

## **Study of stained and unstained Pap smears using Optomagnetic imaging spectroscopy**

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Papanicolaou test is a conventional screening test used to detect cervical pre-cancerous and cancerous processes. A sample of cells from the outer opening of the cervix and endocervical canal is stained using Papanicolaou technique so the cells could be examined with a light microscope. In order to get good results, staining procedure must be optimally conducted. Otherwise, the chances of getting false negative results are increasing. In this paper, we've investigated unstained and stained Pap smears with Optomagnetic imaging spectroscopy to show that staining of cervical samples could be excluded from the test for cervical cancer detection. Results point the influence of overstaining on diagnostic decision, since diagrams depicting the Optomagnetic method applied on overstained smears are notably different from diagrams depicting the same method applied on normally stained as well as on unstained smears. Since overstaining is one of the factors that lead to false negative results in diagnostics, investigation of unstained smears instead of stained smears could improve existing diagnostic techniques. The use of unstained smears in screening would also save time and resources, considering chemical stain and time needed for staining procedure to be done.

**Key words:** Optomagnetic imaging spectroscopy, Pap smears, cervical cancer detection

## **Ispitivanje obojenih i neobojenih Pap razmaza korišćenjem Optomagnetne imidžing spektroskopije**

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Papanikolau test je konvencionalna skrining metoda koja se koristi za detekciju cervikalnog prekanceroznog i kanceroznog stanja. Uzorak ćelija uzet sa spoljašnjeg otvora cerviksa i iz cervikalnog kanala boji se prema Papanikolau proceduri kako bi ćelije mogle da se pregledaju svetlosnim mikroskopom. Da bi se dobili validini rezultati, procedura bojenja mora biti sprovedena optimalno, jer se u suprotnom šanse za dobijanje lažno-negativnih nalaza povećavaju. U ovom radu su neobojeni i obojeni Pap razmazi razmatrani Optomagnetnom imidžing spektroskopijom kako bi bilo dokazano da se bojenje uzoraka može isključiti iz testa za detekciju karcinoma grlića materice. Rezultati pokazuju da prebojenost uzoraka, kao jedan od faktora koji mogu dovesti do postavljanja pogrešne dijagnoze, umnogome utiče na rezultate ispitivanja: poređenjem dijagrama koji oslikavaju primenu Optomagnetne metode na obojene i neobojene uzorke uočavaju se značajne razlike između rezultata dobijenih za prebojene uzorke i rezultata dobijenih za optimalno obojene i neobojene uzorke. Ispitivanje neobojenih uzoraka moglo bi pospešiti postojeće dijagnostičke metode, a ujedno bi uštedelo vreme i novac s obzirom na količinu supstanci potrebnih za proces bojenja i vreme neophodno za izvršavanje same procedure bojenja.

**Ključne reči:** Optomagnetna imidžing spektroskopija, Pap razmazi, detekcija cervikalnog kancera