geometry. Vasculature changes have long been shown for cutaneous melanomas [15]. All of these features can be captured by pump-probe imaging.

More importantly, molecular contrast allows functional mapping of the lesion. We can investigate the behavior of melanocytes by examining the chemical mixture produced by melanogenesis. It has been found that eumelanin content and the chemical heterogeneity of pigmentation allows differentiation between melanoma and benign lesions in biopsy samples. This information can now be acquired *in vivo*. The oxygenation state of blood vessels is relevant to tumor progression as well: Normal tissue will not have regions of severe hypoxia, but many tumors will have chronically and transiently hypoxic regions. Tumor hypoxia correlates with a more malignant phenotype, resistance to treatments, increased metastasis and poor outcomes [16]. By imaging both eumelanin/pheomelanin distributions as well as hemoglobin oxygenation, a full characterization of lesions can be made.

We have demonstrated the viability of noninvasive, epi-mode pump-probe imaging of melanocytic lesions. Pump-probe imaging may also serve as the basis of a powerful diagnostic aid and screening tool for melanoma. Evaluating regions where biopsies are much more difficult to obtain, such as intraocular melanoma, or where tissue conservation is imperative, such as the face, could be very beneficial. This technique opens the door to a more detailed study and richer understanding of the progression of melanoma than has previously been possible.

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