

Featured Publication Note

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In vivo imaging – a powerful tool for tumor neovascularization studies

Neovascularization of tumors induced by vascular endothelial growth factor (VEGF) is a major contributor to tumor enlargement and metastasis. In the search for novel biomarkers of tumor neovascularization, a major hurdle has been the lack of a practical and accurate means to monitor tumor changes *in vivo*, and over time. In this study, the authors evaluated the use of *in vivo* imaging, using a NIR (near infra-red) imaging agent, as a means of monitoring the effects of an anti-VEGF therapeutic antibody on tumor vascularization and metastasis.

Tumor models of breast and lung cancer were established in nude mice by the introduction of cultured U4475 cells and HT1080 cells, respectively. The tumor vasculature was imaged by injecting 30 μ l of the near infra-red agent AngioSense[®]-IVM 680 (PerkinElmer) intravenously. Lower magnification images were obtained using an OV100 whole-mouse imaging system (Olympus[®]). For quantitative analysis, single images of tumor vasculature were obtained using an IV100 intravital laser scanning microscope (Olympus[®]) with a Helium-Neon (633 nm) laser. Images were exported for analysis of the vasculature area.

These data show that *in vivo* fluorescent imaging using AngioSense-IVM 680 correlates well with traditional histochemistry for quantitation of tumor growth (or regression), and thus is a valuable tool for pre-clinical evaluation of cancer biomarkers and therapeutics.

Figure: Serial *in vivo* imaging and quantitation of tumor vasculature in HT1080 cell tumors.

(A) Serial images acquired during the progression of angiogenesis. *In vivo* imaging of tumor vasculature was performed using AngioSense-IVM 680 on the same tumor on different days after inoculation with HT1080 cells. Top panels show vasculature around the tumor, imaged by the OV100 (arrowheads). Asterisks indicate AngioSense-IVM 680 diffusion in the tumor. Scale bar 5 mm. Bottom panels show vasculature in the tumor, imaged by the IV100. Scale bar 500 μ m.

(B) Comparison of vasculature quantitation by *in vivo* imaging (IV100) and immunohistochemical analysis (using the CD31 marker of vascularized tumors). White bar 500 μ m; Black bar 30 μ m.

(C) Validation: The graph shows the good correlation between the IV100 measurements of tumor vasculature and microvessel density (MVD) measurements (n = 9 different tumors).

