in the emitted light. We encourage all practitionners to question their LED producer to provide these details! It happenes, that even the producer does not care about these properties, and even claim to deliver wavelength-pure multi-color LED light!

PL16

Effect of laser radiation on platelet function is dependent on polarization state of laser light

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Introduction: The role of polarization type of laser radiation in its biological effects is not clear. The aim of the study was to investigate the effect of low power laser radiation with different types of polarization on platelet function.
Materials and Methods: The experiments were performed on the whole citrated blood of 11 healthy volunteers. Blood sample of each volunteer was divided into four parts of 130 μL. Three parts were irradiated by the light of semiconductor laser (EMRED Oy, Finland; 660 nm, 16.5 J) with different state of polarization: linear polarization and right and left circular polarization. Different types of the laser light polarization, at a constant flux, were obtained using a quarter wavelength plate. The fourth, non-irradiated, part of the blood sample served as control. Platelet adhesion and aggregation on the polystyrene surface at a shear rate of $1800\,s^{-1}$ were studied using the Cone and Plate(let) Analyzer. Surface coverage (SC), average size (AS) and number of adhered platelets and their aggregates were evaluated.
Results: In control samples, SC was 14.3±1.1%, AS – 55.1±5.4 μm^2, and number of objects – 1439±97. After irradiation of the blood by left circular polarized laser light, AS increased by 34% ($p < 0.01$) and the number of adhered objects decreased by 17% ($p < 0.01$) versus control. Irradiation of the blood by right circular polarized light did not significantly change AS ($p > 0.5$) but decreased number of adhered objects by 12% ($p < 0.01$) as compared to non-irradiated samples. The differences in AS between the samples irradiated by left and right circular polarized light were statistically significant ($p < 0.01$). Linear polarized light had the same effect decreasing the number of deposited objects by 12% ($p < 0.01$); however, SC and AS did not change ($p > 0.1$).
Conclusion: Our data show that the effect of red laser light on platelet aggregation on polystyrene at high shear rate is dependent on the type of laser light polarization.

PL17

Effect of nitric oxide and laser and LED radiation on mitochondrial respiration and membrane potential

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Introduction: Laser radiation was shown to photolyse NO-complexes of hemoglobin and cytochrome *c*. Nitric oxide (NO) and its derivatives are known to inhibit mitochondrial respiration by several mechanisms. Nanomolar concentrations of NO inhibit cytochrome oxidase, specifically and reversibly. Higher concentrations of NO may inhibit other respiratory complexes, by nitrosylating and/or oxidizing protein thiols and removing iron from iron-sulphur centers. The aim of the work was to study the sensitivity to radiation of intact mitochondria and mitochondria inhibited by NO.
Materials and Methods: Mitochondrial membrane potential was estimated by measuring $DioC_6$ fluorescence. 50 nM DiC_6 was added to the mitochondrial suspension (1 mg protein/mL in 20 mM MOPS, 110 mM KCl, 10 mM ATP, 10 mM $MgCl_2$, 10 mM succinate, 1 mM EGTA, pH 7.45), and fluorescence was measured ($\lambda_{exc} = 488$ nm, $\lambda_f = 535$ nm) after 10 min incubation in the dark. The mitochondrial respiration rate was measured polarographically. Rat liver mitochondria (1 mg protein/mL) in 105 mM KCl, 20 mM HEPES, 2 mM $MgCl_2$, 5 mM KH_2PO_4 (pH 7.45) were placed into polarigraphic cell, and the oxygen consumption was measured.
Results: Illumination with blue and green lasers led to statistically significant growth membrane potential (maximal effect 10% at the dose 3 and 6 J/cm^2 respectively). At doses of up to 10 J/cm^2 in the case of blue laser observed a reversible increase in the rate of respiration by 20%.
Adding 120 μM NO resulted in a decrease of membrane potential by 70% and decrease in the rate of respiration by 90%. Illumination of inhibited mitochondria with blue and green lasers resulted in increase in fluorescence of dye by 30% and led to the recovery of respiration to 75 and 40% from baseline. Effect disappeared after illumination.
Not any effect was observed during illumination with red and infrared diodes.
Conclusion: Increases in membrane potential and speed of oxygen consumption in 4 state under illumination with blue and green lasers can be attributed to the flavin, fragment of respiratory complex II, as well as the destruction of complexes NO–cytochrome. In the case of red and infrared diodes lack of effect is probably due to the lack of photosensitizer (porphyrin) in isolated mitochondria.
High concentrations of NO produced a decrease in membrane potential and the respiration inhibition caused by poising of respiratory complexes. The irradiation by blue and green lasers recovers respiration reversibly because of photosensitivity of the NO–cytochrome *c* complex.

PL18

The absorption behaviour of oxygen and the mitochondrial energy transfer – the importance of electromagnetic radiation (light)

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Background and Objective: On the basis of well known biochemical models, a consistent theoretical model of the mitochondrial energy transfer is described by taking into consideration the radiation phenomena of electrons (wave-particle dualism).
Regarding the absorption behaviour of the respiratory chain and of oxygen, the importance of electromagnetic radiation (molecular bond energy of pyruvat, natural solar light and therapeutical low level laserlight) for the mitochondrial energy transfer becomes evident.
Results and Conclusion: the process of the mitochondrial energy transfer is identified as a process of radiation during the oxidation process of foodstuffs and finally again during the reduction of oxygen to water. In the mitochondrion electromagnetic molecular bond energy of the hydrogen and covalent bonds of pyruvat is released as a radiation and is absorbt from oxygen, NAD/NADH and the so called electron carriers of the respiratory chain.
Respecting the absorption behaviour of oxygen 391.2 nm until 844.6 nm it becomes evident, that the role of oxygen during the energytransfer processes from pyruvat to the respiratory chain (electron transfer to oxygen) is just as a radiation and absorption process of electromagnetic waves (light).