INTERACTION OF ELECTROMAGNETIC FIELD WITH BIOOBJECTS. APPLICATION OF LASERS IN BIOLOGY AND MEDICINE

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Four essentially varioys theraputic ways of EHF-radiation

1. Action of electromagneyic irradiation on EHF-range of freqencies which appropriate to character of fuctional disorder for adaptive precesses growth stimulation is used

2. Influence on frequencies reflection specificity of a concrete antigen

3. Influence at the frequncies that activate immune cells, but don`t activate the nonspecific cells to concrete antigen.

4. EHF-radiation action joined with factors, that distroy the irreversibly changed tissues, with

The interaction of electromagnetic fields with substaces

Substace in an electrical field.

All bodies consist of molecules, molecule from atoms, and each atom from the positively chargednucleus and rotatinf around of it electrons, having a negative charge. Usually, bodies electrical are neutral, as with a high degree of accracy the amount of electric negative charges is equal to amount of electric field essntioally depends, how these charges are connected among themselves.

Value which shows in how many times the intensity of electric field in dielectric E_T less than intensity of external electric field E is named as dielectric permeablility or dielectric constant έ. Thus total electric field intensity can be expressed by the following formula

$$E_\tau = \frac{E}{\varepsilon}$$

The amount of charges on unit area is directly proportional to value of intensity of EF and of dielectric permeability

$$\sigma = \varepsilon_0 \varepsilon E$$

The size $\varepsilon_0 \varepsilon_\tau E$ refers to as electric displacement or induction of an electric field and is designated as D

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Density of dispacement current is equal to speed of change of density of charge.

$$J_c = \frac{d\sigma}{dt} = \frac{dD}{dt} = \varepsilon_0 \varepsilon_\tau \frac{d E_\tau}{dt} = \varepsilon_0 \varepsilon_B \frac{d E_B}{dt}$$

Density of a current of conductivity depends on intensity of EF in substance and coefficient of proportionality between them refers to as specific conductivity γ

$$j = \gamma \, E_\tau = d\,\frac{\sigma}{dt}$$

The amount Π_E of absorbed energy per one second of substance with a surface area in 1 m^2 is directly proportional to a square power of frequency v and intensity E of electric field

$$\Pi_E = 1.4 \times 10^{-19} \frac{r}{\gamma} v^2 E^2$$

The value of a total magnetic field induction **B** in paramagnetics also is described by the formula

$$B = H + x\,H = \mu_0 \mu\, H$$

The energy of a magnetic field in unit of valume W of diamagnetic or paremagnetic is expressed by the formula

$$W = \mu\,\mu_0\frac{H^2}{2} = \mu_0\frac{H^2}{2} + \mu_0\frac{(\mu-1)}{2}H^2$$

Reactions, the infience on which MF renders are distributed in biological systems. Thre are processes of electrons transport on a cytochromes chain and connected to them reactions of oxdation phosphorylation, free radicals paricipating in cancerogenesis, electrons transport in Kerbs cycle reactions, many fermentation reactions selection in MF of products containing magnetic isotopes, etc