Biophotonics in Oncology

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Looking back to the development of lasers and their influence in oncologic surgery the first step was made with the introduction of the CO2-Laser by Isaac Kaplan. The development of power transmitting fibres was the second step optimally synchronized with the development of endoscopic surgery driven by gynaecologists, urologists and paediatrics surgeons. The era of the thermal lasers had begun and numerous surgical techniques were developed, of which some are today’s routine, some have been left. The concept of in situ destruction by interstitial laser coagulation of diseased tissues offered a minimal invasive option, today mainly used in oncology for the destruction of liver metastases. In the course the less surgical but more elegant Photodynamic Therapy was re-invented, delivering a new and enlightening option for cancer treatment and is constantly moving into the focus. Major future developments have to be expected in his field, and in diagnostics. Fluorescence spectroscopy, fluorescence imaging and optical coherence tomography (just to name a few) are currently under investigation for their use in oncologic imaging and surgical feedback systems. New technical laser concepts offering wavelengths are discovered and may lead to new surgical systems with specialized applications and high precision, being less bulky and more affordable compared to current surgical systems. Multiphoton effects, nanomedicine and photointernalisation also offer new solutions for old problems. Drug – light interaction may not be limited to the current strategies.

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