REAL-TIME MONITORING OF CELL APOPTOSIS USING TWO-PHOTON FLUORESCENCE INTENSITY AND LIFETIME IMAGING MICROSCOPY

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Keywords: Cell apoptosis, noninvasive monitoring, two-photon excitation, fluorescence lifetime

Abstract

Cell apoptosis is a kind of programmed cell death process. Abnormal cell apoptosis results in various diseases, such as cancer, AIDS, and autoimmune disease. Moreover, visualization of apoptosis process also can offer valuable information for evaluating therapy efficiency and drugs screening of early diagnosis. Therefore, the real-time imaging of cell apoptosis will help to monitor disease progression and therapeutic response. Some strategies have been developed to track the apoptotic process, such as detecting the caspase activation, sensing the phosphatidylserine residues on the outer plasma membrane and DNA laddering visualization. However, these reported systems have limits for routine monitoring apoptosis process in living cells due to the need for complicated steps and pretreatment. It is urgent to develop a noninvasive and sensitive method to monitor apoptotic cells.

In our study, we used a two-photon excitation (TPE) laser-scanning microscope to monitor the apoptosis process of treated cells. These cells treated with apoptotic inducer emitted higher autofluorescence compared with normal cell under TPE. In our project, we will integrate fluorescence spectrometer and fluorescence lifetime imaging microscopy to identify the property of this autofluorescence. It is expected to discover a novel biomarker in cell apoptosis process and establish a noninvasive technique to evaluate the therapeutic efficiency.

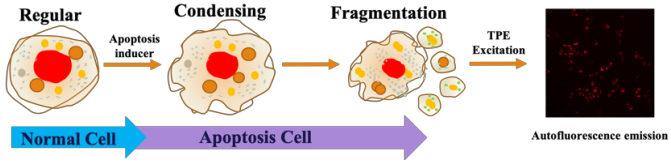

Figure1: The scheme for real-time monitoring of apoptosis cell based on autofluorescence

Reference

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