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3 | Optical techniques for cervical neoplasia detection.

ABSTRACT

This paper provides an overview of the current research in the field of optical techniques for cervical neoplasia detection and covers a wide range of the existing and emerging technologies. Using colposcopy, a visual inspection of the uterine cervix with a colposcope (a binocular microscope with 3- to 15-fold magnification), has proven to be an efficient approach for the detection of invasive cancer. Nevertheless, the development of a reliable and cost-effective technique for the identification of precancerous lesions, confined to the epithelium (cervical intraepithelial neoplasia) still remains a challenging problem. It is known that even at early stages the neoplastic transformations of cervical tissue induce complex changes and modify both structural and biochemical properties of tissues. The different methods, including spectroscopic (diffuse reflectance spectroscopy, induced fluorescence and autofluorescence spectroscopy, Raman spectroscopy) and imaging techniques (confocal microscopy, optical coherence tomography, Mueller matrix imaging polarimetry, photoacoustic imaging), probe different tissue properties that may serve as optical biomarkers for diagnosis. Both the advantages and drawbacks of these techniques for the diagnosis of cervical precancerous lesions are discussed and compared. KEYWORDS:Mueller polarimetry; Raman spectroscopy; cervical intraepithelial neoplasia; confocal endomicroscopy; nanotheranostics; optical coherence tomography; optical spectroscopy PMID: 29046833 PMCID: PMC5629403 DOI: 10.3762/bjnano.8.186