Effect of Laser and LED on Enzymatic Production of Ceramide

An enzyme (Phospholipase C Type I from Clostridium perfringens) was exposed to 0-810 J/cm² of energy using laser light at wavelengths 808 nm, 532 nm, 1064 nm, and 1342 nm and two LED light sources at wavelengths 810 nm and 640 nm. Enzyme responses were evaluated by measuring ceramide concentration using HPTLC (high performance thin-layer chromatography) at 0.5, 1, 2, 3, 4, 6, 17, 24 h after irradiation. The duration of effect was evaluated from the experimental data. The results show that enzyme activity can be increased by using both laser and LED sources whose wavelength is located within a certain range. The effect depends on the energy and wavelength of the light. The increase in enzyme activity continued for about 4 h after irradiation. This study shows that the duration of irradiation should be included as one of the main laser parameters when reporting on the effects of laser irradiation on enzymes. We also find that laser sources and LED sources have the same effect on enzyme activity if the wavelength and absorbed energy are equal.

General information
Publication status: Published
Organisations: Department of Physics, Department of Systems Biology, Optical Sensor Technology, Department of Photonics Engineering, Tianjin Medical University
Pages: 131-136
Publication date: 2011
Peer-reviewed: Yes

Publication information
Journal: Photochemistry and Photobiology
Volume: 87
Issue number: 1
ISSN (Print): 0031-8655
Ratings:
BFI (2011): BFI-level 1
Scopus rating (2011): CiteScore 2.54 SJR 0.955 SNIP 0.966
Web of Science (2011): Impact factor 2.413
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
Original language: English
Keywords: Sphingomyelin, Ceramide, Phospholipase C, Laser irradiation, Enzyme activity, Hydrolysis
DOIs:
10.1111/j.1751-1097.2010.00820.x
Source: orbit
Source ID: 268390
Research output: Contribution to journal › Journal article – Annual report year: 2010 › Research › peer-review