Experimental Study

Radiotherapy by lasers and radioactive sources in therapy many diseases caused by bacterial tumors isolated from malignant tumors (cancer)

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Abstract

Objective: Is study aims to solve a problem in the field of specialisation to serve a community and have a community service for patients by finding ways to treat skin diseases and other diseases including cancer by using radiation light emitted from lasers and radioactive sources.

Study design: Randomized Controlled Trails (RCT).

Backgrounds: A scientific study that deals with a problem in the field of medical physics about radiation to serve a community. This study came to reach a study concerning treatment using radiation whether employing radiation emitted from lasers, as in the Nd:YAG laser, Semiconductor laser, Helium-Neum laser and different types of lasers or radiance emitted from radioactive provenance as in radioactive provenance Cobalt, Strontium, Sodium, Americium, Polonium, Thallium and Cesium with diverse doses, different efficacy and

diverse times. Various types of laser are efficacious in killing various types of bacteria, inclusive Pseudomonas bacteria, *Staphylococcus spp*. bacteria, *Serratia marscences* bacteria, *Acinetobacter spp*. bacteria, *Morganella morganii* bacteria and second types of bacteria isolated from various clinical provenance inclusive from blood, skin, wounds, burns, ulcers on the skin, acne on the skin, malignant and benign tumors from skin cancer, leukaemia, white blood cell cancer, liver cancer, kidney cancer, colon cancer and another and it has been proven that killing these microorganisms raise the time of exposure to radiation and the higher the doses. For these microorganisms and accordingly, our suggestion for this study is that the employ of the Nd:YAG laser which is a laser that is secure to use at 500 pulses per second, be used in the treatment of skin diseases and infections reason via the microorganisms mentioned above and the employ of radioactive sources obtainable in powder compose in the treatment of injuries and skin diseases caused via prior microorganisms via preparing a cream, the radioactive substance is mixed with it in small doses, not altitude and that it does not side impact on humans, that is, does not reason side impacts.

Studies encompass the characterization of bacteria through tumor tissues have been in the situation of tumourigenesis as a consequence of bacterial existence through healthy tissues and in general, dogma carry that such bacteria are causative agents of malignancy (directly or indirectly). Clinical monitoring of bacteria within tumors arise from spontaneous infection of instituted tumors.

Methodology: Semiconductor laser for (5, 10, 20, 30) minute with (P< 5 m W), wavelength = 650 +-10 nm and wavelength 532 nm, (continuous laser), output for S.C. laser (ħυ 532 +-10) nm., the output power = < 200 mW. Nd:YAG laser (500 pulse, 1000 pulse, 1500 pulse), wavelength = 1.06 nm. Energy per pulse (energy density or power density) is 700 mJ. Pulse duration is 10 ns, repetition rate of 1 Hz and effective beam diameter of 4.8nm . Pulsed peak power = Pulse Energy Pulse duration = 700 m J = 70 m J /ns 10 ns applied in the equipment 500 V to turn on the machine at ħυ =532 (frequency doubling), 500 was utilized for pulse irradiation. He-Ne laser for (5, 10, 20, 30) minute with wavelength 6328 A°, procedure of laser is C.W laser, output power 1mW, the pulse duration is C.W laser, with energy density or power density 0.1624 mW/mm2, a spot size of insinuation to laser light is 6.154 mm2.

Key words: Nd: YAG, Semiconductor, He-Ne laser, CS^{137}, CO^{60}, Am^{241}, Na^{22} and Sr^{90}

Introduction

A scientific treatise that deals with a problem in the field of medical physics about radiance in order to render a community. This treatise came in order to reach a study regarding treatment employing radiance whether employing radiance emitted from lasers, as in the Nd:YAG laser, Semiconductor laser, Helium-Neum laser and another types of lasers or radiance emitted of radioactive provenance as in radioactive resource Cobalt, Strontium, Sodium, Americium, Polonium, Thallium and Cesium with various doses, different efficacy and different time. Different kinds of laser are efficient in killing various types of bacteria, including Pseudomonas bacteria, *Staphylococcus spp*. bacteria, *Serratia marscences* bacteria, *Acinetobacter spp*. bacteria, *Morganella morganii* bacteria and another types of bacteria isolated from various clinical provenance inclusive from blood, skin, wounds, burns, ulcers on the skin, acne on the skin, malignant and benign tumors from skin cancer, leukemia, white blood cell cancer, liver cancer, kidney cancer, colon cancer and others and it has been proven that killing that microorganisms raise the time of exposure to radiance and the elevation the doses. For these microorganisms and as, our suggestion for this treatise is that the employ of the Nd:YAG laser that is a laser that is to use at 500 pulses per second, be used in the treatment of skin diseases and infections caused by the microorganisms mentioned above and the use of radioactive sources available in powder form in the treatment of injuries and skin diseases caused by before microorganisms by preparing a cream, the radioactive substance is mixed with it in small doses, not high and that it does not side effect on humans, that is, does not cause side effects. Studies involving the characterization of bacteria within tumor tissues have been in the context of tumourigenesis as a consequence of bacterial existence through healthy tissues and in common, dogma holds that such bacteria are causative agents of malignancy (directly or indirectly). Clinical observations of bacteria within tumors arise from spontaneous infection of determined tumors [1, 2, 3, 4].

The expansion of cancer is associated with several genetic and environmental employee. Furthermore there has been an association between cancer expansion and bacterial and viral infections for decades. Several viruses can merge into the human genome and immediately commence tumourigenesis for instance human papillomavirus (HPV) in cervical cancer and the herpes virus in Kaposi's sarcoma. In other status, cancer expansion is indirect for example with *Helicobacter pylori* that participate to gastric cancer and mucosa associated lymphoid tissue (MALT) lymphoma due to chronic. There are of bacteria that are the reason of cancer

and anothers are opportunistic in the apparition of cancer. There are kinds of bacteria that are the reason of cancer (causative) including *Mycoplasma sp*., *Chlamydophila pneumonia*, in lung cancer; *Salmonella typhii*, *H. Pylori*, *H. hepaticus*, *H. bilis* in Gall-bladder carcinoma. Moreover, *Chlamydia pneumonia*, *C. trachomatis*, *C. psittaci* in Pulmonary Mucosa-Associated lymphoid tissue (MALT) and others are opportunistic in cancer, *Mycoplasma sp*., in Ovarian cancer; *Streptococcus gallolyticus*, *H.pylori* in Colorectal cancer [5].

A laser is a aooliance that emits light during a process of optical amplification depend on the induced emission of electromagnetic radiance. The word "laser" is an acronym for light amplification via persuade emission of radiance. Radiosource, in astronomy, any of various subject in the existence that emit comparatively large amounts of radio waves. Nearly all kinds of astronomical subject give off several radio radiance, but the strongest provenance of such emissions inclusive pulsars, specific nebulas, quasars and radio galaxies and radiance sterilization has been broadly utilized in several developed and developing countries to sterilize health care products. A historical survey shows clearly that ionising radiance was utilized extensively to treat several types of infections prior the advent of antibiotics [6].

Methodology

Clinical inspectation include Study design, treatise population, identification via VITECK2-GN, antimicrobial susceptiblity tests till antibiotics, efficiency of radiance on bacterial tumors, cell line culture and statistical analysis.

Study design

In this descriptive study design of diverse bacteria via various study designs, assemble of Baghdad hospitals of various patients. Study design are particular plan or protocol for direct study that permit the researcher to translate the fictional hypothesis till an operational one and other realize is the formulation of vastige and experiments, as well as observational studies in medical, clinical or another kinds of research (epidemiological) inclusive human beings [7].

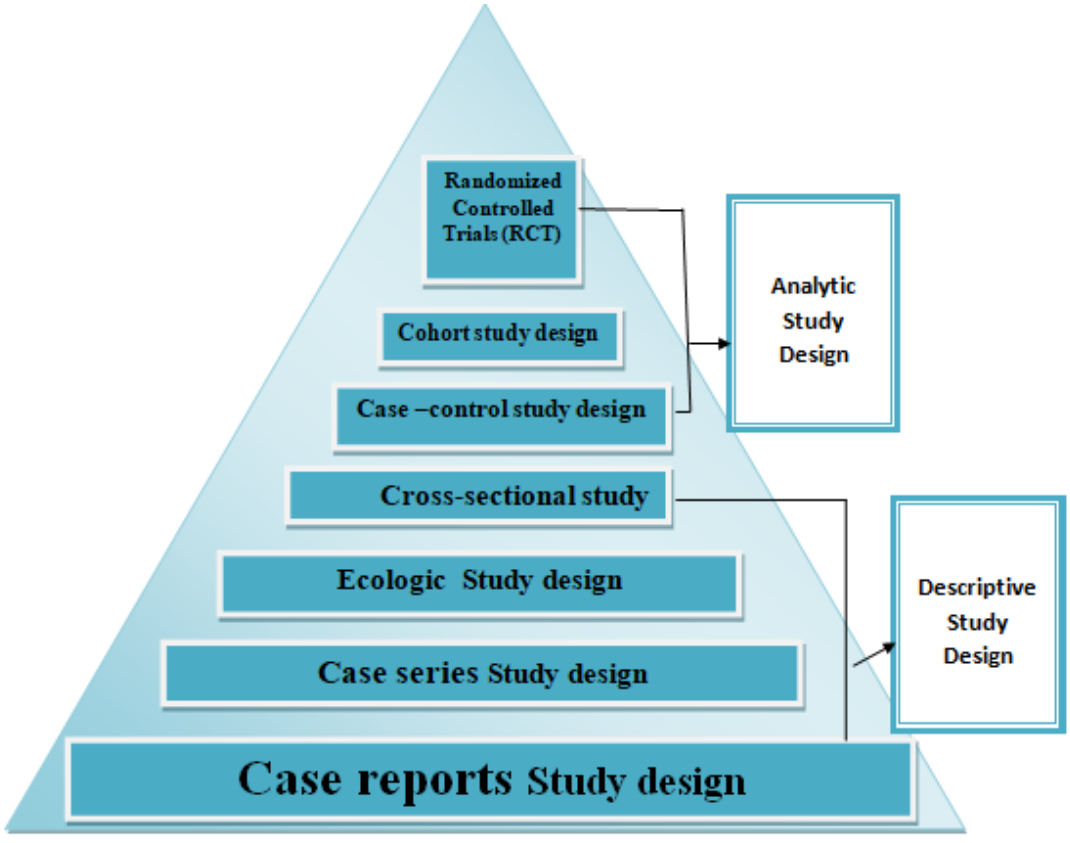

Figure (1): Types of the study design include Descriptive studies and Analytic study.

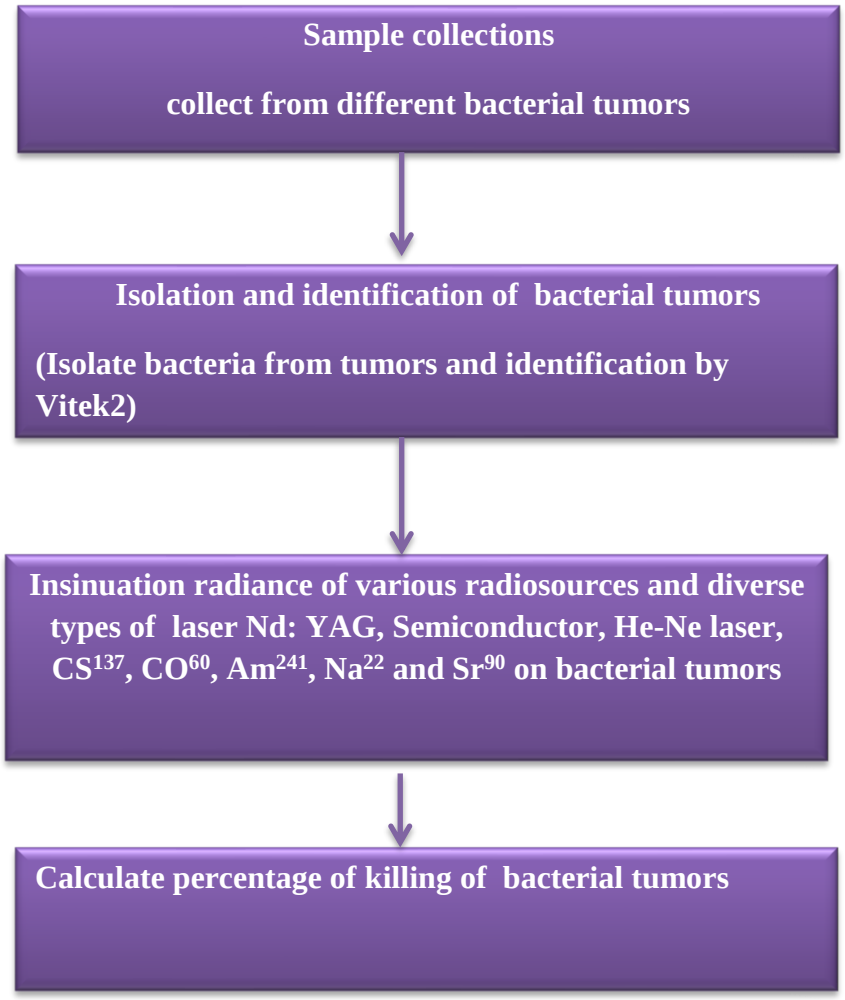

Figure (1): Scheme for Study design of this study.

Insinuation bacterial tumor to Nd: YAG, Semiconductor and He-Ne laser

Bacterial tumor culture was done depending to [8] with some modifications as follow:

Bacterial tumors were implant in Nutrient broth at 37° C for 24 h to arrive the stationary-phase culture, subsequently culture was centrifuged (5000 rpm for 10 minutes). The pellet was suspended in 150 ml of sterile normal saline. Subsequently, 1ml of this solution was insecured to laser in various times (10 , 20 , 30) second, with control (without exposure).

Semiconductor laser for (5, 10, 20, 30) minute with (P< 5 m W) , wavelenghth = 650 +-10 nm and wavelength 532 nm, (continuous laser), output for S.C. laser (ħυ 532 +-10) nm. the output power = < 200 mW. For S.C. laser ħυ (650+-10) nm, the output power =< 100 mW . energy density or power density for ħυ 532 +-10) nm, power density is 200 mW /cm^2 but in S.C. laser ħυ (650+-10) nm, power density is 100 mW/ cm^2. density or power density for ħυ 532 +-10) nm, power density is 200 mW /cm^2 but in S.C. laser ħυ (650+-10) nm, power density is 100 mW/ cm^2, spot size of insinuation to laser light =1n cm^2.

Nd:YAG laser (500 pulse, 1000 pulse, 1500 pulse), wavelenghth = 1.06 nm. Energy per pulse (energy density or power density) is 700 mJ. Pulse duration is 10 ns, repetition rate of 1 Hz and effective beam diameter of 4.8nm . Pulsed peak power = Pulse Energy Pulse duration = 700 m J = 70 m J /ns 10 ns utilized in the device 500 V to turn on the machine at ħυ =532 (frequency doubling), 500 was used for pulse irradiation.

He-Ne laser for (5, 10, 20, 30) minute with wavelength 6328 A°, manner of laser is C.W laser, output power 1mW, pulse duration is C.W laser, with energy density or power density 0.1624 mW/mm^2, spot size of insinuation to laser light is 6.154 mm^2

The percentage of Killing counts from the equation:

$$\text{Percentage of Killing \%} = \frac{\text{Control} - \text{treated}}{\text{Control}} * 100$$

Insinuation of bacterial tumor to Beta, Alpha and Gamma radiance

Bacterial tumors implanted was done depending to Tramps *et al.*, (9) with several modifications as follows:

The radiance facility utilized was gamma (γ) irradiation, Beta, Alpha radiance in a various dose and diverse energy for (1, 2, 3) hr. The bacterial tumors seclude was grown in Nutrient broth for 24 h. on a shaker (150 rpm) at 30ºC. The fully grown bacterial culture was centrifuged at 8000 rpm for 15 minutes. The supernatant was pour and the pellets were suspended in sterile saline.

The suspended cells were assembled in a clean sterile flask to form pool. The bacterial suspension of the pool (5ml) was dispensed in clean sterile screw cap test tubes and roofless to various doses of Gamma, Beta, Alpha radiance utilizing triplicates for each dose. The non-irradiated control and the irradiated cultures were implanted on the surface of Trypton soy agar plates, in rapprochement to the control group (without insinuation to laser), each run was accomplish in triplicate, impregnated in Trypton soy agar and the applicable count, percentage of killing was specified.

The percentage of Killing, calculated from neutralization

$$\textbf{Percentage of Killing \% } = \frac{\textbf{Control – treated}}{\textbf{Control}} \textbf{ *100}$$

Table (1): Gamma, Alpha and Beta radiance, doses and energies.

Isotope	Type of decaye	E (MeV)	Do (µSv)
^{90}Sr	β	0.198	63.100
	β^-	0.318	10.573
^{60}Co	ɣ	1173.1332	$1.3178*10^{-4}$
	β +	0.513	32.444
^{22}Na	ɣ	1.275	$1.416*10^{-4}$
	β	0.514	96.950
^{137}Cs	ɣ	0.662	$1.776*10^{-4}$
^{241}Am	α	5485.6 5442.8	non
	ɣ	0.060	0.320

Table (2): Influence different rays with attribution viability with percentage of bacterial tumors revealed to radioactive radiance.

Radiosources radiance	Activity µci)(	Types of radiance	Dose for 1 hours/ msv	Dose for 2 hours/ msv	Dose for 3 hours/ msv
Cs^{137}	10 µci	β,ɣ	$11.728*10^{-5}$	$23.456*10^{-5}$	$35.1843*10^{-5}$
Cs^{137}	10 µci	β	$6.367058*10^{-5}$	$12.73411648*10^{-5}$	$19.1011747*10^{-5}$
Cs^{137}	1 µci	β,ɣ	$6.28903*10^{-5}$	$12.56806*10^{-5}$	$18.867099*10^{-5}$
Cs^{137}	1 µci	β	$3.4478394*10^{-5}$	$6.835678*10^{-5}$	$10.2535183*10^{-5}$
Co^{60}	10 µci	β,ɣ	$2.3323*10^{-5}$	$4.6647*10^{-5}$	$6.99705*10^{-5}$
Co^{60}	10 µci	β	$1.866686*10^{-5}$	$3.733172*10^{-5}$	$5.6000586*10^{-5}$
Co^{60}	1 µci	β,ɣ	$1.55599*10^{-5}$	$3.111989*10^{-5}$	$4.86798*10^{-5}$
Co^{60}	1 µci	β	$1.24532*10^{-5}$	$2.490655*10^{-5}$	$3.735982*10^{-5}$

Basic Cell Culture Processes and Procedures

Cell culture procedure vary relying on the cell type and application, require to be aware that if cells are not holder in a manner that is suitable for each procedure, their characteristics might alter. This section insert general cell culture procedures whilst noting significant points for respect.

There are two procedure for acquisition cells from a cell bank or by insulting cells of donor tissue while starting culture of cells acquired from a cell bank, one require to go during the process of "thawing," "cell seeding" and "cell observation."

While utilizing tissue imperturbable from a donor, superfluous tissue are commonly elminated if it is attached. There are two main procedures to insulate cells of the tissue, transfer culture and enzymatic procedure. In enzymatic processes, isolation of cells of the tissue of interest utilizing a proteolytic enzyme solution. If an enzyme is utilized, dilute the enzyme or halt the enzyme reaction with an enzyme reaction inhibitor, subsequently progress with the steps of "cell seeding" and "cell observation" to attend the cell culture.

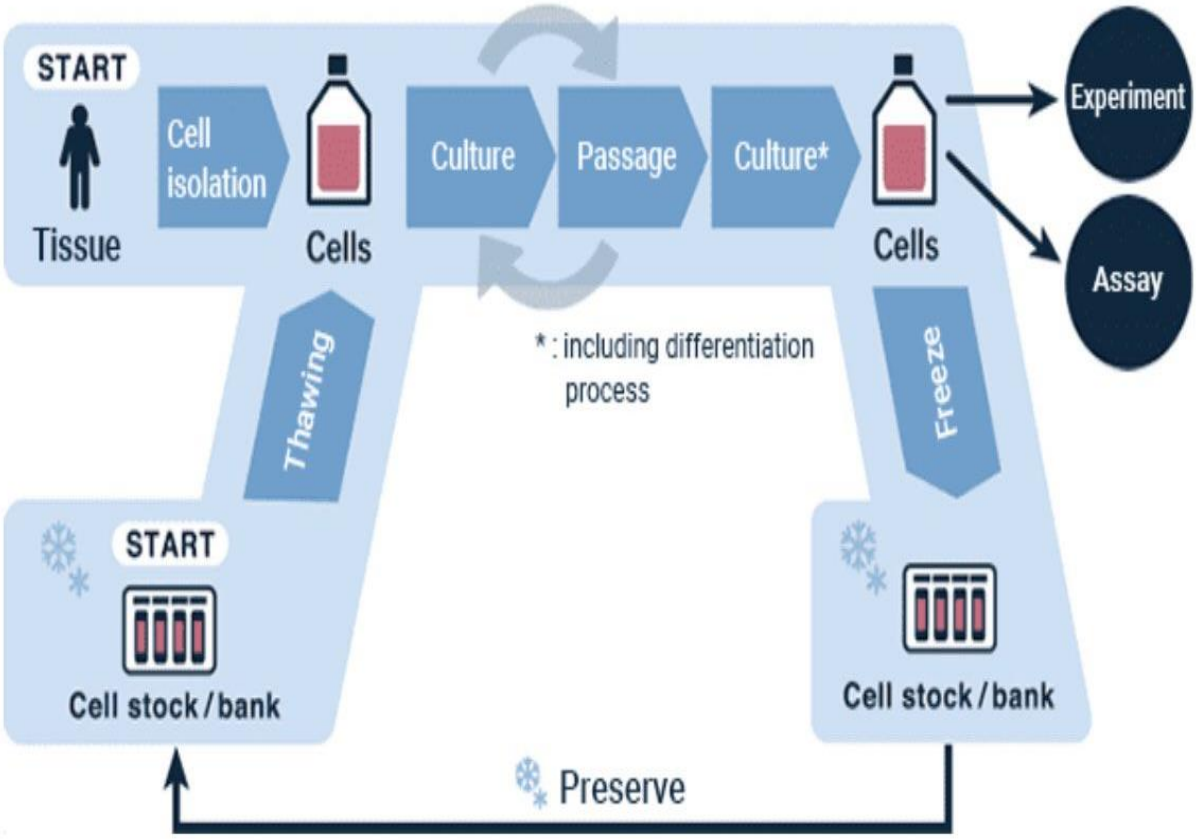

Figure (2): Preparation of cell line culture.

Acknowledgement about author

Researcher Dr. Nebras Rada Mohammed Ph.D in Biotechnology with a microbiology, Genetic Engineering, Molecular Genetics and Protein Engineering, she is a researcher, creator, inventor and author, editor-in-chief of the Journal of Articles and Inventions in the American Goidi Journal, she is teaching, as a lecturer at the University College of Al-Turath University college, she has Bachelor's degree in Microbiology and a Master's degree in Molecular Biology in Microbiology from Al-Mustansiriya University, an arbitrator, international resident and consultant. In medical laboratories, she has been an expert in medical laboratories and a holder of the title of a science project, an arbitrator, a distinguished publisher, she got a silver supporter of scientific platforms, a chairman of a committee in a scientific society, receiving accolades from international intellectual property, the Best Arab Woman Award 2020, also the Best Community Personality Award, the Best Research Award 2019. Also, she obtained the Best Research Award 2020 and an American Award For the invention of 2020 by the American Goidi the World Investment Commission in America, she holds the title of the best distinguished inventor globally by the World Investment Commission in America and holds the first places for inventions presented in the world.

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