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ISSN 2410-7751 (Print)
ISSN 2410-776X (Online)

Biotechnologia Acta
T. 7, № 1, 2014

"Biotechnologia Acta" v. 7, no 1, 2014
doi: 10.15407/biotech7.01.087
P. 87-92, Bibliography 13, Ukrainian
Universal Decimal classification: 621.318.4:616

MECHANOMAGNETIC REACTOR FOR ACTIVATION OF ANTICANCER DRUGS


1 National Cancer Institute Ministry of Medical Health, Kyiv, Ukraine
2 National Technical University of Ukraine «Kyiv Polytechnic Institute», Kyiv
3 Kurdyumov Institute for Metal Physics of National Academy of Sciences of Ukraine, Kyiv
Mechanomagnetochemical activation can increase the concentration of paramagnetic centers (free radicals) in the anticancer drug, for example, doxorubicin that enables to influence its magnetic properties under external electromagnetic field and improve its magnetic sensitivity and antitumor activity. The principles of design and operation of mechanomagnetic reactor for implementation of this technology which includes mechanomagnetochemical activation and electromagnetic radiation of the drug are described in the paper. The methods of vibration magnetometry, electron paramagnetic resonance spectroscopy and high-performance liquid chromatography were used for studying of doxorubicin mechanomagnetic activation effects.

The studies have shown that a generator of sinusoidal electromagnetic wave, working chambers from caprolactam, fluoroplastic or organic materials with metal inserts and working bodies made from steel or agate depending on the required doxorubicin magnetic properties are expedient to use in the designed mechanomagnetic reactor. Under influence of mechanomagnetochemical activation doxorubicin, which is diamagnetic, acquires the properties of paramagnetic without changing g-factors in the spectra of electron paramagnetic resonance. Mechanomagnetochemical activation of doxorubicin satisfies pharmacopoeia conditions according to the results of liquid chromatography that points on perspective of this method using in technology of tumor therapy with nanosized structures and external electromagnetic radiation.

**Key words:** free radicals, doxorubicin, mechanomagnetochemical activation.

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The use of nanoferromagnetics to increase the cytotoxic effect of antitumor drugs. Exp. Oncol.
2009, 31(3), 163–166.


4. Orel V. E., Kudryavets Yu. I., Bezdenezhnih N. N., Satz S., Danko M. I., Krhanovskaya N. N.

Mechanochemically activated doxorubicin nanoparticles in combination with 40 MHz frequency irradiation on A–549 lung carcinoma cells. Drug Deliv.
Burlaka A.
P.
Lukin S.
M.
Uvarov V.
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Schepotin I.
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