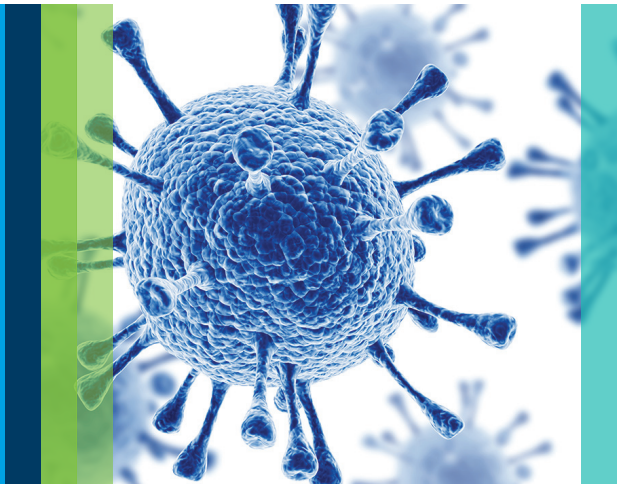
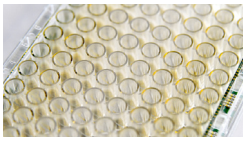
Monitor Viral Cytopathic Effects in Real-Time

Vaccine and virology applications using xCELLigence RTCA

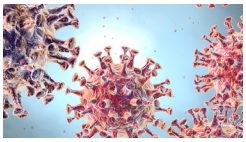


The rapid and high-throughput xCELLigence Real-Time Cell Analysis workflow is ideal for infectious viral assays.



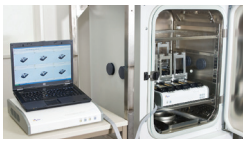
Step 1: Grow cells in E-Plate

Adherent cells are first seeded in E-Plate wells. Microelectronic biosensors enable the dynamic, real-time, label-free, and noninvasive analysis of virus-mediated cytolysis



Step 2: Infect with virus

Cells are infected with virus in the presence or absence of neautralizing antibody or anti-viral drugs.



Step 3: Monitor viral CPE in real-time

The xCELLigence system is housed inside a $C0_2$ incubator and automatically acquires data in real-time, minimizing manual sample handling and risk of exposure

Dynamic monitoring of Vero E6 cells during VSV infection

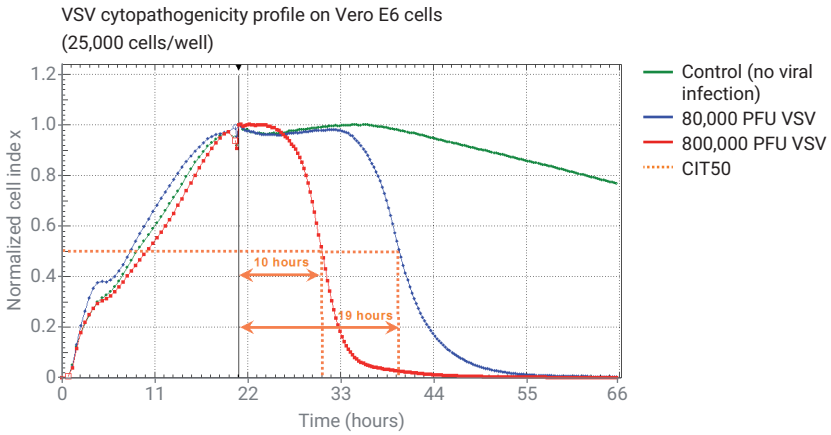
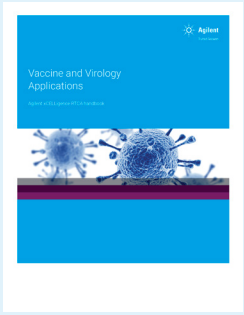


Figure 1. The virus-mediated effect on adhesion, spreading, and proliferation of the cells was monitored by measuring cell impedance every 15 minutes using the xCELLigence RTCA SP instrument. Time of addition of virus at 20.5 hours is indicated by the black vertical line. The time point when the CI value had decreased to 50% of the maximum (CIT50) value is indicated by the dotted orange lines.



Vaccine and Virology handbook

Download the Vaccine and Virology Handbook to discover a more accurate method to characterize viral activity.

Visit: go.aceabio.com/RTCA_vaccine_book

Key applications:

- Virus titer determination
- Neutralizing antibody detection and quantification
- Antiviral drug studies
- Viral fitness comparisons
- Oncolytic viruses
- Virucide efficacy

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Benefits of a high-throughput viral assay

- **Automatic and rapid results**—Monitor viral cytopathic effects (CPE) without using agar, dye, fixative, or labels, over time scales ranging from minutes to days.
- **Improved lab biosafety**—Greatly reduce workload and manual handling of samples, minimizing risk of exposure to infectious material.
- **Highly sensitive**—Obtain quantitative kinetics for the entire virus life cycle with exquisite sensitivity and reproducibility.
- **Objective**—Eliminate subjective data analysis from conventional assays that require visual interpretation and generate publication-quality results automatically.
- **Scalable and adaptable**—Compatible with both 96- and 384-well formats as well as disease relevant and primary cells.

During extensive optimization of a chimeric yellow fever dengue vaccine, Charretier *et al*[1] found that when compared to a traditional titer determination assay, the xCELLigence RTCA approach "was 5-times less labor-intensive (operator time) and cost 3.5-times less (including operator time, reagents, consumables)."

[1] *Charretier, C. et al. Robust Real-Time Cell Analysis Method for Determining Viral Infectious Titers During Development of a Viral Vaccine Production Process. J. Virol. Methods 2017 Nov 14, 252, 57–64.*

Related products	Throughput
xCELLigence RTCA SP System	1 x 96 wells
xCELLigence RTCA MP System	6 x 96 wells
xCELLigence RTCA HT System	4 x 384 wells
xCELLigence RTCA eSight	3 x 96 wells impedance 5 x 96 wells imaging

Improve lab biosafety by reducing exposure to biohazardous material

Obtain complete viral CPE data sets with minimal viral exposure to personnel, since addition of virus samples and manual plate handling only happens once. Readouts and images are taken automatically at every time point, while data collection and analysis are handled electronically.

Figure 2. An Agilent xCELLigence RTCA eSight instrument is housed inside an incubator and offers a significant reduction in biohazardous exposure and plastic waste.

Further reading

Gilchuk, P. et al. Analysis of a Therapeutic Antibody Cocktail Reveals Determinants for Cooperative and Broad Ebolavirus Neutralization. Immunity. 2020 Feb, 52(2): 388 – 403.

Thieulent, Côme J. et al. Screening and Evaluation of Antiviral Compounds Against Equid Alpha-Herpesviruses Using an Impedance-Based Cellular Assay. Virology 2019 Jan, 526: 105–116.

Branche, E. et al. Human Polyclonal Antibodies Prevent Lethal Zika Virus Infection in Mice. Sci Rep. 2019 Jul 8;9(1): 9857.

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