 p. (in Russian).
6. Chizhenkova R.A Pulse flows of populations of cortical neurons under low-intensity pulsed microwaves: interspike intervals // Radiational biology. Radioecology. - 2014. - V. 54. - No. 4. - P. 393-404 (in Russian).
7. Chizhenkova R.A., Safroshkina A.A. Effect of low-intensity microwaves on the behavior of cortical neurons // Bioelectrochemistry and Bioenergetics. - 1993. - V. 30. - No. 1. - P. 287-391.