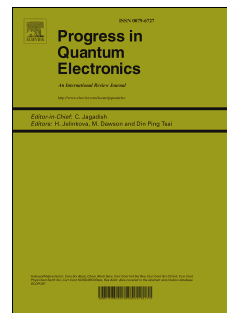


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Laser-induced generation of singlet oxygen and its role in the cerebrovascular physiology

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# Laser-induced generation of singlet oxygen and its role in the cerebrovascular physiology

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## Abstract

For over 55 years, laser technology has expanded from laboratory research to widespread fields, for example telecommunication and data storage amongst others. Recently application of lasers in biology and medicine presents itself as one of the emerging areas. In this review, we will outline the recent advances in using lasers for the generation of singlet oxygen, traditionally used to kill tumour cells or induce thrombotic stroke model due to damage vascular effects. Over the last two decade, completely new results on cerebrovascular effects of singlet oxygen generated during photodynamic therapy (PDT) have been shown alongside promising applications for delivery of drugs and nanoparticles into the brain for therapy of brain cancer. Furthermore, a "gold key" has been found to overcome the limitations of PDT, such as low light penetration and high toxicity of photosensitizers, by direct generation of singlet oxygen using quantum-dot laser diodes emitting in the near infrared (NIR) spectral range. It is our motivation to highlight these pioneering results in this review, to improve understanding of the biological role of singlet oxygen and to provide new perspectives for improving clinical application of laser based therapy in further research.

## Content

1	Introduction	2
2	Mechanism of triplet to singlet oxygen transition	4
	2.1. Singlet oxygen generation in organic solution	5
	2.2. Singlet oxygen generation in living cells	6
	2.3. Cytosolic free calcium level and ion channel activity under laser pulse	8

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