

12th World Cancer Conference

September 26-28, 2016 London, UK

Near infrared transillumination detection of prostate carcinoma *in vitro*

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Prostate cancer is the second cause of cancer death in men worldwide. The existing methods of prostate cancer imaging are: Magnetic resonance imaging (MRI) and positron emission tomography (PET). However, main drawback of these methods is that they are not able to detect small volumes of cancerous outgrowths. Besides, these methods are highly complicated and partially invasive. This circumstance resulted in searching of amore simple, non-invasive method for the detection of prostate cancer at early stage of its development when tumor dimensions are small. In the present work we show that near-infrared irradiation (NIR) can be used for visualization and diagnosis of cancer outgrowth in the prostate *in vitro*. Experiments were carried out on the prostates derived from radical prostatectomy. After operation a prostate was examined with the use of infrared rays and transillumination images were obtained. For this purpose prostate was illuminated with near infrared radiation (NIR) by the means of light emitting diodes (850-920 nm). NIR passing through the prostate was captured by charge-coupled device (CCD camera) which in turn was connected to PC. Intensity of near infrared light passing through the noncancerous prostate tissue is nearly homogeneous. Intensity of near infrared light passing through the cancerous outgrowth is lower than the intensity passing through the non-cancerous tissue of the same prostate; thereby, cancerous formations are differentiated as the dark areas in the relatively white background. Specially developed software analyzes and processes a distribution of intensities of the grayscale images, measures the ratios of their strength, and determines the rate of prostate malignancy.

Biography

Besarion Partsvania has completed his PhD from Tbilisi State University and Post-doctoral studies from Georgian Technical University. He is the Head of Bio-cybernetic Department at the Georgian Technical University. He has published more than 75 papers in reputed journals.

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