DYNAMIC OF BLOOD PRESSURE HYPERTENSION IN SIBERIAN POPULATION DURING OF LONG PERIOD ANALISIS

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The purpose of the study was to investigate indexes and dynamics of blood pressure levels and hypertension in Novosibirsk citizens 45-64 years old during the 20-years period. We studied indexes of different blood pressure levels among Novosibirsk citizens of both sexes, 45-64 years old in two representative samples of two typical regions within the framework of two projects WHO MONICA and HAPPIE. Population studies in Novosibirsk were held in 1984-85, 1994-95 and 2003-05 years on basis of representative samples. The estimation of the prevalence of BP levels in population was held according criteria recommended Word Scientific Society of Cardiologist in 2004 year. In all studies we used average BP. We also studied if subject knows about his high BP and taking antihypertensive drugs two weeks before the study. The frequency of hypertension in subjects of both sexes 45-64 years old (55%), was similar to the results of 1985 and 1995 years. However, in 2003-2005 frequency of hypertension in women (54,2%) was lower than in men (57,1%, $p<0,05$). Both among men and women in 1995 decreased the frequency of high blood pressure: from 57 to 51% in men, and from 62 to 54% in women ($p<0,001$). Maximum decrease was registered with II level of hypertension. Thus, there were no registered dynamics in comparing the results of 1985, 1995 and 2005 years. By 2005 year the frequency of different levels of hypertension in men population returned to the level of 1985 year. In women population part of severe hypertension and ISAG noticeably decreased. Unfortunately, the prevalence of hypertension among men and women population 45-64 years old is still high.

BIOLOGICAL TISSUES IRRADIATION DOSES DURING THE FRESH SURFACES FORMATION

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The fresh surfaces formation provided by materials destruction or cleavage often leads to surfaces charging and strong electric fields generation [1]. These fields can create the high energy electrons beams and Bremsstrahlung radiation. For example the destruction of quartz and granite is accomplished by low intensity relativistic electron fluxes creation. However the adhesive tapes peeling is accomplished by significantly more intensive electron beams creation. These beams can provide hard irradiation of skin and other layers of biological tissues during the adhesive tapes separation. We will estimate this irradiation using the generalized diffusion model for non-relativistic electrons.

The electron transport mechanism [2] is defined by the ratio of stopping path (absorption distance) L_a and transport path (scattering distance) L_s. Stopping path is defined by the consequence of inelastic collisions of electrons with substance atoms. Transport path is defined by the distance providing the significant change of the electron movement direction. The model key parameter is the diffusion ratio $R=L_s/L_a$. If $R >> 1$, then the electron trajectory is almost straight. The electron path along the coordinate in this case, obviously, is equal to the stopping path $L = L_a$. In the opposite limit case $R << 1$, electron changes many times the direction of its movement, and electron transport is defined by the diffusion theory:

$$L = \sqrt{2Dt} = \sqrt{(2/3)L_a L_s}\,,$$

where diffusion coefficient $D = (1/3)\, L_s v$; diffusion time $t= L_a / v$; v – electron velocity. It follows that the electron path along the coordinate in this case is approximately equal to the average geometric of stopping path and transport path. In the general case, the average path along the coordinate can be defined by the combination of limit cases:

$L = L_a$ for $R \geq 1.5$;

$L = \sqrt{(2/3)L_a L_s}$ for $R < 1.5$.

Both limit cases give the same result for cross-linking $R \approx 1.5$.

In accordance with [3] the peeling of an adhesive tape can provide the flow of electrons of about 10^{10} per 1 cm^2 of surface with electron energy 30 keV. Cross-linking occurs for this energy for the charge of the atom nucleus z = 2.8, which is close to the average charge of the skin atom nucleus (z = 2.7). Generalized diffusion model gives the electron path along the coordinate (straight approximation) L = 12.9 μm. The tissue gets energy $4.8 \cdot 10^{-5}$ j/cm^2 in the volume $1.29 \cdot 10^{-9}$ m^3. For tissues of 920 kg/m^3 density, this gives a hard dose of 40 Gy. It follows that the irradiation dose due the adhesive tapes separation from skin and other segments of biological tissues may up to 4 or more orders of magnitude higher than a natural irradiation dose of biological tissues per year. Such hard doses may lead to biological and chemical degradation of tissues layers with thickness up to 10 μm and more, as well as stimulate radiation processes in biological organism in the whole.

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ДОЗЫ ОБЛУЧЕНИЯ БИОТКАНЕЙ ПРИ ОБРАЗОВАНИИ СВЕЖИХ ПОВЕРХНОСТЕЙ

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Образование свежих поверхностей при разломе и разрыве материалов часто приводит к заряжению поверхностей и генерации сильных электрических полей [1]. Эти поля способны рождать потоки электронов и тормозного излучения высокой энергии. Так при разломе кварца и гранита возникают потоки релятивистских электронов невысокой интенсивности. Существенно более высокие интенсивности имеют электронные пучки, рождающиеся при разматывании липких лент. Эти пучки могут обеспечивать существенную дозовую нагрузку при отрыве липких лент от кожи и других слоев биотканей. Рассчитаем эту нагрузку с использованием модели обобщенной диффузии нерелятивистских электронов.

Характер транспорта электронов определяется [2] соотношением тормозного пути (длины поглощения) L_a и транспортной длина пробега (длины рассеяния) L_s. Тормозной путь – это путь, который проходит электрон до своего полного торможения (поглощения) вследствие неупругих столкновений с атомами среды. Транспортная длина пробега характеризуется расстоянием, на котором существенно меняется направление движения частицы (пробег до разворота). Ключевым параметром модели является диффузионное отношение $R=L_s/L_a$.

Если $R >> 1$, то электрон пройдет путь L_a и затормозится, так и не успев заметно искривить свою траекторию. Длина почти прямолинейного пробега вдоль координаты в этом случае, очевидно, равна пройденному пути $L = L_a$. В противоположном предельном случае $R << 1$, частица за время полного торможения успевает многократно изменить направление своего движения, и транспорт носит диффузионный характер. При этом средняя длина пробега L вдоль координаты равна $L = \sqrt{2Dt} = \sqrt{(2/3)L_a L_s}$, где $D = (1/3)\, L_s v$ - коэффициент диффузии; $t = L_a / v$ - время диффузии, v – скорость электрона. Отсюда следует, что длина пробега в этом случае близка к среднему геометрическому из тормозного пути и транспортной длина пробега. В общем случае среднюю длину пробега можно задать сшивкой предельных случаев:

$L = L_a$ для $R \geq 1.5$; $L = \sqrt{(2/3)L_a L_s}$ для $R < 1.5$.

При $R \approx 1.5$ оба предельных случая дают одинаковый результат.

В соответствии с [3] при разматывании липкой ленты может возникать поток электронов с энергией 30 кэВ, причем на 1 $см^2$ поверхности поступает 10^{10} электронов. Сшивка при такой энергии имеет место для заряда ядра атомов z=2.8, что близко к среднему заряду ядра атомов кожи (z=2.7). Модель обобщенной диффузии дает в этом случае длину пробега электрона (в прямолинейном приближении) L = 12.9 мкм. Биоткань получает энергию $4.8 \cdot 10^{-5}$ Дж/ $см^2$ на объем $1.29 \cdot 10^{-9}$ $м^3$. Для биоткани плотностью 920 кг/$м^3$ это дает немалую дозу облучения 40 Гр.

Отсюда следует вывод, что доза облучения при отрыве липких лент от кожи и других слоев биотканей может на величину до 4 и более порядков превышать естественную дозу облучения биотканей за год. Такие мощные дозы могут приводить к биологическому и химическому разрушению слоя биоткани толщиной до 10 мкм и более, а также стимулировать радиационные процессы в биоорганизме в целом.

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PROBIOTIC PREPARATIONS FOR PROPHYLAXIS AND TREATMENTS OF FLU

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More and more a difficult character of flu epidemics and messages on cases of interspecific transfer of the bird's flu have drawn attention of the public and experts to this problem in connection with an opportunity new global epidemic of a flu. The virus of avian flu H5N1 has broken a species-specific barrier and infected people that have entailed very high mortality percentage. Strains H5N1 the avian flu there was the reason of destruction of 60 human of the Asian countries a Flu does not cause constant immunity, therefore preventive maintenance demands not smaller attention, than early diagnosing and treatment. The effective vaccines can appear too late to block early stage pandemic. To constrain distribution of an infection from its center and to win so necessary time will help urgent application antivirus preparations and acceptance of quarantine measures.

In view of a wide circulation strains a flu resistant to known antivirus to preparations great value for prophylaxis and treatments of flu get means of nonspecific preventive maintenance - interferon inductors. One of such preparations can be probiotic Vectom with binary (antiviral and antibacterial effect) and immunomodulation activity. Active component of this preparation are recombinant bacteria Bacillus of family Bacillaceae. Recombinant strain B.subtilis with several genes of the human leucocytes interferon was designed in LTD "Panagene" on the basis of strain with high antagonistic activity concerning pathogenic flora. Probiotic Vectom with gene of the human leucocytes α2b-interferon has been tested for prophylaxis of flu during the epidemic period in military hospital. The per os application of this probiotic - 2 times a day were provided with decrease in disease on more than 70%. Application of a probiotic for treatment of the illness has provided easy current of illness and reduction of terms of disease.