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Title:Terahertz pulsed imaging of freshly excised human colonic tissues

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Abstract:We present the results from a feasibility study which measures properties in the terahertz frequency range of excised cancerous, dysplastic and healthy colonic tissues from 30 patients. We compare their absorption and refractive index spectra to identify trends which may enable different tissue types to be distinguished. In addition, we present statistical models based on variations between up to 17 parameters calculated from the reflected time and frequency domain signals of all the measured tissues. These models produce a sensitivity of 82% and a specificity of 77% in distinguishing between healthy and all diseased tissues and a sensitivity of 89% and a specificity of 71% in distinguishing between dysplastic and healthy tissues. The contrast between the tissue types was supported by histological staining studies which showed an increased vascularity in regions of increased terahertz absorption.

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