SELF-DEPENDENT ANTITUMOR ACTION OF LOW-INTENSIVE FACTORS OF THE ELECTROMAGNETIC AND BIOCHEMICAL NATURE IN EXPERIMENTS

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Research objective

Influence of *weak* electromagnetic radiations of various frequency ranges and bioactive substances taken in ***small doses*** **on *tumors* and *state of organism* of experimental animals**

Results of earlier researches

(L.H. Garcavi, A.I. Shiklyarova, F.M. Zaharuta)

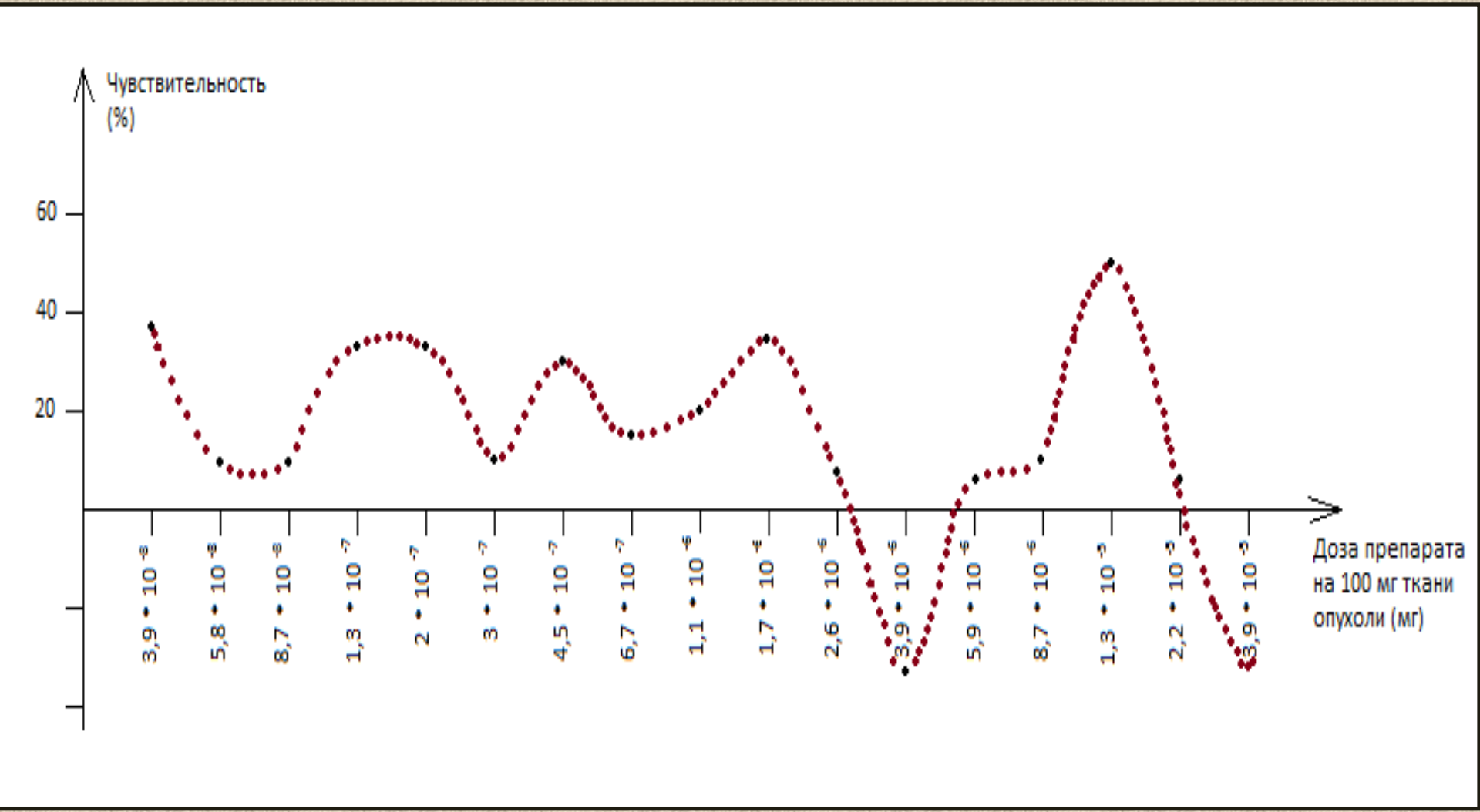
1. Polymodal dependences of reactions of a tumor and organism from intensity of the factors:

- ***sensitivity*** *of a tumor tissue to* **cytostatics**
- *expression of* ***antistress*** *effect of* **adrenaline**
- *expression of* ***antitumor*** *influence of* ***adrenaline***
- *expression of* ***antitumor*** *influence of* **magnetic field** of low intensity and infra low-frequency

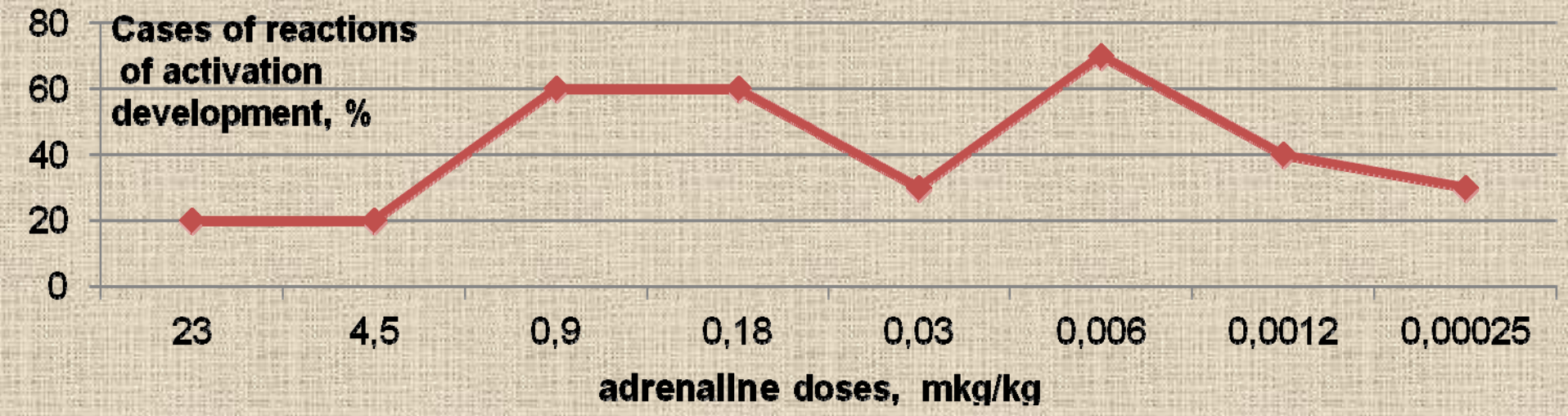
2. The effects of *liquor* in small doses

- *antitumor effect*
- *geroprotective effect*

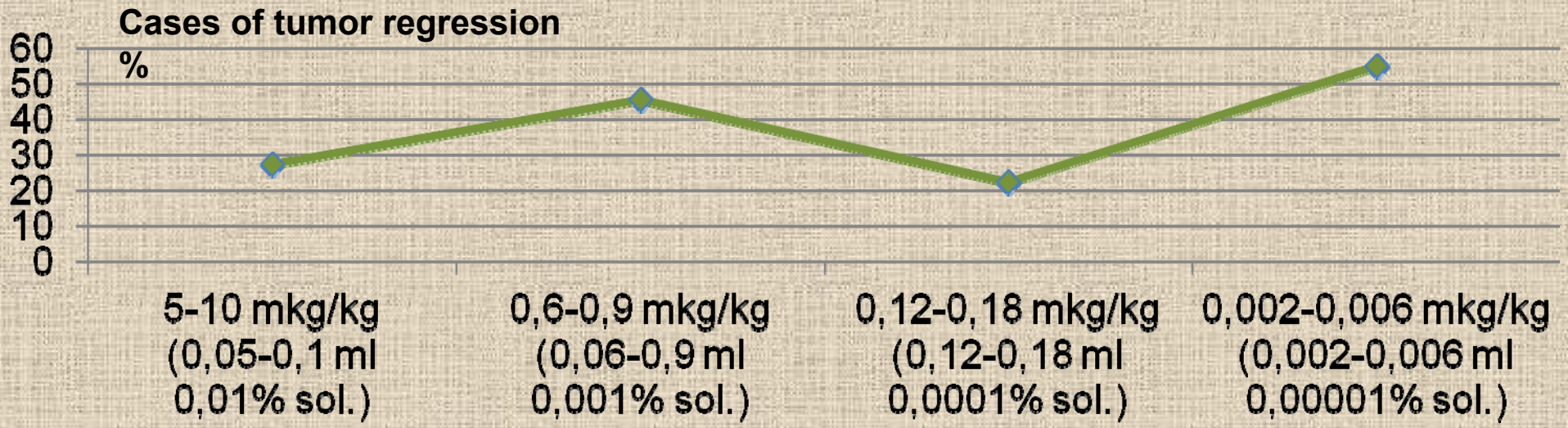
Sensitivity of **RMK-1** ***tumor*** *tissue* ***to tiofosfamid*** *(*cytostatic) at consecutive change of its dose



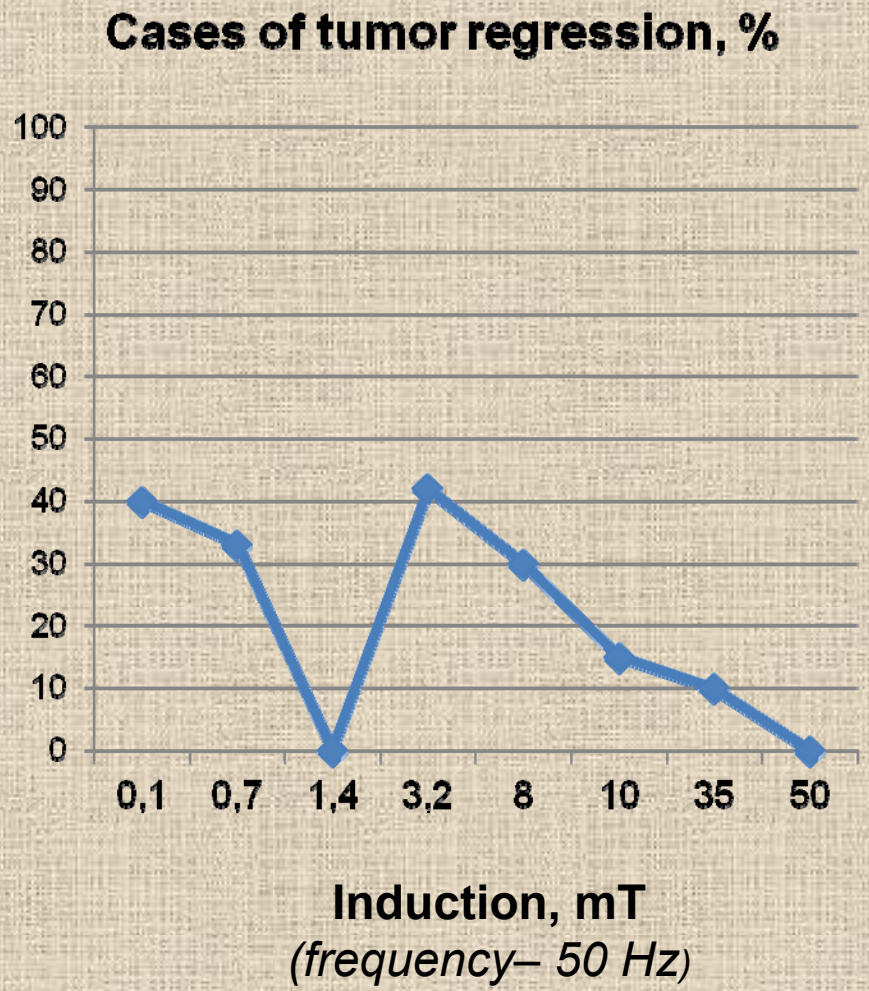
Antistress effect at rats without tumors as a result of single injection of **adrenaline** in various doses



Antitumor activity of **adrenaline** in various doses



Nonlinear dependence between antitumor effect and the parameters of magnetic field of low intensity and infra low frequency (ILF MF) – an induction, frequency characteristics



ILF MF, 3,2 mT:

50 Hz ⟶ 0,03 – 0,3 – 3 – 9 Hz

▲ Increase in time of achievement of effect at 25-30%

▲ Increase in life expectancy by 2,4 times

Effects of the cerebrospinal fluid ***(CSF, liquor)*** *taken in small doses*

(***Intraspecific*** **heteroliquorotherapy** - ***L.H. Garkavi, A.I. Shiclyarova***)

I. Antitumor effects

▲ **Tumor regression** in 57% cases and **tumor growth inhibition** by 5 times at other animals by *intrathecal* injections of diluted liquor of **healthy animals**

saline dilution of liquor is ***10^2 times.***

▲ **Inhibition of growth** of ***large tumors*** *(about 20 sm^3)* by *intravenous* injections of diluted liquor of **cured animals**

saline dilution of liquor is ***10^4 times****,*

algorithms of activation therapy were used,

donors of liquor – animals after tumor regression influenced by adrenaline in small doses

II. Recovering of reproductive function in aged female rats by injection of liquor of young females rats in low doses

Saline dilution of liquor is ***10^2 times.***

Own researches

The studied factors:

1. ***Millimeter-wave electromagnetic radiation (EMR UHF)***
2. ***The resonant radiation (microwave)***
3. ***Nanoparticles of magnetite (magnetic fluid)***
4. ***The homeopathic remedy on the basis of human CSF***

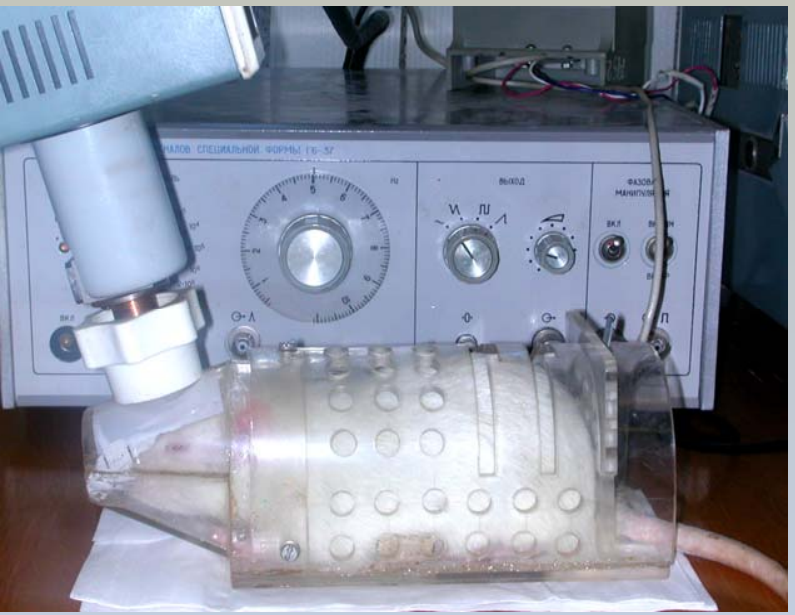
The objects of study - white outbred rats with transplanted tumors of two types:

- ***Sarcoma 45***
- ***Pliss Lymphosarcoma***

1. EMR UHF

Carrying out actions

Experimental setup for the impact of EHF EMR



Exposure parameters on (apparatus “Yav-1”):

localization - head
42.2 GHz
10 mW/cm2
Frequency Modulation:
- monofrequency - 7.8 Hz
- polipolifrequency - 1,7-3,4-7,8-15,6 Hz

Start of impacts- 3 days before tumor transplantation

Modulated EMR UHF
"Delayed" antitumor effect in animals with Pliss lymphosarcoma

Tumor growth in rats of control g

Complete regression

Partial regrassion (37-49%)

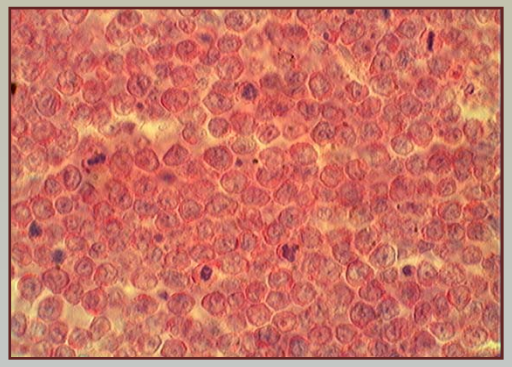
“Aciniform” tumor.
Growth into the skin is absent

The tumor begins to separate from the underlying tissues

Distinction from rats of control group in state of wool

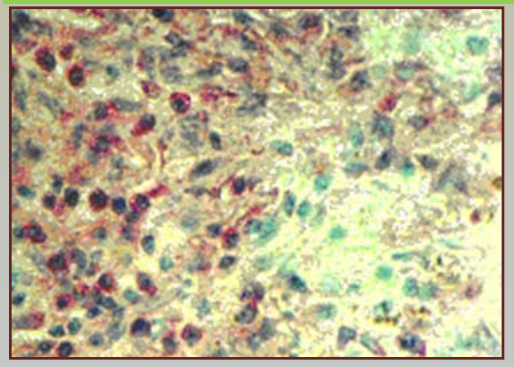
"Delayed" antitumor effect in rats with Pliss lymphosarcoma under different regime of EMR UHF modulating

Tumor growth



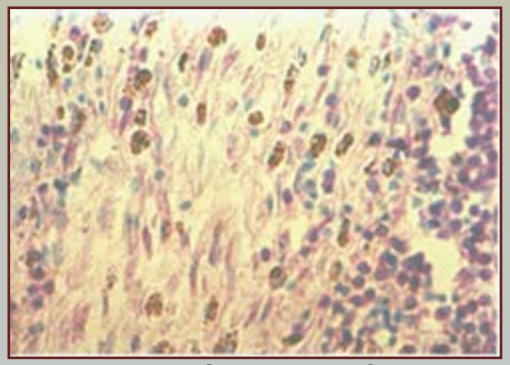
Dense emplacement of cells with numerous figures of mitosis. Brachet. x 100

Partial regression



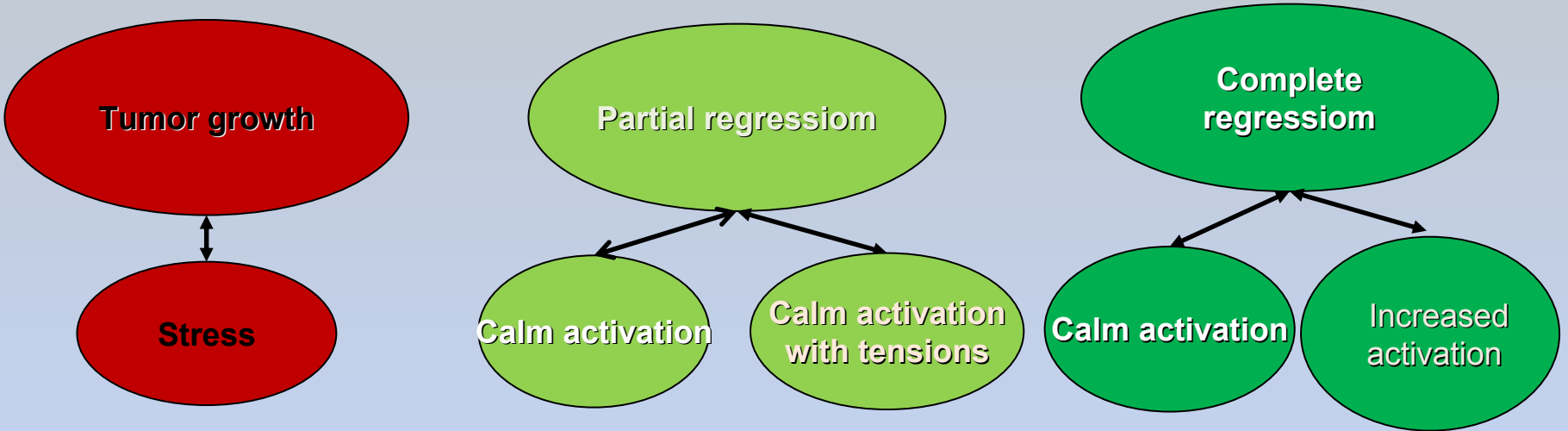
Marked infiltration of plasma cells. Brachet. X 400

Complete regression



Marked infiltration of macrophages, lymphocytes, plasmocytes . Brachet. x400

Antitumor effect and *adaptation reactions*



2. Study of the effects of *resonance radiation* (RR) (SPE effect)

(Together with the RPO "Telemachus", Saratov)

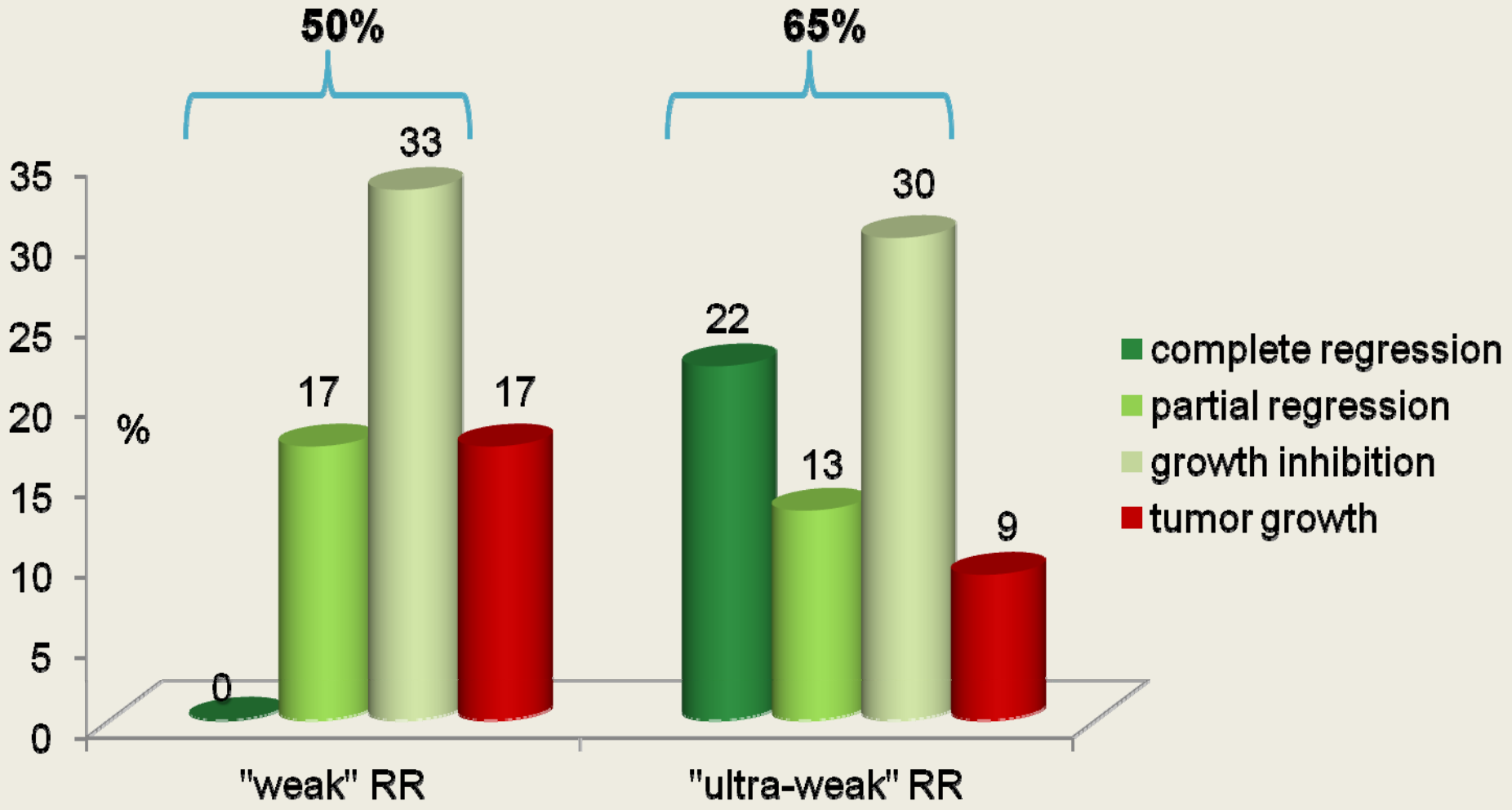
Parameters (apparatus - series of "Aquaton"):

- The frequency is about 1 GHz, the same as the frequency of self-radiation water-based environments

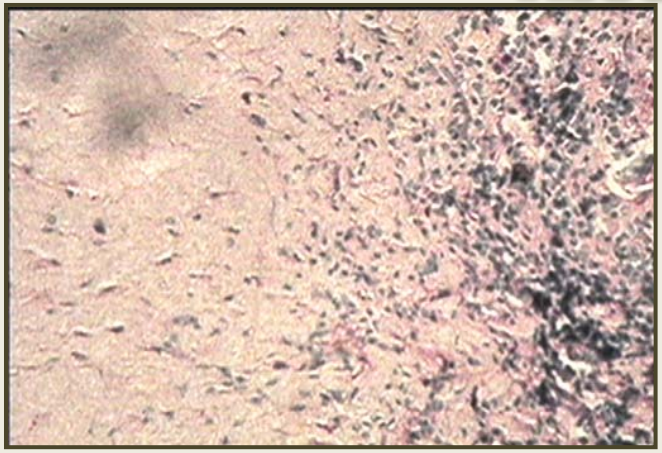
- Localization:
  *on the head - the **central impact***
  *on the head and the peritumoral area - **double impact***

- Intensity:
  "weak" impact - 50 mW/cm^2
  "ultra-weak" impact - less than 1 mW/cm^2

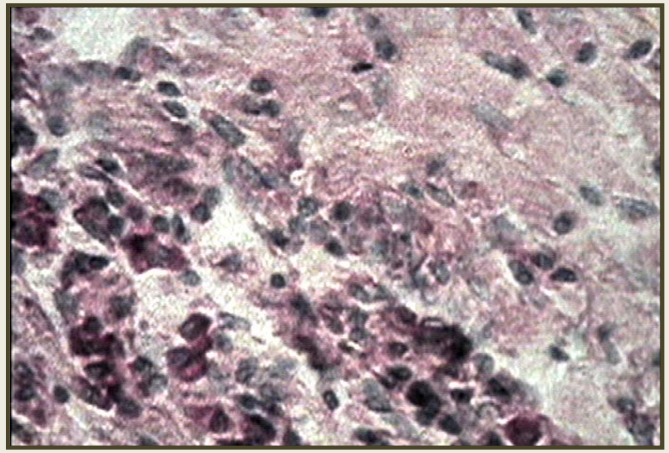
The effect of "weak" and "the ultra-weak" resonance radiation (RR) on the development SARCOMA 45



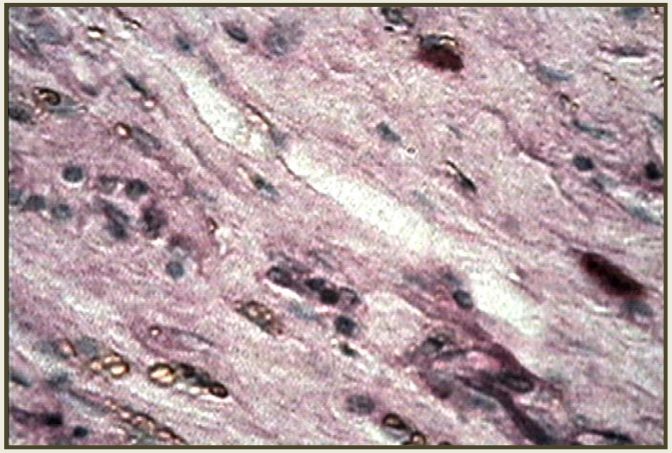
The regression of SARCOMA 45 under the influence of Resonance Radiation



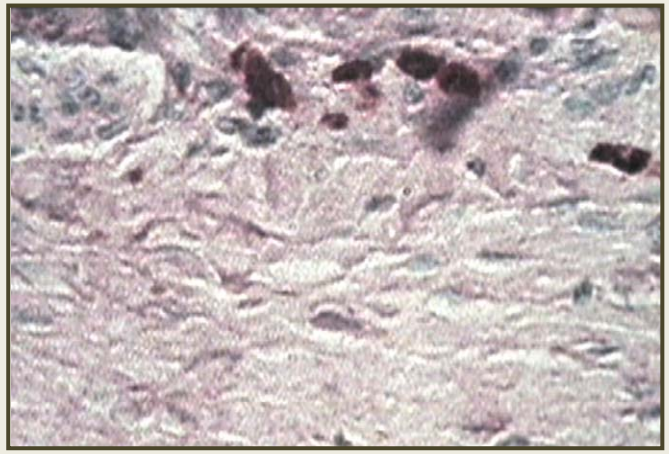
Substitution of regressed tumor of connective tissue. Brachet .x160



Partial regression. Abundant infiltration of plasmacytes and lymphoid cells. Brachet. x630

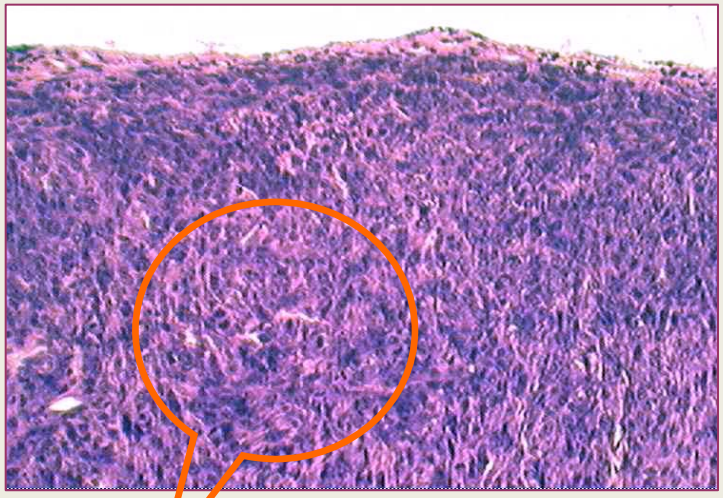


Partial regression. Activated macrophages. Brachet. x630

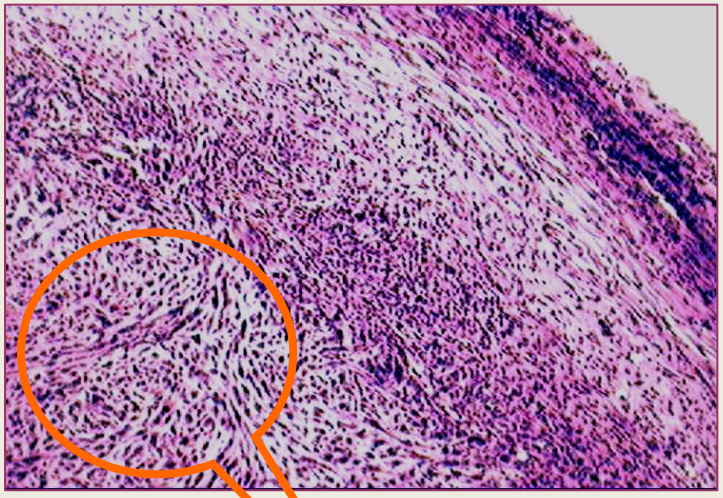


Partial regression. Tissue basophiles. Brachet. x630

Changes ("normalization") in tumor tissue under the influence of RR

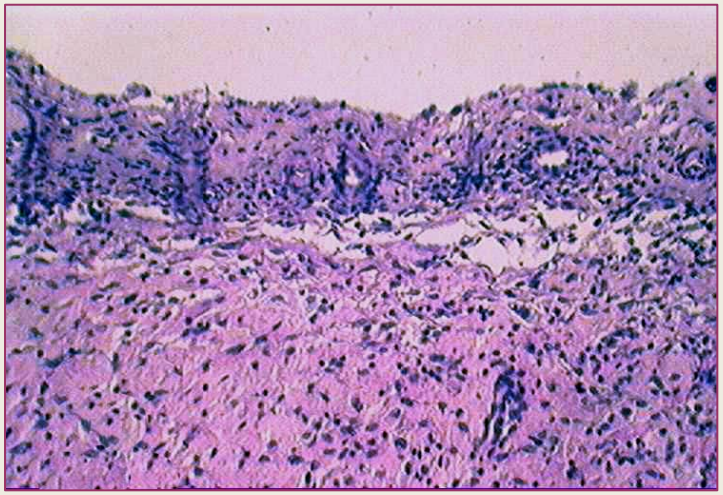


Tumor growth. Hem.-eosin.x200

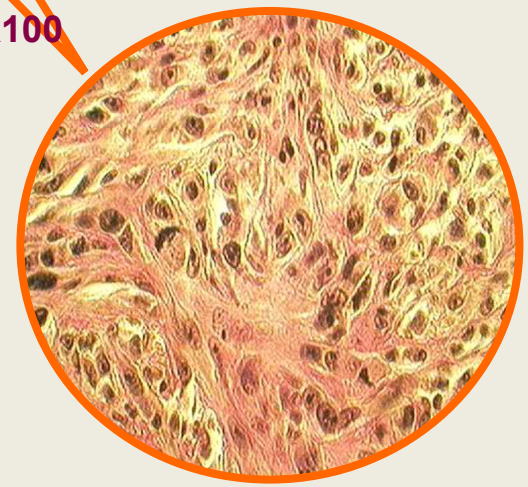


Tumor growth inhibition.
Hem.-eosin. x100

Collagen is missing
Van Gison. x400



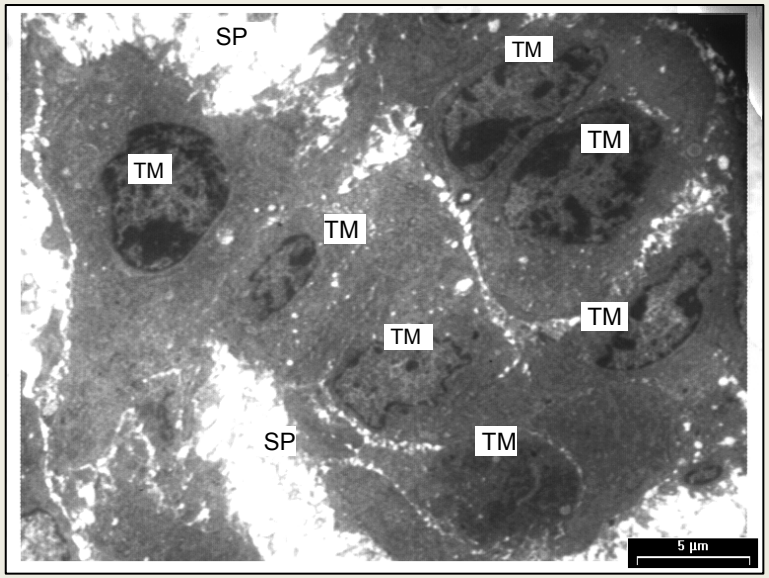
Regression. Hem.-eosin. x200

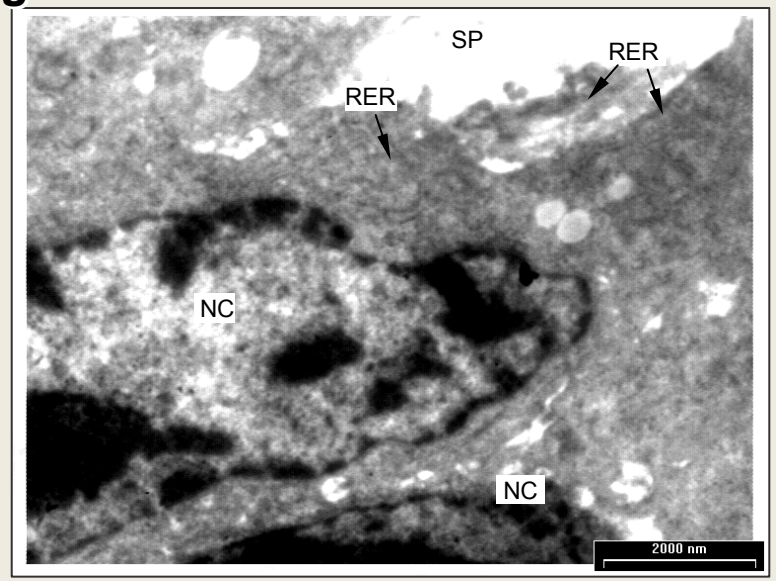


The presence of collagen
Van Gison. x400

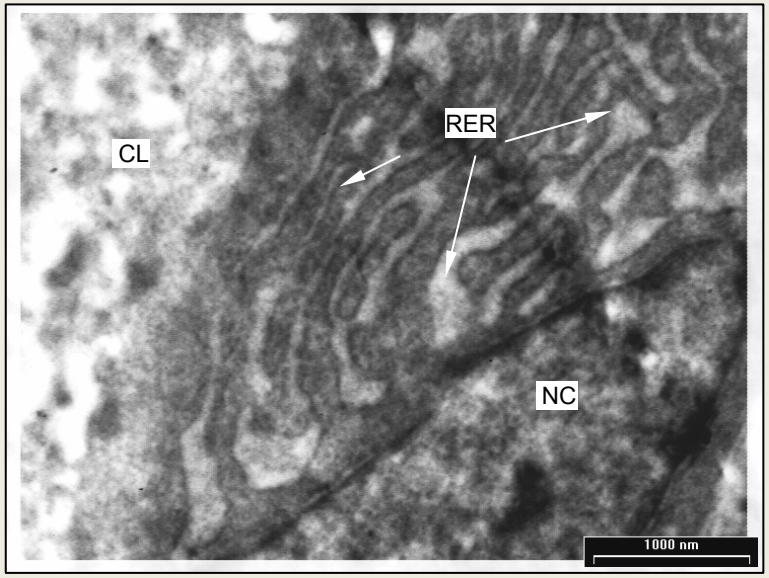
Changes in tumor cells of Sarcoma 45 under influence of RR

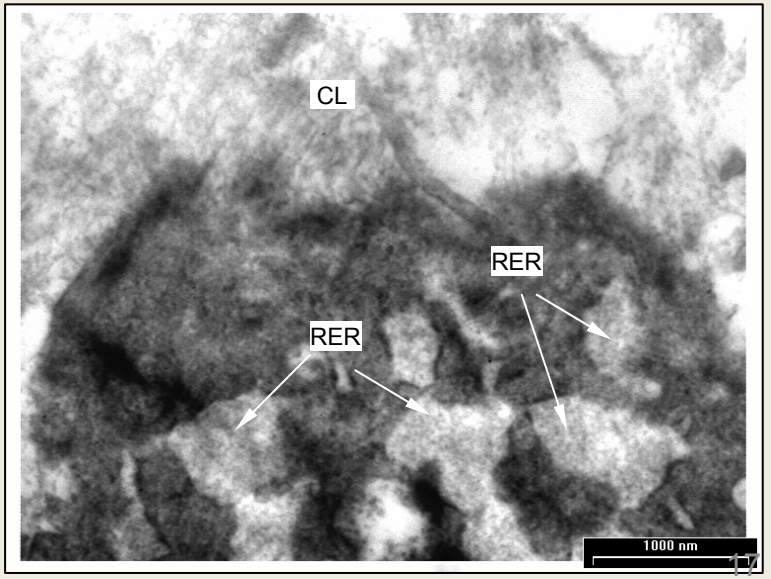
Tumor growth





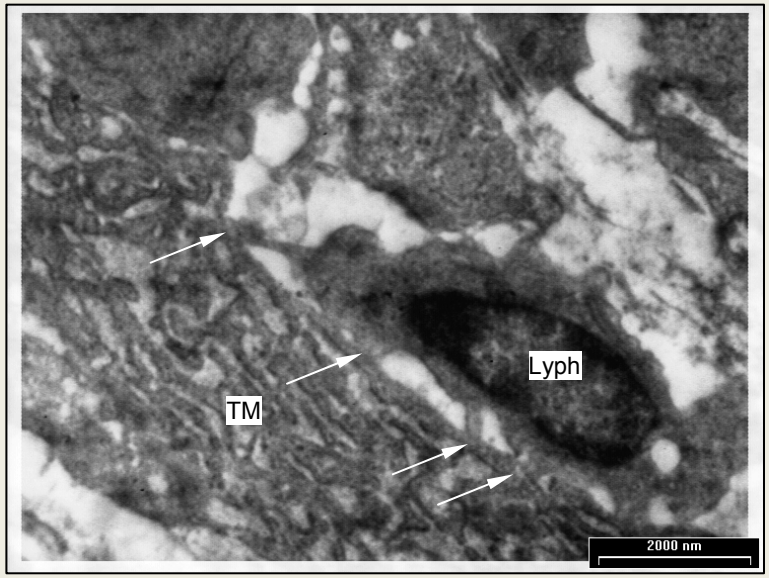
Partial tumor regression

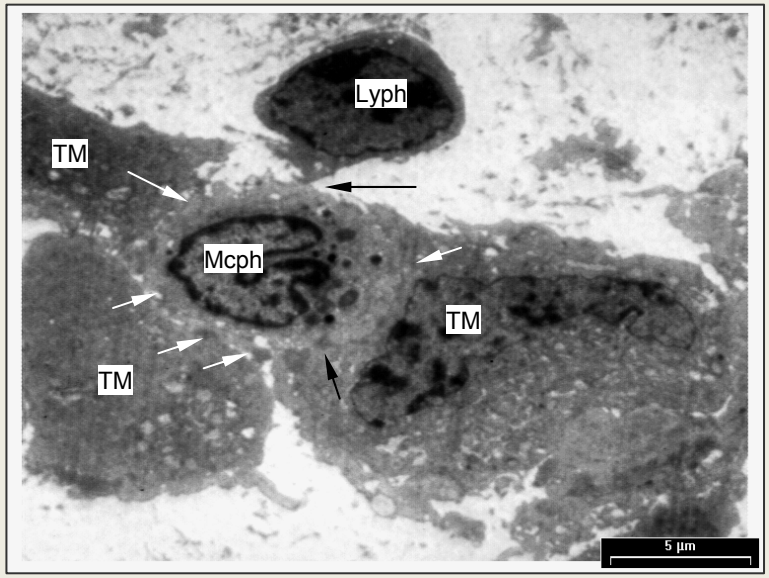




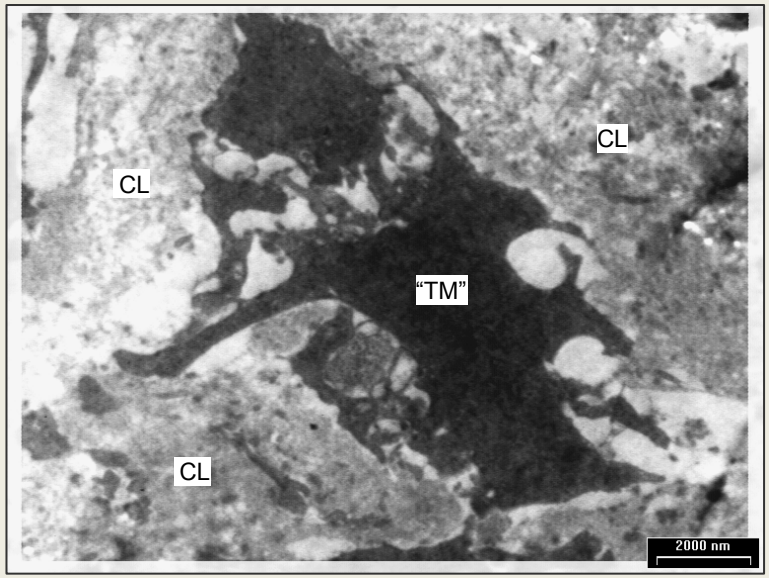
RR. Partial regression of sarcoma 45. Activation of cell-cell interactions

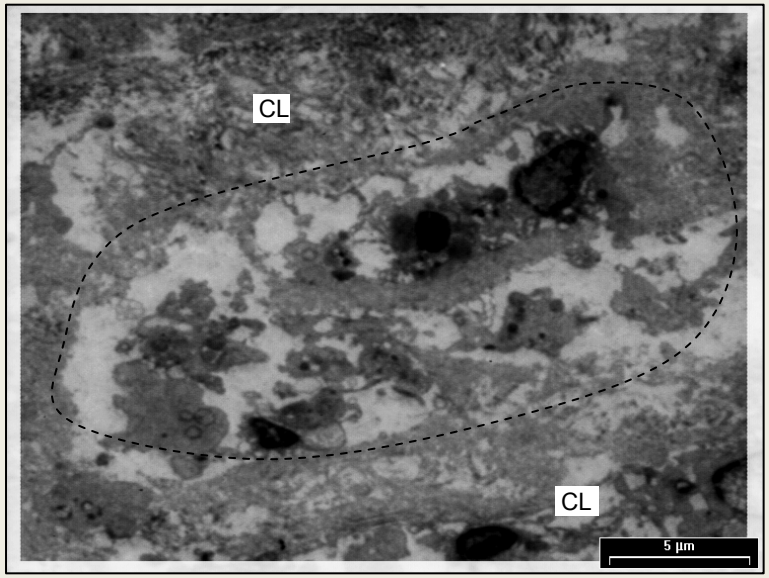
Contacts of immune cells with tumor cells





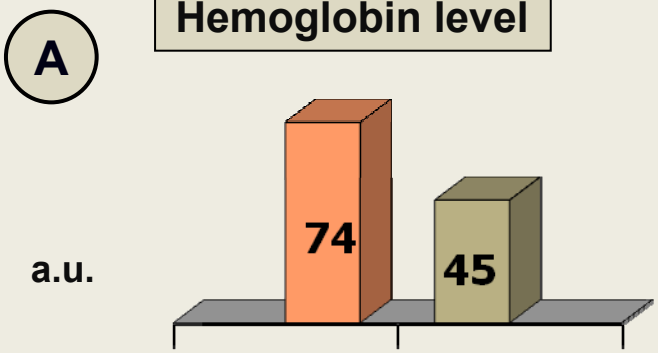
Death of modified tumor cells





Changings of some biochemical parameters under effective influence of resonance radiation (RI)

A Hemoglobin level

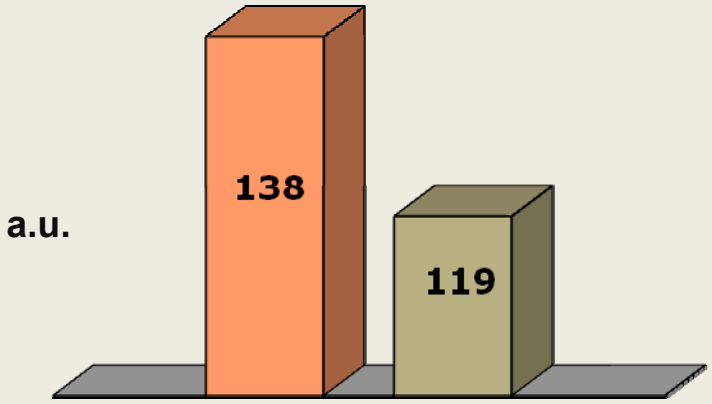


A. Anti-hypoxic effect

Control group

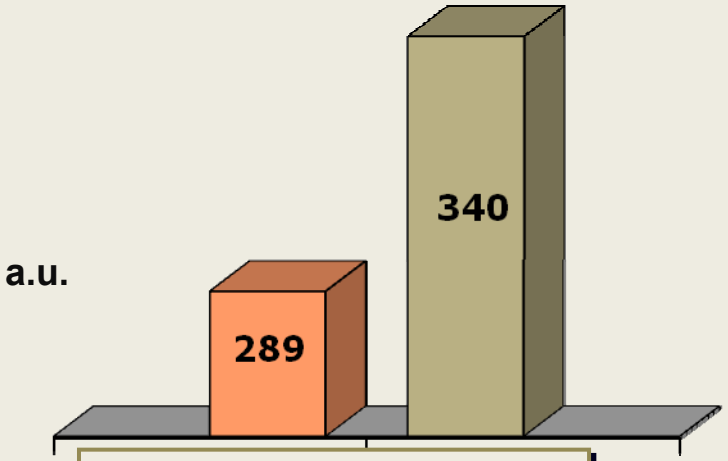
RR

B Catalase activity



B. Antioxidant effect

C Middle-mass peptides

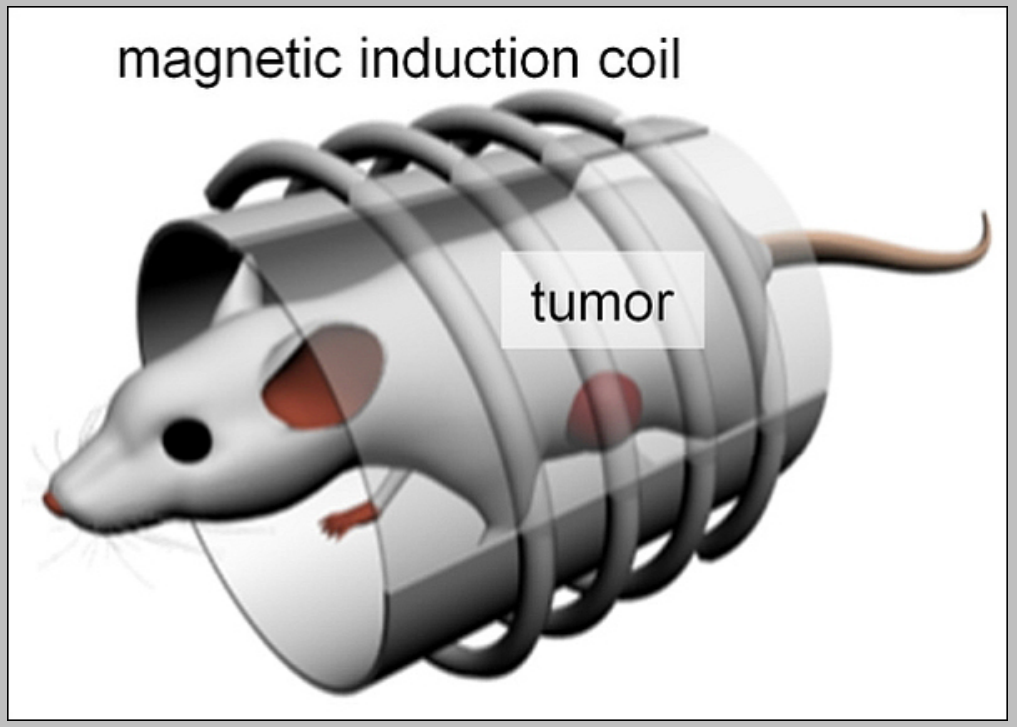


C. Detoxifying effect

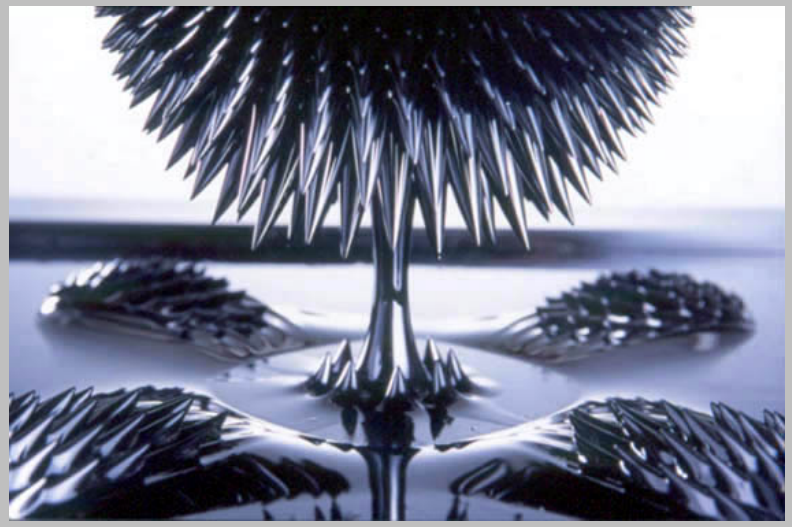
3. Magnetite nanoparticles (magnetic fluid, MF)

Means for targeted drug delivery

The modern use of ferrimagnetic nanoparticles in the antitumor treatment

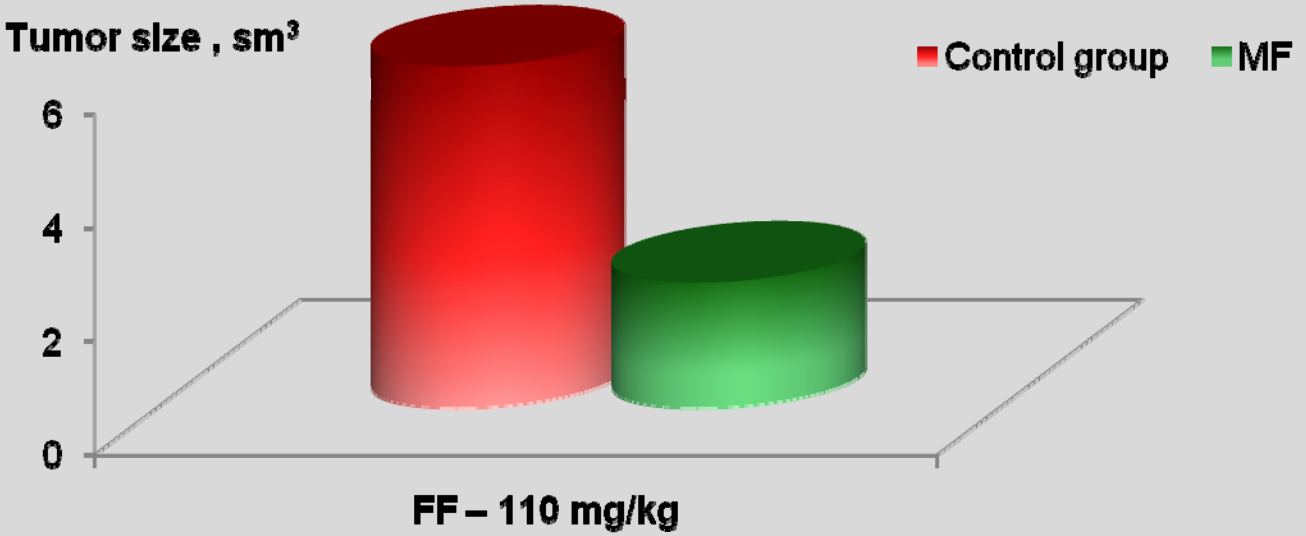


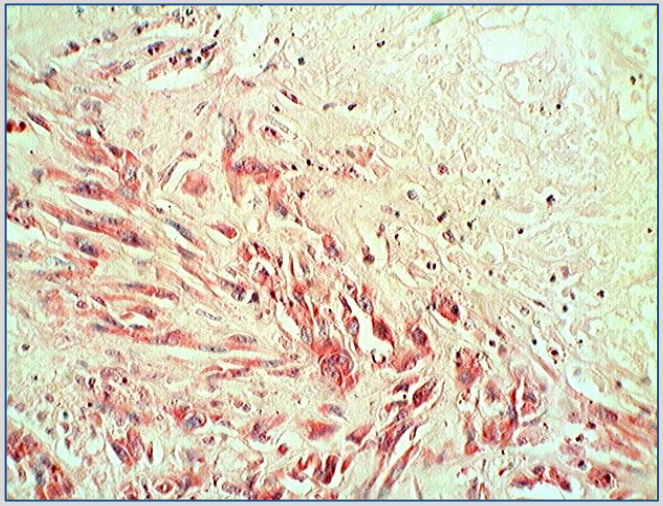
Magnetic fluid hyperthermia.
Principle of action.



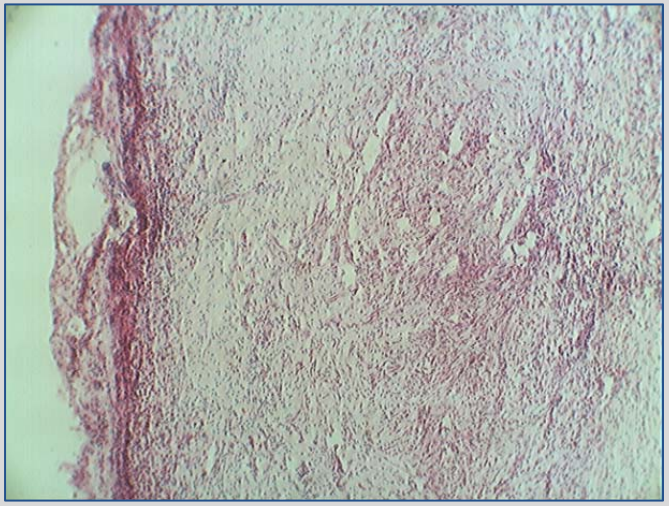
Magnetic fluid (MF)

THE EFFECTS OF MAGNETITE NANOPARTICLES (MF) IN RATS WITH SARCOMA 45





Partial regression of the tumor. Degenerative changes in tumor cells. Brachet. x 400



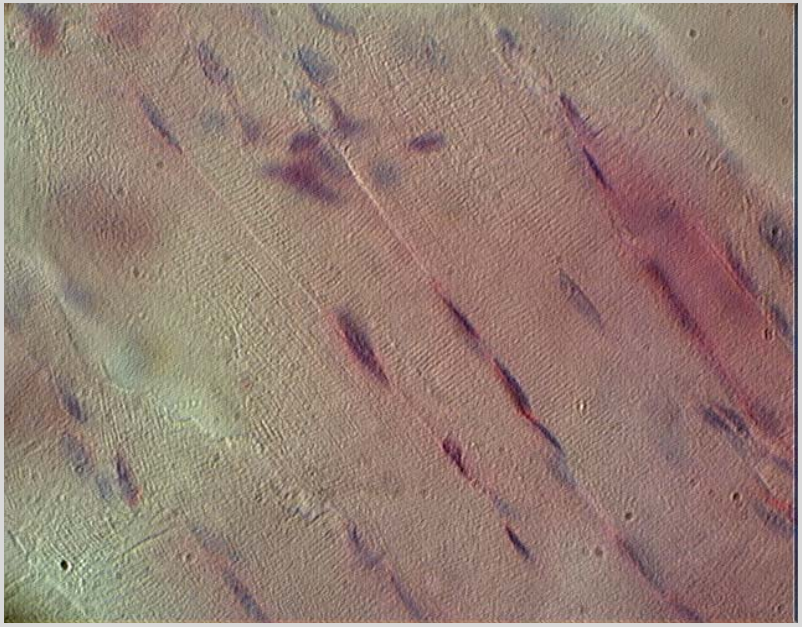
Complete tumor regression with tumor tissue replacement by connective tissue. Abundant infiltration of immune system cells. Brachet . x100

EFFECTS OF MF IN RATS WITH PLISS LYMPHOSARCOMA

Features of the development of Pliss lymphosarcoma:

- - High rate of growth,
- - High capacity for invasion,
- - Resistance to cytostatic drugs and radiotherapy.
- The effect - complete tumor regression in 17-40% of cases

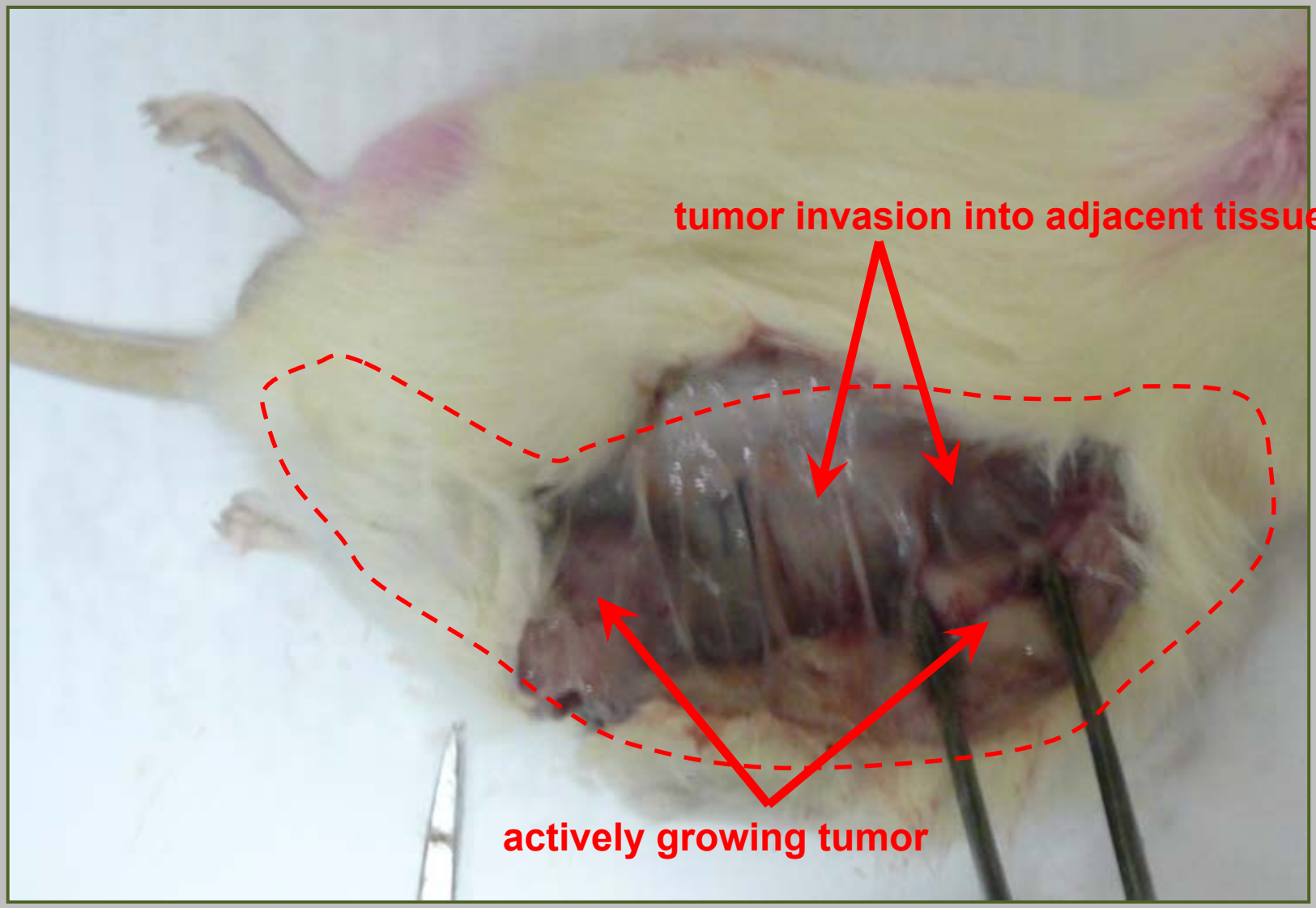
The maximum size of the regressed tumors – 30 sm^3



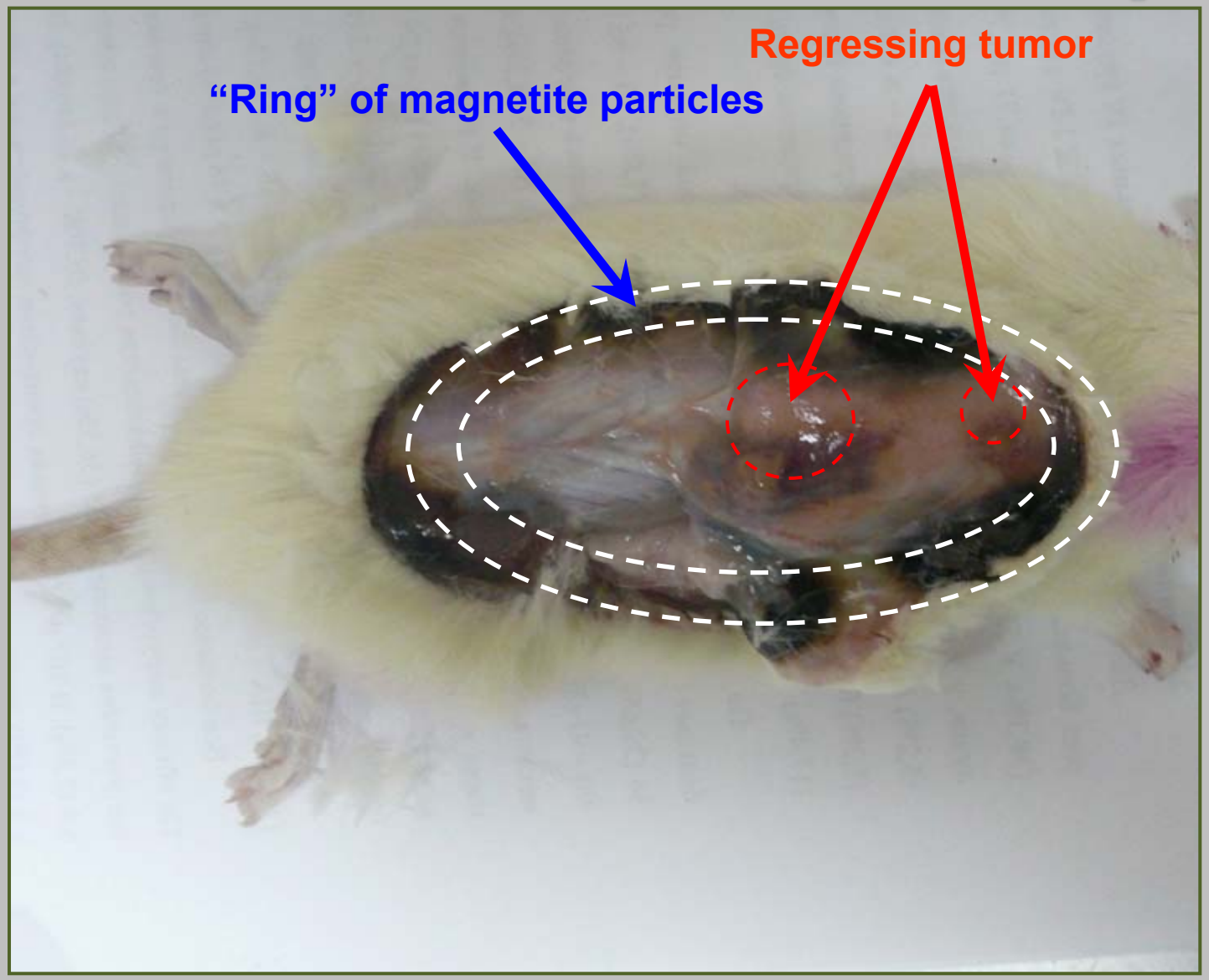
No evidence of tumor. Brachet. x400

Examination the rat with complete tumor regression in 8 months after the experiment.

GROWTH OF PLISS LYMPHOSARCOMA IN RATS OF THE CONTROL GROUP



REGRESSION OF PLISS LYMPHOSARCOMA UNDER THE INFLUENCE OF MAGNETIC FLUID (MF)



4. HETERO LIQUOROTHERAPY (L.H. Garkavi)

Properties of liquor (CSF)

Features **of the liquor** as a biological fluid :

- relatively low levels of toxic substances (*blood-brain barrier*)
- a wide range of biologically active substances → high biological activity

The sources of biologically active substances in **liquor :**

- neurons
- glial cells
- the cells of local barrier the immune system
- plexus choroideus

Research directions

Within the same species

(Garkavi L.H., Shiclyarova A.I.)

Donors of liquor:

- healthy people

-"actively healed" (activation of antitumor mechanisms of resistance)

Liquor dilution : 1C (10^2), 2C (10^4)

No species specificity

(Garkavi L.H ., Zhukova G.V.)

Donors of liquor:

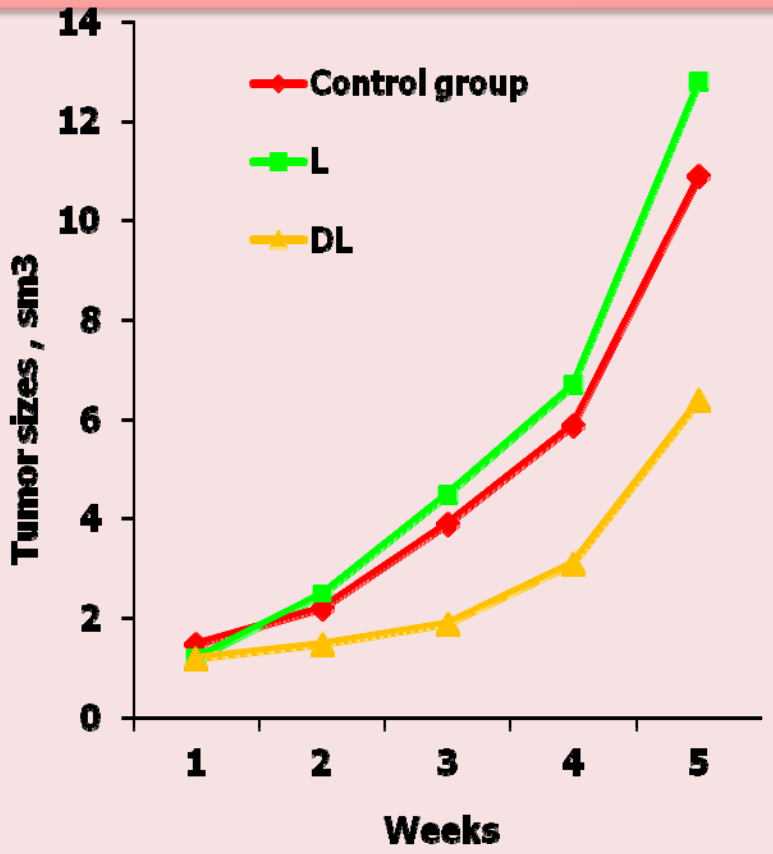
-"passively healed" (the surgical removal of the tumor)

-healthy people

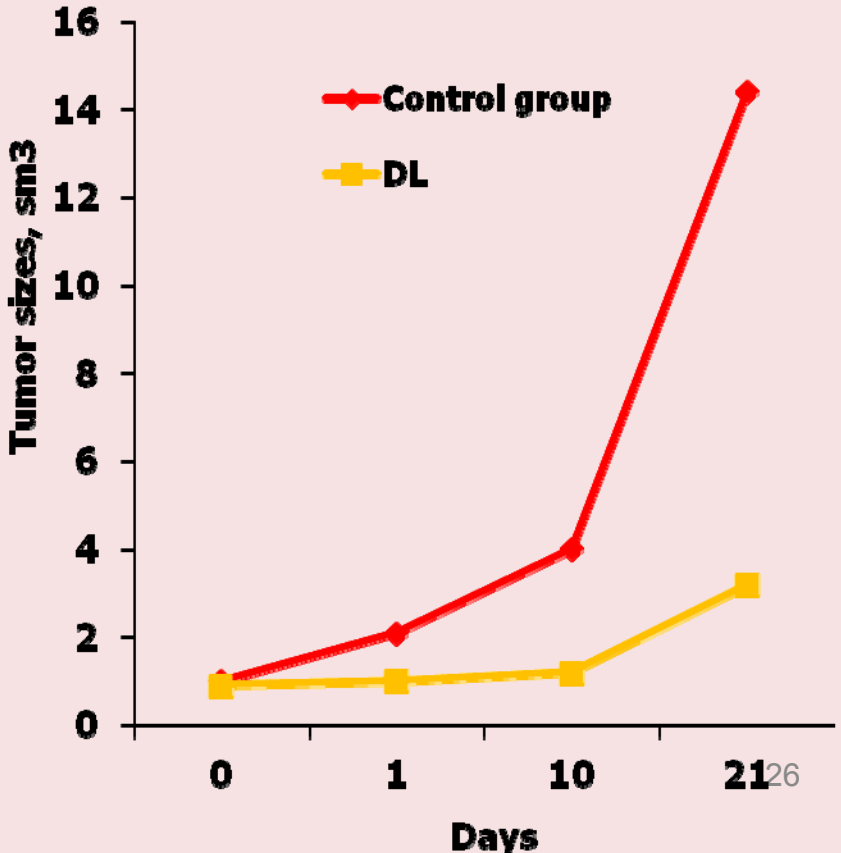
-actively healed" (activation of antitumor mechanisms of resistance)

Liquor dilution : 2C (10^4)

Effects of heteroliquorotherapy in tumor-bearing rats



The dynamics of the sizes of sarcoma 45 in rats with injection of diluted liquor (DL) obtained in a patient K. radically resected without relapse.



The dynamics of the sizes of sarcoma 45 in rats with injection of liquor taken from patients with tumors brain, undiluted (L) and diluted (DL)1:10^4 .

Prospective researches in biology and medicine

Development of methods for the use of the characteristics of nano-associates in highly diluted solutions of BAS to

- discovery of ***new effective chemical factors*** for diagnostic and therapeutic purposes
- ***optimization of biotropic parameters*** of weak electro-magnetic radiations on the body, the pathologic zones, body fluids used for the treatment

Thank you
for your attention