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Optofluidic intracavity spectroscopy of single cells in a passive Fabry-Perot resonator HUA SHAO, WEINA WANG, Electrical and Computer Engineering Department, Colorado State University, SUSAN LANA, Animal Cancer Center, Colorado State University, KEVIN LEAR, Electrical and Computer Engineering Department, Colorado State University — Considerable effort has been devoted to analyzing complex biological systems such as living cells by combining photonic and microfluidic techniques. Cells in biocavity lasers developed by Gourley et al produced rich multimode spectra that multivariate analysis correlated with the cell type. Optofluidic intracavity spectroscopy (OFIS) reported here operates on a similar principles but does not require gain media. It measures transmission spectra of individual cells in a passive Fabry-Perot (FP) cavity. Non-normal incidence identified the relative order of the various transverse modes to verify the applicability of different simplified models of the cavity modes. Distinctive spectral features, including transverse mode spacing and the number of modes were used to differentiate red and white human blood cells, for example. OFIS measurements of canine lymphoma cells produced repeatable transmission spectra. Continuing investigations on the capability of OFIS to distinguish cancer cells will be reported.

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