Irrespective of the above technical considerations, a question naturally arises as to the diagnostic benefit and utility of combining PA imaging and OCT. As shown in this study, the complementary contrast of each modality permits both vascular anatomy and tissue micromorphology to be visualized. However, since Doppler OCT and related methods [19,20] can also visualize the vasculature with high spatial resolution (with some exceptions—e.g. if blood flow is negligible), it may be the functional spectroscopic capability of PA imaging that provides the dominant *raison d'etre* for combining the two modalities. Spectroscopic PA methods can quantify the concentrations of oxy and deoxyhemoglobin and thus blood oxygen saturation. In addition, when combined with measurements of flow, provided by either by Doppler OCT methods or PA Doppler itself [32], it would also be possible to measure metabolic oxygen rate which is of broad physiological significance in characterizing a variety of pathophysiological processes such as angiogenesis and tissue inflammatory and healing responses. Given these considerations, the system may find application as a tool for high-resolution functional imaging in dermatology. Applications could include studying skin conditions such as tumors, vascular lesions, soft tissue damage such as burns and wounds, inflammatory conditions such as dermatitis and other superficial tissue abnormalities characterized by changes in the skin morphology and the structure and function of the supplying vasculature. It may also find a role in ophthalmology. Here, as suggested in Ref. [33], the well-established ability of OCT to visualize micromorphological features of the retina could be complemented by absorption contrast of PA imaging to quantify retinal blood oxygenation and specific chromophores such as melanin in the RPE.

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