International Journal of Biochemistry and Biophysics 1(1): 1-8, 2013 http://www.hrpub.org
DOI: 10.13189/ijbb.2013.010101

Nuclear Transmutation and Cancer in the Biological Cell

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Abstract The aim of this study is to introduce the restrictions of recent disclosures of Nuclear Transmutations (NT), cancer and their overlap occurring in biological entities due to natural or human-caused background agents. This approach involves the experimental proof that elemental transmutations were occurring and regulated in living organisms by the level of radiation to which those organisms have been exposed. The accelerated deactivation of reactor Cs-137 isotope has been verified showing a significantly higher influence upon the spontaneous decay characteristics in growing the biological cells. The effect of NT of Manganese into stable rare isotope Iron (Fe^{57}) in the presence of gamma-ray source by means of Mössbauer spectroscopy was carried out in growing bacterial cultures in heavy-hydrous (D_2O) sugar- salt nutrient medium deficient in Iron and contains Manganese. During growing, the replication of DNA, aberrant alterations of gene expression along with cell cycle arrest has been confirmed. NT is a matter of energy balances; under the natural background radiation the low growth energy (E_G) of the biological cell allows the safe elemental transmutations only. While the exposure to long term effects at low doses of radiation alters gene expression that influences cell cycle to be arrested, increasing the cell growth energy that allows the harmful and the lethal transmutations besides to the formation of different kinds of cancerous tumors. Thus, as cancer is a disease of inappropriate cell proliferation, NT within the biological cell is a biomarker for cancer detection. All agents - but not only radiation - that lead to the increase in E_G of the biological cell are considered cancer causes regulate the NT within the biological cell that contributes to cell proliferation disruption.

Keywords Emad formula, Microbial catalyst transmutator, Safe transmutation, Harmful and lethal transmutation

1. Introduction

The observations on the Cold Fusion Phenomenon (CFP) in the biological entities have been presented in previous several papers conclude that living organisms are in constant exchange with their surroundings. Such exchange of elements occurs regularly in the biological systems in particular by reactions among the first few dozen of the periodic table. It would appear that the elemental transmutation is essential to maintain a balance of certain elements in the biological bodies, where health would be considerably impaired if the body gains energy continuously from such transmutations [1]. Some examples for the proposed NT that occur in the biological cells are: $_{11}Na + _{8}O \rightarrow _{19}K$; $_{19}K + _{1}H \rightarrow _{20}Ca$; $_{20}Ca - _{1}H \rightarrow _{19}K$; or $_{12}Mg + _{8}O \rightarrow _{20}Ca$; $_{14}Si + _{6}C \rightarrow _{20}Ca$. But in the same time did not suggest how such exothermic and endothermic bio-nuclear reactions might be facilitated at the nuclear-atomic level [2]. There were numerous evidences that the premise upon which the study was based was true, i.e., those nuclear transmutations were indeed taking place in the living organisms of all types. It was shown that there was a net loss in mass for the transmutation of Na, K and Mn to Mg, Ca, and Fe respectively. These represented energies in the range of 8.35 MeV to 11.69 MeV [3]. On the other hand, studying the effects of these NT on man-health has revealed some mysterious biological findings that need to be explained. For instance, Calcium is best known for its role in growing, maintaining the bones and teeth, it also helps the heart and other muscles do their work, and there is strong evidence that low calcium intake can lead to fragile bones, high blood pressure, and certain types of cancer. In addition, recent studies have shown that calcium may reduce the risk of colon cancer and perhaps some other types of cancer when combined with vitamin D, and have the potential to help prevent cancers of the breast and pancreas [4-6]. But in the same time, there is some evidence that a high calcium intake, mainly through supplements, is linked with increased risk for prostate cancer, especially for prostate cancers that are more aggressive [7]. Further more, most cases of high calcium levels are caused by the cancer itself, especially in its later stages [8]. Such mysterious biological findings show the connection and the combination of the elemental transmutation and cancer. On the contrary, there are also a number of arguments of a theoretical nature against biological transmutation; simply the Coulomb barrier would prevent nuclei to come together for interaction under any plausible scenario. Further, the classical laws of conservation would have paradoxical or even absurd consequences for the

whole system of nature contradicts what have settled by theoretical physics, and experimentally confirmed. This approach introduces a model which is neither against physicists nor biologists points of view. As the possibility of bio-transmutation is inferred from studying NT at low temperature in metallic and hydrocarbon materials [9], some recent experiments were done to prove the CFP in the biological cultures by too much similar method to that done to prove CFP in metallic and hydrocarbon materials. Thus, current thesis explains and discusses CFP and its probable mechanism in bio-systems, from a point of view that NTs in these various materials should have common causes, and consequently have at least some related results. Furthermore, it introduces the bio-effect of the NT on the biological cell along with their accompanied genetic alterations that if severed induce cancer, to investigate the connection of the NT, cancer, and their overlap. Hereby, current approach assesses the NT classification according to their risks on man health, and provides the missing part to investigate all effects of the Human-caused background.

2. Methods and materials

Some of the elements which were definitely proved to be transformed naturally in biological bodies by Louis Kervran and confirmed by Goldfein, S. were sodium to magnesium, Potassium to calcium, and manganese to iron, whereas their nuclear reactions are proposed to be done by neutron capture followed by beta decay as follows; $^{23}_{11}\mathrm{Na}+\mathrm{n} \rightarrow {}^{24}_{11}\mathrm{Na}^{*} \rightarrow {}^{24}_{12}\mathrm{Mg}+\mathrm{e}^{-}+\underline{\nu_{e}}^{*}$, $^{39}_{19}\mathrm{K}+\mathrm{n} \rightarrow {}^{40}_{19}\mathrm{K}^{*} \rightarrow {}^{40}_{20}\mathrm{Ca}+\mathrm{e}^{-}+\underline{\nu_{e}}^{*}$, $^{55}_{25}\mathrm{Mn}+\mathrm{n} \rightarrow {}^{56}_{25}\mathrm{Mn}^{*} \rightarrow {}^{56}_{26}\mathrm{Fe}+\mathrm{e}^{-}+\underline{\nu_{e}}^{*}$ [1, 3]. Such nuclear reactions illustrate the role of background thermal neutrons as an energetic radiation source to increase the Gamow factor that is responsible for penetrating Coulomb barrier between two nuclei. The background neutrons that collide with biological bodies in which "Mg adenosine triphosphate (Mg ATP)" the energy producer that lies in the mitochondrion of the cell acts as a condensed cyclotron on a molecular scale or a biological particle accelerator catalyses NT by providing the collided neutron enough energy to react with an element in the cell [3,9]. Furthermore, many experiments have been conducted by different schools of researching to confirm the role of radiation in the NT in biological cultures; Vysotskii, V., et al. showed successful experiments on utilization of high-activity wastes in the process of transmutation in growing microbiological cultures in which Barium has been transformed to samarium $\mathrm{Ba}^{*}_{140} + \mathrm{C}_{12} = \mathrm{Sm}_{152} + \Delta\mathrm{E}$, ($\Delta$E = 8.5 MeV) [10], followed by another experiment to accelerate the deactivation of Reactor Cs-137 Isotope in growing biological cells [11]. Similar experiments have been carried out by N.A. Reiter and Dr. S.P. Faile confirmed accelerated deactivation of radioactive thorium in growing fungi [12, 13].

2.1. Biological condition & Radiation levels

In 1962 Louis Kervran concluded in his book Biological Transmutations [1] that "It is obvious, for example, that special procedures should be applied for the measurements related to energy balances. These measurements are very complicated. Known calorimetric methods cannot be applied, because neutrinos intervene, as we are here in the domain of weak interactions. Neutrinos interact only very seldom with matter, A large part of the energy is carried away under a virtual form, so to speak. It goes through space without affecting our senses or our measurement instruments. How can we measure it? The future alone will tell" No information has been discovered to know the energy required for these reactions to occur and, thus whether there would be a net gain of energy or not. By 2010 Emad Y. Moawad, showed that, the decaying energy of the nucleus of the radionuclide is

$$E_{Decay}=\ln\left(\left(\ln\left(\frac{dA}{dN}\right)\right)^{2}\right)\mathrm{Emad}=\ln\left[\left(\ln\frac{\ln 2}{t_{1/2.\mathrm{Radionuclide}}}\right)^{2}\right]\mathrm{Emad}\quad(1.1)$$

[14-19], while the growth energy (E_G) of the biological cell of the growing biological culture is

$$E_{G}=\ln\left(\left(\ln\left(\frac{dG}{dC}\right)\right)^{2}\right)\mathrm{Emad}=\ln\left[\left(\ln\frac{\ln 2}{t_{D}}\right)^{2}\right]\mathrm{Emad}\quad(1.2)$$

[14-19], where A is the activity of the radionuclide and N is the number of undecayed nuclei at any one time, G is the activity of the biological culture $G=G_{0}\times e^{\frac{\ln 2}{t_{D}}\times t}$, t_D is the cell doubling time, C is the number of biological cells at any one time, while Emad is a variable unit for measuring these energies. This result differs from one element to another depending on the mass number of that element, according to the following formula:

$$\mathrm{Emad}=\frac{c^{2}}{e}\times(\mathrm{mass\ number})^{1+\frac{1-\ln\left[\ln\left(\ln\left(\frac{\ln 2}{t_{1/2.\mathrm{Radionuclide}}}\right)\right)^{2}\right]}{\ln(\mathrm{mass\ number})}}\ \mathrm{MeV}\quad(1.3)$$

[14-19]. While the Emad unit of the biological cell is considered identical to that of the nucleus of 131I as it is the commonest safely used radionuclide in therapies. Consequently the Emad unit of the biological cell can be derived by substituting the mass number of 131I and its half-life in seconds in the converting formula (1.3) to obtain that $\mathrm{Emad}_{\mathrm{Bio.Cell}}=\mathrm{Emad}_{131\mathrm{I}}=23234.59\mathrm{MeV}$ (1.4) [14-19]. Hence the domain of the E_G function starts from the

value that gives a positive range, as normal for all types of energies then $E_G>0 \Rightarrow \ln\left[\left(\ln\frac{\ln 2}{t_D}\right)^2\right]>0$

$$\Rightarrow \left[\left(\ln\frac{\ln 2}{t_D}\right)^2\right]>1 \Rightarrow \left(\ln\frac{\ln 2}{t_D}\right)<-1$$

$\Rightarrow \frac{\ln 2}{t_D}<\frac{1}{e} \Rightarrow t_D > \ln 2\times e$ sec (1.5), which is the biological condition for existing E_G per cell for all living organisms. Or in other words the doubling time that achieves E_G per cell for all living organisms is $t_D > \ln 2\times e$ sec (1.884169385 sec). This study investigates the relationship between the E_G of the biological cell, and the net gain of energy of the NT reactions that happen inside it. Hereby this approach posits that E_G of the biological cell regulates such reactions that may occur inside it. Thereby, the net energy gained from NT reaction inside a cell should be less than the cell E_G. Moreover, occurrence of NT in the biological culture would be possible, if its total net energy gained does not exceed the total E_G of that culture.

Natural background radiation

Natural background radiation NBR comes from two primary sources: cosmic radiation and terrestrial sources. The worldwide average background dose for a human being is about 2.0 millisievert (mSv) per year [20]. This exposure is mostly from cosmic radiation and natural radionuclide in the environment, affecting outer cells of live species more than the inner ones, which is clear when high doses to radiation workers would redden the skin (erythema). Accordingly, the exposure to NBR dose of 2 mSv by outer cells (about 1 %) of adult (70 kg), is equivalent to E_{NRB} = 1.2484MeV/Cell, converted as shown in Eqt (1.4) to E_{NRB} = 0.0000538132 Emad /Cell (1.6). This level of NBR expresses the standard level that settled by this approach for the natural biological cell where this is far greater than human-caused background radiation exposure, which in the year 2000 amounted to an average of about 5 μSv per year from historical nuclear weapons testing, nuclear power accidents and nuclear industry operation combined, and is greater than the average exposure from medical tests, which ranges from 0.04 to 1 mSv per year. Consequently, from Eqt (1.6) it is clear that, all living organisms will be affected normally by the environmental standards for NBR effects, and it can be deduced that the natural (healthy) cell E_G is $E_{NRB}=0.0000538132Emad$ that corresponds to 1.2484MeV/Cell.

Low Dose Radiation (LDR) effects

The observational evidence for radiation-induced cancer in humans comes largely from the exposure to effects at low doses. However, for the setting of environmental standards and for gauging the consequences of exposures routinely received by the general public, the most important doses are relatively small doses received over long periods of time. Several official organizations e.g. the Committee on the Biological Effects of Ionizing Radiations of the National Research Council (BEIR) have settled these consequences [20]. Taking the dose-rate effectiveness factor, DREF into account, as well as other minor differences in the estimates, an overall consensus estimate for low doses and low dose rates is: risk of eventual fatal cancer: 0.05 per Sv (0.0005 per rem). This risk factor can be taken to apply to an "average person" but in its most precise form applies to a general population. Consider a population of 100,000, with a representative distribution by age and sex. Then, for example, if each person receives a 20 mSv dose, the collective exposure is 2000 person-Sv and the calculated number of excess eventual cancer deaths is 100[20]. Accordingly, the exposure to Low-Dose Radiation (LDR) of 20 mSv by outer cells (about 1 %) of adult (70 kg), is equivalent to E_{LDR} =12.484 MeV/Cell, converted as shown in Eqt (1.4) to E_{LDR} = 0.000538132 Emad /Cell (1.8). Accordingly, it is clear that, all living organisms will be affected by the environmental standards for LDR effects as their cell E_G is higher than that of the LDR has been settled by the BEIR [21]. With respect to the experiment conducted by Vysotskii, V., et al. on utilization of high-activity waste in the process of transmutation in growing associations of microbiological cultures in which Barium transformed to Samarium $Ba^*_{140} + C_{12} = Sm_{152} + \Delta E$, (Δ E = 8.5 MeV) [10] , from Eqts (1.6) and (1.8) it can be deduced that, the transmutation of Barium into Samarium occurs in the biological cells of growth energy above the NRB effects but less than the LDR effects.

Maximum Tolerated Dose (MTD) in radiotherapy

O'Donoghue et al. showed that the sizes of individual administrations were set by the requirement that the whole-body burden of radioactivity must not exceed 1.1 GBq (30 mCi) 1311[22]. Accordingly, the exposure of adult (70 kg) to this maximum tolerated dose [MTD] corresponds to E_{MTD} = 15.3 MeV/Cell, converted as shown in Eqt (1.4) to E_{MTD} = 0.000658485 Emad /Cell (1.10). Consequently, from Eqts (1.6), (1.8), and (1.10) it can be deduced that safe or harmless transmutation in the human cell, whose energy is less than 0.000538132 Emad or 12.484 MeV. By exceeding this limit the probability of inducing cancer increases gradually until reaching the maximum tolerated energy level of 0.000658485 Emad or 15.3 MeV. Hereby, this approach considers the transmutation whose occurrence results in an energy gain greater than the MTD a lethal one for the human cell.

2. Experimental Proofs

2.1 Accelerated Deactivation of Reactor Cs-137 Isotope in Growing Biological Cells [11]

A successful experiment on utilization of high-activity waste in the process of transmutation in growing associations of microbiological cultures was carried out lately by Vysotskii, V., et al. [10, 11] In those experiments "microbial catalyst-transmutator (MCT) with mass about 1 g (1×10^7 Cells) was placed in the glass flasks with 10 ml of water were extracted from the active zone of an atomic reactor. The water contained reactor isotope Cs-137 with initial activity about 1.46×10^{-7} Curie/L on the 10th day after extraction of water from the active zone of the nuclear reactor. In control experiments the same radioactive water but without MCT was used. The cultures were grown at the temperature 25^0 C. Activity of all closed flasks has been measured every 7 days by amplitude Ge detector. The results of controlled influence on gamma-radioactivity of different isotopes in different biochemical compositions are reported. The accelerated deactivation of Cs-137 isotope was observed! Speeded up decay of Cs-137 isotope in all experiments with MCT and with the presence of different additional salts during more 100 days has been observed. In control experiment (flask with active water) the law of decay was "usual" and the life-time was about 30 years. The most speeded up decay of Cs137 isotope with life-time of 310 days (accelerated by 35 times) was observed at the presence of Ca salt [11]. Results of this experiment show that enough Cs-137 were lost anomalously, and then one can tell from the reduction in the strength of the gamma emission that Cs-137 life-time decreased exponentially from 30 years to 310 days along time of experiment (130 days) [11]. Consequently, amount of decayed energy increased anomalously, from $2.27593?\ 0^{-6}E_{0.Cs137}$ to $2.52241?\ 0^{-1}E_{0.Cs137}$. This means that it is possible to achieve significantly higher influence upon the spontaneous decay characteristics under circumstances of the NT in MCT. In the same time, internal adaptation of the association for such aggressive effects demands the existence of some time that is necessary for mutagene change of 5-10 generations that corresponds to several days. Thereby the MCT doubling time is between $\frac{10}{5\rightarrow10}=4/3$ days. Since, it is believed that cell hypoxia contributes significantly to resist traditional chemical disinfection. This happens for at least two reasons: First, most agents cannot penetrate beyond 50−100 micrometers from capillaries [23], therefore never reaching the cells in the hypoxic regions. Second, the lower nutrient and oxygen supply to cells in the hypoxic zones causes them to divide more slowly than their well-oxygenated counterparts. Therefore, hypoxic cells exhibit greater resistance to chemical treatments, as well as radiation that targets rapidly dividing cells or requires oxygen for efficacy [24-27]. Consequently, from Eqt (1.2) the work done against the biological culture growth can be calculated as the total E_G of the hypoxic cells, as follows: if the percentage of the hypoxic cells is h %, then

$$W_r=-h\%\int_{C_0}^{0}\ln\left(\ln\frac{dG}{dC}\right)^2 dC \qquad [21]$$

$$\Rightarrow W_{BC}=\ln\left(\ln\frac{dG}{dC}\right)^2\times C_0\times h\%Emad$$

where, C_0 is the initial number of the biological cells, h is the percentage of the hypoxic cells, and $\ln\left(\ln\left(\frac{dG}{dC}\right)^2\right)$ is the biological culture growth energy/cell in Emad units. Accordingly, the E_G of the MCT can be calculated by knowing its doubling time(t_D)which is equal to 4/3 days, while percentage of hypoxic cells (h %) is on average of 10%, then the E_G are equivalent to 4.973299917 Emad, which can be converted as shown in Eqt (1.4) to 1.8484 Joule. While the accumulated released energy from 1.46×10^{-7} Ci of Cs-137 was 1.3952 J which is less than the E_G of the MCT (1.8484J) to conclude the necessary condition for inducing transmutation in the biological cultures; the total decay energy of the nuclear transmutation should be less than the E_G of the biological culture.

2.2. Transmutation of Manganese into Iron in Various Materials (Plants, Bacterial Culture, and Metallic Materials), and Increasing Risks of Carcinogenesis

Louis Kervran [1] showed that some plant families can transform manganese into iron. The reaction may be reversed in other plants and in other soils. The reaction is as follows: $Mn^{55} + H^1 >> Fe^{56}$. This reaction gives mass loss = [54.938 05030+ 1.007 825 19 - 55.934 936 3] = 0.010 939 19 a.m.u [3] interpreted into net gain energy corresponds to 10.18 MeV, higher than NBR effects but less than that of LDR. Accordingly, this transmutation is harmless as it is considered within the tolerated limits. As studying the possibility of bio-transmutation is inferred from studying Nuclear Transmutation (NT) at low temperature in metallic [9], some recent experiments were done to prove the CFP in the biological cultures by too much similar method to that done to prove CFP in metallic and hydrocarbon materials; As same as Matthew Trainer showed that Neutron Transmutation Doping (NTD) process induces low energy NT of Manganese into Iron in metallic materials[28], as Vysotskii, V., et al. carried out experiments showed the same Low-Energy NT of Manganese into Iron in growing bacterial cultures[29]. Matthew Trainer showed that Neutron Transmutation Doping (NTD) process induces low energy NT as a result of the capture of slow (thermal) neutrons, where the material is irradiated with a neutron flux in a reactor. Stable and unstable isotopes are produced; the unstable isotopes undergo further transmutations usually accompanied by emission of radiation. Irradiation of a tantalum capacitor with neutrons for 24 h results in transmutations in the manganese dioxide (β - MnO_2) electrolyte layer, the isotope Mn-56 is initially produced by the slow neutron reaction: $^{55}_{25}Mn+n\rightarrow{}^{56}_{25}Mn$. This isotope has a half-life of 2.58 h and decays to ^{56}Fe ,

accompanied by the emission of β^- particles and γ -rays: $^{56}_{25}Mn \rightarrow {}^{56}_{26}Fe + \beta^-$, γ -rays at 846.75, 1810.67 and 2113.04 keV[29], which confirms the role of radiation as one of the essential agents that are necessary to stimulate the NT in the metallic materials as previously postulated by current thesis. By same methodology, Vysotskii, V., et al. conducted a series of experiments based on new technology employing the precise methods of mossbauer spectroscopy to investigate the effect of NT of Manganese into stable rare isotope Iron (Fe^{57}) by means of mossbauer effect according to the reaction $Mn^{55} + d^2 + \gamma_{Ray} \rightarrow Fe^{57}$ in growing bacterial cultures in heavy-hydrous (D_2O) sugar-salt nutrient medium deficient in Iron and contain Manganese. They placed various single-cell organisms like Deinococcus Radiodurans in heavy-water containing manganese sulphate. Fe^{57} would result if a deuteron enter the nucleus of the manganese due to nuclear reaction , which can be detected easily at very low levels and with no chance for mistaken identity using the Mössbauer effect. Vysotskii, V., et al. found that Fe^{57} was made at a constant rate when heavy-water and manganese were both present in the growing cultures. No effect was seen when normal water was used or when the manganese was absent. During growing, the replication of DNA of the bacterial cultures has been occurred. As Mössbauer spectroscopy is a gamma-ray source, it confirms the role of radiation as one of the essential agents that are necessary to cause aberrant genetic alteration results in cell cycle arrest, stimulate the NT in the biological cultures, and increasing risks of carcinogenesis as previously postulated by current thesis. With respect to risks of carcinogenesis on genes and cell cycle alterations following an Ionizing Radiation effect; Tobias Sahr, Gabriele Voigt [30] has showed that Low level radiocaesium exposure alters gene expression in roots of Arabidopsis. They have measured the accumulation of caesium in plant material grown for 5 wk on agar contaminated by up to 60 Bq / cm^3 ^{134}Cs . ^{134}Cs was found to accumulate, in particular, in leaf rosettes and was dependent on the activity concentration in the growth media. All effects observed upon ^{134}Cs application were caused by low chronic doses of ionizing radiation and not by the known effects of Cs ions and showed an up-regulation of genes involved in the DNA excision and repair system, and in homologous recombination events. In addition, genes influencing the cell cycle and the cytoskeleton were only induced with ionizing radiation [31, 32].

3. Results

The results of all the provided experiments in section Methods and Materials are consistent with the existence of radiation being essential to induce NT in the biological bodies. Measuring the biological E_G in MeV or Joules, allows to asses the limits of energy that is suitable for the treatment purpose. From data of the experiment shown in (2.1), the accumulated released energy from Cs-137 (1.3952 J) was less than the E_G of MCT (1.8484J), to confirm the necessary condition for transmutation to be induced in the biological cultures and achieve significantly higher influence upon the spontaneous decay characteristics; the total decay energy of the NT should be less than the E_G of the biological culture, and in the same time, the E_G of the biological cell should be greater than that produced by these reactions to allow their occurrence within the cell. As a result of the mass loss of NT reactions that occur naturally in biological bodies a net surplus of energy was also produced which is almost impossible to be detected or observed except by high technical methods like Mössbauer spectroscopy as shown in the experiment shown in (2.2). The safe transmutation is defined by the nuclear reaction that results in a net gain of energy less than that of the standard has been set for a long-term of exposure to LDR effects, whereas the harmful or lethal one needs higher E_G than that of LDR level so that it may occur in the presence of any agent that could cause an increase in the E_G of the biological cell. Similar methodology fulfilled that of Vysotskii, V., et al. and Matthew Trainer that is presented in experiment shown in (2.2) confirms a point of view assessed in the current approach that bio-transmutation is inferred from studying NT at low temperature in metallic materials, and that NT in these various materials should have common causes, and consequently have at least some related results. Thus, the exposure of biological bodies to environmental stressors, such as ultraviolet (UV) radiation, air pollutants, metal ions or ionizing radiation, microbial action…etc influences important cellular responses, resulting in a changed gene-expression profile which damages or disturbs the DNA replication, and leads to a cell cycle arrest causing an inappropriate cell proliferation to occur as shown in the experiment shown in (2.2) and cancer is a disease of inappropriate cell proliferation.

4. Discussion

In general it is already settled down that CFP between charged nuclides results in a radiation of low levels which are almost impossible to be detected or observed. Around room temperature, energy of particles as deuterons, and protons are very small, consequently the penetration ratio through coulomb barrier between one of those particles and another nuclide in metallic, or hydrocarbon, or biological materials is not enough for Fusion reactions to occur between nuclides, which expresses the case of stability for those materials. By increasing energy of such nuclides artificially by means of a high voltage electric field or irradiation, or increasing such energy naturally by existence of background thermal neutrons, the penetration ratio would be increased to a level that overcome coulomb barrier between particles to permit the CFP [9]. In order to explain a phenomenon, one must place it in a framework accepted by

at least the majority of scientists. After establishment the existence of biological transmutations, it was required to suggest a global theory at the atomic level where this theory could provide a base for the explanation of transmutations at low energies. This approach disagrees with prior view for transmutation as a balance of elements, and considers it as balance of energies instead. Explaining of observations of the provided experiments in section "Methods and Materials (2.)" had not been introduced yet, as measuring of E_G of the MCT done by applying Emad formula [14-19] as previously shown. Such new measuring allowed for the first time to estimate the biological E_G in MeV or Joules, to asses the limits of energy that suitable for the treatment purpose and provides the missing part to investigate all effects of the Human-caused background. For instance, the provided experimental analysis in (2.1) has settled down the necessary condition to induce NT in BC; the total decay energy of the NT should be less than the E_G of the biological culture, and in the same time, the E_G of the biological cell should be greater than that produced by these reactions to allow their occurrence within the cell. Such experimental analysis provides the hope that the CFP in biological systems gives solution to the problem of radioactive waste products (RWP), taking into account that RWP total decay energy, and the net gain of energy from these fusion reactions should not exceed the E_G of each of the biological culture, and the cell respectively, provided that their effect is less than the LDR effects. In addition, this condition confirm the hypothesis of current approach and illustrate the role of background thermal neutrons as an energetic radiation source to increase the Gamow factor that responsible for penetrating Coulomb barrier between two nuclei. The background neutrons that collide with biological bodies in which "Mg adenosine triphosphate (Mg ATP)" the energy producer that lies in the mitochondrion of the cell acts as a condensed cyclotron on a molecular scale or a biological particle accelerator catalysis NT by acquiring the collided neutron enough energy to react with an element in the cell. Thus, the mechanism of the biological transmutations can be summarized as follows; naturally the elemental harmless transmutations are continuous operations in all living organisms, to maintain their balance of elements as they need relatively small E_G to occur, and until the increase of the E_G of their cells to a level permits such harmful transmutations. Such mechanism introduces an extremely simple and fundamental principle for cancer in relation to the physical energy condition of a cell. Fundamentally, the connection between the cell cycle and cancer is obvious: cell cycle machinery controls cell proliferation, and cancer is a disease of inappropriate cell proliferation, in which cancer cells are linked in a vicious cycle with a reduction in sensitivity to signals that normally tell a cell to adhere, differentiate, or die. Stages of cell cycle are G_1-S-G_2-M, The M stage stands for "mitosis", in which nuclear chromosomes separate and cytoplasmic (cytokinesis) division occurs and produces two identical daughter cells and its duration is defined by cell doubling or division time and denoted by t_D which is the parameter that express E_G of the biological cell as previously introduced in Eqt (1.2) [14-19]. Since the lower nutrient and oxygen supply to cells for a long term cause them to divide more slowly [33], their doubling time t_D would be longer and hence their E_G would be larger. Thus, Cancer is a critically High state of energy and slow division within a cell, in which the cell is being “trapped” for various reasons; when a high energy proliferating cell is found to be lacking the proper nutrition, consequently would allow the harmful transmutations which impair balance of energies. Once the intake energy to cells is insufficient for the demand, hydrogen will be shifted to pyruvic acid converting it to lactic acid. Lactic acid build up in tissues and blood is a sign of inadequate mitochondrial oxygenation, which may be due to hypoxemia, poor blood flow (e.g., shock) or a combination of both. If severe or prolonged it could lead to cell death (apoptosis) [27]. Such explaining settle down the fundamental principle for cancer in relation to the physical energy condition of a cell as previously introduced. Data shown in the presented experiment in (2.2) indicate that low-level ionizing radiation influences important cellular responses, resulting in a changed gene-expression profile, confirming that damaging or disturbing the DNA replication, induce the gene expression of cyclin B_1 and lead to a G_2 arrest [34], that shows risks of carcinogenesis following an Ionizing Radiation effect on genes and cell cycle alterations, and the role of radiation as an agent regulates the NT in the biological cultures, and causes genetic alteration that if severed lead to cancer. As cell cycle proteins are involved in the regulation of mitosis and RNA processing in eukaryotes [35], and act with cyclindependent protein kinases, and cyclins to control the cell cycle [36]. The cyclin-cyclin dependent kinase (CDK) adds phosphate to a protein along with cyclins represent major control switches for the cell cycle, causing the cell to move from G_1 to S or G_2 to M. The impact of low levels of ionizing radiation on gene expression in BC and its effect on cell cycle and consequently t_D and E_G has been investigated by current approach to provide a view on transcriptional changes of potentially irradiation-responsive genes along with its DNA damage, causing cyclin-cyclin dependent kinase inhibitors (CDIs) bind to and inhibit CDK, followed by arresting the cell cycle at some phases that lead to increase t_D and consequently E_G of the biological cell, as shown in the presented experiment in (2.2), that if severed the protein p53 blocks the cell cycle inducing apoptosis (cell death) where a genetic a defect in p53 leads to a high frequency of cancer in affected individuals[37]. As, this combination of altered properties increases the difficulty of deciphering which changes are primarily responsible for causing cancer it would be easier to conclude that all agents that lead to increase t_D and consequently E_G of the biological cell are considered as cancer causes. . Hereby, current approach recommends that a test for cell E_G can play a major role in targeted earlier interception for cancer.

5. Conclusions

It is concluded that elemental transmutations were indeed occurring in life organisms as the E_G of these organisms is the only parameter that allows such transmutations and were probably accompanied by a net gain of energy due to the mass loss of transmutation reactions. For transmutation occurrence in biological culture, the total decay energy of such nuclear transmutation should be less than the growth energy of the biological culture. It is a matter of energy balances; under the natural circumstances, the low growth energy of the biological cell doesn't allow harmful or lethal transmutations of elements. As far as cell growth energy increases due to exposure to the long-term effects of low doses of radiation in the presence of MCT, whenever the biological cell allows harmful transmutations which cause different types of cancerous tumors.

Conflict of interest

The author declares that there is no conflict of interest concerning this paper.

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