cal vein endothelial cells (HUVEC). Combination therapy of Chlorin e6-PDT + Nimotuzumab resulted in highest percentage of cell death as compared to mono-therapy with Nimotuzumab or PDT. Apoptosis was the predominant cause of cell death in both PDT and combination group. Similarly, OSCC xenograft tumor in nude mice showed the highest reduction of tumor size in the combination therapy group (87% reduction), followed by mono-therapy group of Nimotuzumab (68.5%) and PDT (5.5%) after a 15-day monitoring period. In conclusion, the efficacy of oral cancer PDT can be significantly improved when combined with Nimotuzumab treatment.

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Radiosensitizing effect of 5-aminolevulinic acid for malignant gliomas in experimental glioma in vivo study

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Background: Because of its high cellular uptake, 5-ALA fluorescence-guided surgery for malignant gliomas is a very practical and simple method for neurosurgeons. Generally, some porphyrin compounds act not only as photosensitizers but also as radiosensitizers. We previously showed that 5-ALA sensitized glioma cells to ionizing irradiation in vitro. In the present study, we investigated whether 5-ALA can act as a radiosensitizer in experimental glioma in vivo.

Methods: Syngeneic Fischer 344 rats subcutaneously injected with 9L were administered 5-ALA. Subcutaneous (s.c.) tumors were subsequently irradiated with 2 Gy/day for 5 consecutive days. Tumor growth was assessed until 16 days after the treatment, and then tumor specimens were histologically evaluated.

Results: Multi-dose ionizing irradiation induced greater inhibition of tumor growth in rats with 5-ALA administration compared to other groups. Immunohistochemical examination showed that numerous Iba1-positive macrophages gathered at the surface of and within the s.c. tumors after multi-dose ionizing irradiation with 5-ALA administration. In particular, some Iba1-positive macrophages revealed features of the phagocytic process.

Conclusion: Multi-dose ionizing irradiation with 5-ALA induced not only a direct cytotoxic effect but also enhancement of the host antitumor immune response, and thus caused high inhibition of tumor growth in experimental glioma.

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Novel potential nanostructures for photodynamic therapy

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Dimers could be very effective for generating photothermal damage because the excitation of the surface plasmon resonance (SPR) results in a temperature increase near the NP surface. In addition they present the advantage that the frequency of the SPR resonance can be tuned by using different NPs sizes or interparticle separations. The surface enhanced Raman scattering (SERS) response of the complex located in the gap of the NP aggregates results in an analytical SERS enhancement factor of 100,000. This feature corroborates that the ruthenium complex is indeed located between nanoparticles. An additional confirmation of this fact has been performed using Transmission Electron Microscopy (TEM), in which dimers, trimers and other aggregates where found. A kinetic study of the NP aggregation process, followed by the evolution of the UV vis extinction spectra, has been also performed. The results show that in a first stage it exist isolated NPs, later we can see the formation of dimers and trimers and in a third stage we observe NP-chains. We also perform fluorescence quenching experiments, finding Stern Volmer constants around $K_{sv} = 4 \times 10^{11}\ M^{-1}$. These constants involved a phenomenon called superquenching, which means a massive deactivation of the emission of the complex.

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Advantages and prospects of PDT targeted therapy combining noninvasive SDT

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Combination SDT and PDT with immunoadjuvant may be a promising systemic treatment modality, not only for superficial cancers but also for deep-seated tumors and long distance metastasis lesions. As we know, PDT has a lot of advantages, such as tumor selectivity, mini-invasive, low toxicity, good repeatability, beauty and to protect important organ function. The key one is tumor selectivity, also called tumor targeting. From this characteristic of PDT, Sonodynamic therapy (SDT) is a new cancer therapy basing on photodynamic therapy (PDT), is flourishing in the world. The major advantage of SDT over its close relative PDT, is the increased penetration of ultrasound through mammalian tissue compared to light. As a result, SDT can be used to treat a wider array of deeper and less accessible tumors than PDT. For the similar mechanism of PDT and SDT, SDT may be exploited for the generation of effective therapeutic cancer vaccines like PDT. So combination SDT and PDT with immunoadjuvant may be a promising systemic treatment modality, not only for superficial cancers but also for deep-seated tumors and long distance metastasis lesions which would surpass all of the single therapy as PDT, SDT and PIT (PDT-immunoadjuvant therapy).

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Dosimetry optimization of intrapleural photodynamic therapy for malignant pleural mesothelioma

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Intrapleural photodynamic therapy (iPDT) has emerged as a promising treatment when combined with surgical macroscopic tumor resection. Successful iPDT requires the most complete and uniform light delivery. This study aims at monitoring iPDT by the characterization of a light delivery device and intraoperative dosimetry. Light distribution was measured around the tip of a light wand, made with an endotracheal tube, a cylindrical light diffuser and a localization sensor, using an isotropic probe and digital photography. An effective attenuation coefficient (μ_{eff}) was defined. This illumination profile, used as a unit illumination dose, was