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Titel des Beitrags: Short and long-term phototoxicity in cells expressing genetic reporters under nanosecond laser exposure.

Abstract: Nanosecond-duration laser pulses are exploited in a plethora of therapeutic and diagnostic applications, such as optoacoustic imaging. However, phototoxicity effects of pulsed radiation in living cells, in particular those expressing genetic reporters, are not well understood. We established a three-dimensional fluorescent protein expressing cellular model in order to reliably investigate the extent and major exposure parameters responsible for both photobleaching and phototoxicity under pulsed laser exposure, unveiling a variety of possible effects on living cells, from reversible photobleaching to cytotoxicity and cell death. Significant losses of fluorescence levels were identified when exposing the cells to illumination conditions considered safe under common standards for skin exposure in diagnostic imaging applications. Thus, the use of photolabile fluorescent proteins and their in vivo exposure parameters have to be designed carefully for all applications using pulsed nanosecond radiation. In particular, loss of signal due to bleaching may significantly alter signals in longitudinal measurements, making data quantification challenging.

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