ACOUSTICS2008/635
Ultrasound contrast agents in an in vivo murine melanoma model

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The purpose of the study was to test different types of microbubble contrast agents (SonoVue®, Definity® and targeted microbubbles against vascular endothelial growth factor receptors (KDR, antiCD31)) to quantify angiogenesis. After SonoVue® and Definity® injections, a strong, rapid and heterogeneous signal enhancement was detected in all tumors. According to the tumor size, the quantification of the perfused area revealed major inter-individual variations. Three groups of animals bearing tumors, following SonoVue® administration, were arbitrarily constituted to compare various sonographic parameters such as AUC, mTT, etc.... The tumoral size increase seemed negatively correlated to a decrease in all quantified parameters. Non linear acoustic signal from microbubbles targeted to the molecular site was determined by an ultrasound-based destruction-reperfusion scheme. In tumor-bearing mice, an increase of the retention time (>10 minutes) was revealed following KDR and antiCD31 targeted microbubbles administrations when compared to the retention time of non targeted microbubbles. The amount of remaining targeted bubbles remains always lower than non specific agents. Results showed that quantitative contrast-enhanced ultrasound imaging could be an effective method for monitoring angiogenesis process in mice and so could be used for the follow-up of tumours under specific treatment.