Application Note

IPRASENSE
CELL CULTURE MONITORING INSTRUMENTS

Keywords or phrases

Cell proliferation, Cell growth, time-lapse imaging, cell culture, cell activity, VERO

Adherent Cell Culture Proliferation Assay In A Serum Comparative Study With Time-Lapse Imaging

Abstract

Cell growth is pivotal in various biological contexts, offering insights into cellular activity, pathology, and regeneration. Traditional endpoint assays for cell proliferation have limitations. However, the **CYTONOTE** system introduces real-time monitoring through time-lapse imaging. It automates cell counting, eliminates labeling, and streamlines growth curve analysis via the **HORUS** software. **CYTONOTE** 6W emerges as an accessible tool for efficient cell growth monitoring, providing valuable advantages over traditional methods.

Introduction

The term cell growth is used in the contexts of biological cell development, cell division (reproduction) and cell proliferation. Cell proliferation is an important indicator for assessing cellular activity, metabolism, physiology, pathology, normal tissue development, regeneration and renewal. There are several types of cell proliferation assays based on DNA synthesis (e.g. 3H thymidine incorporation, BrdU), on metabolic activity (LDH) or on ATP concentration (luciferase bioluminescence). Stem cells and cancer cells are very important in cell proliferation assays. Imaging allows to visualize cell proliferation and growth. This is particularly the case of IPRASENSE products.

The **CYONOTE** records cell growth with time-lapse imaging. Cells are automatically counted without labelling. Furthermore, with the **CYTONOTE**, it is no longer necessary to extract the cells at regular intervals to perform the counts. The **HORUS** software is creating a growth curve to monitor the growth of cells without extracting the medium.

Material & Methods

1. Cell Proliferation Assay

The **CYTONOTE** is able to perform measurements inside the incubator and it recognizes cells without any labelling. The **HORUS** software automatically calculates cell number, cell saturation, cell area, cell concentration, cell morphology …

*Figure 1 : **CYTONOTE** 6W on the left and **HORUS** Software on the right*

On this picture below, VERO cell line is cultivated in six-well plates in an incubator at 37°C with 95% humidity. Image acquisition was performed with the **CYTONOTE**. As described in the picture below, cell confluence can be observed and measured.

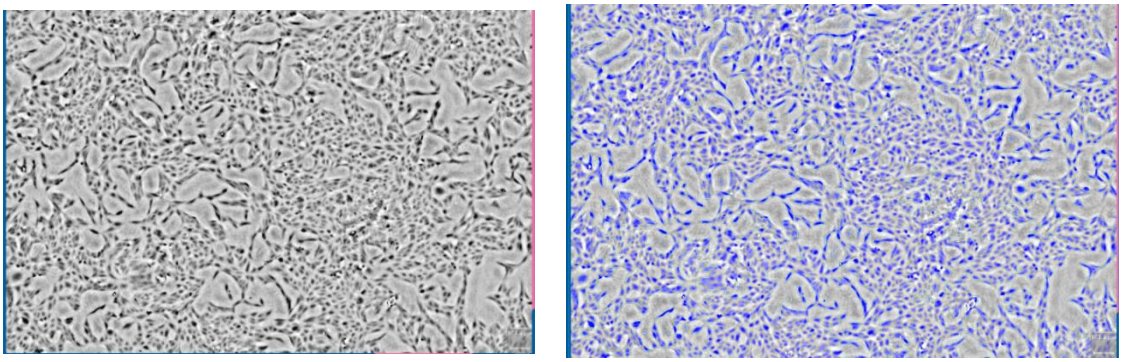


*Figure 2 : VERO cell proliferation assay on images by **HORUS** software without mask (on the left) and with mask (on the right). Cells are represented in blue and the contours of the proliferation zones in green.*

2. Cell Culture

The experiment was made with VERO cell line cultivated in six-well plates in an incubator at 37 °C with 95% humidity. The **CYTONOTE** 6W is designed to monitor the 6 sensors simultaneously or distinctly for 6 parallel or independent cell cultures. The experiment was performed in duplicate with 3 different conditions by adding 3 different serums. The **CYTONOTE** carried out continuous measurements during 4 days from inoculation (day 0).

Results

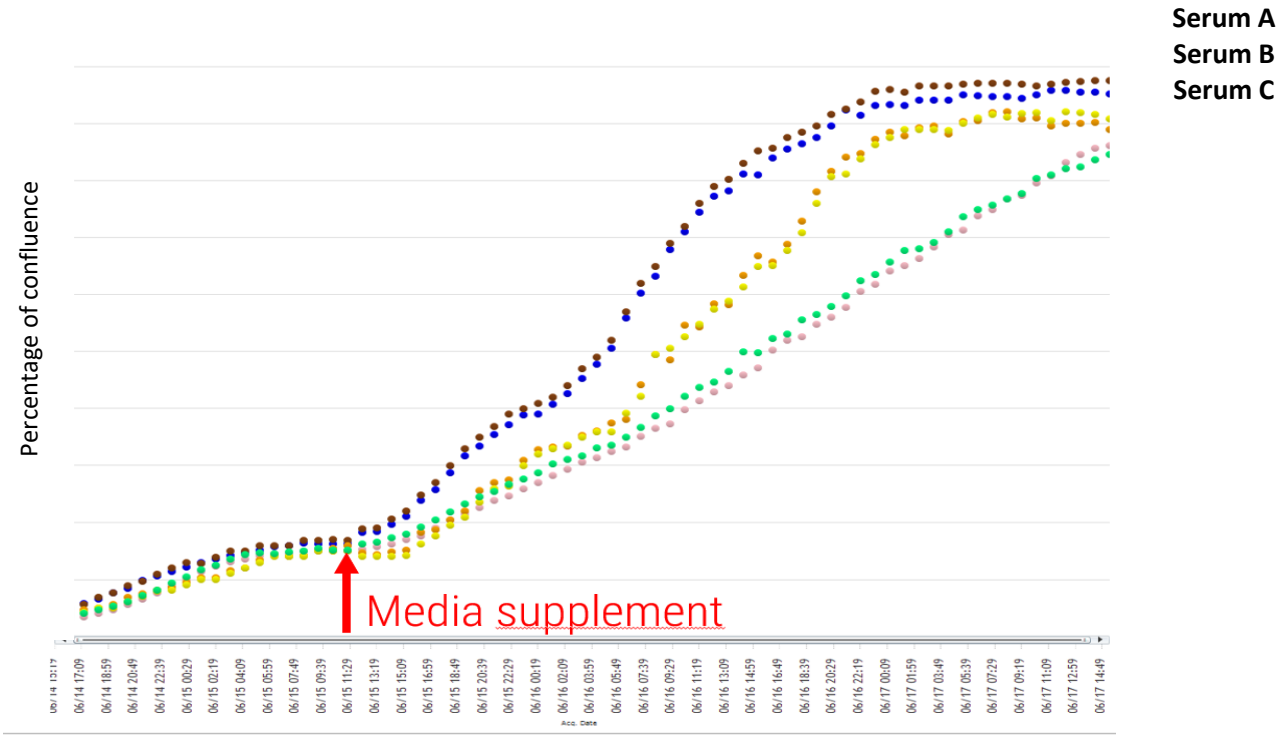


Figure 3 : *Confluence curves with 3 conditions induplicate obtained by* ***HORUS*** *software.*

Between days 0 and 1, the **HORUS** software gives repeatable results, as shown with the overlapping curves for the same conditions. On day 1, three different serums were added to the cell culture. We see that the proliferation curve is different according to the serum because the speed of growth is different. The proliferation of the culture in contact with the serum A is faster than that with the serum B. That in contact with the serum C is faster but more regular than the other two cultures. Furthermore, the curves are always overlapped for the same conditions.

The **CYTONOTE** 6W allows us to compare proliferation of VERO cell line that had been in contact with 3 different serums. Thus, serum has an impact on cell proliferation.

Conclusion

Performing real-time monitoring of cell proliferation instead of endpoint measurement provided significant advantages. The **CYTONOTE** allows to visualize and quantify cell proliferation using time-lapse imaging. Analysis of growth curves is automatic with the **HORUS** software and doubling times can be extrapolated. The **CYTONOTE** 6W is an easy tool to perform monitor cell growth.

References

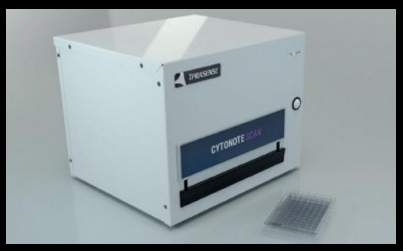
(1) Online version available at https://www.iprasense.com/live-cell-imaging-automatic-cell-counters-applications/proliferation-and-growth-assay/

(2) Allier C, et al. Imaging of dense cell cultures by multiwavelength lens-free video microscopy. Cytometry A. 2017 May; 91(5):433-442 https://onlinelibrary.wiley.com/doi/epdf/10.1002/cyto

OTHER PRODUCTS

CYTONOTE 1W

Compact device for obtaining real-time images of your cells from your incubator.



CYTONOTE SCAN

Monitoring cell culture in multi-well plates allows you to obtain real-time images of your cells from your incubator.

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