

Screening Deformed Red Blood Cells Irradiated by Ionizing Radiations Using Windowed Fourier Transform

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Abstract : Ionizing radiation, such as gamma radiation and X-rays, has many applications in medical diagnoses and cancer treatment. In this paper, we used the windowed Fourier transform to extract the complex image of the deformed red blood cells. The real values of the complex image are used to extract the best fitting of the deformed cell boundary. Male albino rats are irradiated by γ -rays from ^{60}Co . The male albino rats are anesthetized with ether, and then blood samples are collected from the eye vein by heparinized capillary tubes for studying the radiation-damaging effect in-vivo by the proposed windowed Fourier transform. The peripheral blood films are prepared according to the Brown method. The peripheral blood film is photographed by using an Automatic Image Contour Analysis system (SAMICA) from ELBEK-Bildanalyse GmbH, Siegen, Germany. The SAMICA system is provided with an electronic camera connected to a computer through a built-in interface card, and the image can be magnified up to 1200 times and displayed by the computer. The images of the peripheral blood films are then analyzed by the windowed Fourier transform method to extract the precise deformation from the best fitting. Based on accurate deformation evaluation of the red blood cells, diseases can be diagnosed in their primary stages.

Keywords : windowed Fourier transform, red blood cells, phase wrapping, Image processing

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