

Multi-Channel Charge-Coupled Device Sensors Real-Time Cell Growth Monitor System

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Abstract : A multi-channel cell growth real-time monitor and evaluation system using charge-coupled device (CCD) sensors with 40X lens integrating a NI LabVIEW image processing program is proposed and demonstrated. The LED light source control of monitor system is utilizing 8051 microprocessor integrated with NI LabVIEW software. In this study, the same concentration RAW264.7 cells growth rate and morphology in four different culture conditions (DMEM, LPS, G1, G2) were demonstrated. The real-time cells growth image was captured and analyzed by NI Vision Assistant every 10 minutes in the incubator. The image binarization technique was applied for calculating cell doubling time and cell division index. The cells doubling time and cells division index of four group with DMEM, LPS, LPS+G1, LPS+G2 are 12.3 hr, 10.8 hr, 14.0 hr, 15.2 hr and 74.20%, 78.63%, 69.53%, 66.49%. The image magnification of multi-channel CCDs cell real-time monitoring system is about 100X~200X which compares with the traditional microscope.

Keywords : charge-coupled device (CCD), RAW264.7, doubling time, division index

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