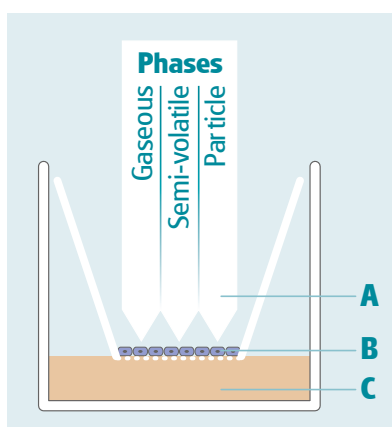


## Reliable *in vitro* Exposure Systems for Screening of Antiviral Lead Compounds against Coronavirus (COVID-19 / SARS-CoV-2)

Highly efficient and realistic application of aerosolized drugs to human cells of the respiratory tract under physiologic conditions



### Air / Liquid Cultivation and Exposure in Exposure Module

- A Direct and controlled exposure of test atmosphere to cells
- B Cells on membrane
- C Medium below cells

In inhalation therapy, drugs are deposited as aerosols on cells of the respiratory tract from the nasal or lung region. For preclinical drug development physiologically realistic *in vitro* cell culture models of the pulmonary epithelium and the air-blood barrier as well as from the nasal region are commercially available. Recently, these models have been refined to mimic SARS-CoV-2 infections.

In traditional *in vitro* testing cells are completely covered with cell culture media and it is common that drugs are dissolved in the cell culture media. This submerged exposure method represents an unphysiological drug application as the drug interacts with the cell culture media and thus the cells might receive a different dose and formulation than originally planned. Furthermore submerged lung epithelial cell cultures do not secrete protective

lining fluids such as mucus or surfactant which weakens their predictive power for patients.

As a result, the submerged exposure method could lead to wrong conclusions.

The VITROCELL® Cloud Alpha Systems were developed for exposure under realistic and physiologically relevant conditions at the air/liquid interface.

VITROCELL®  
Cloud Alpha 12



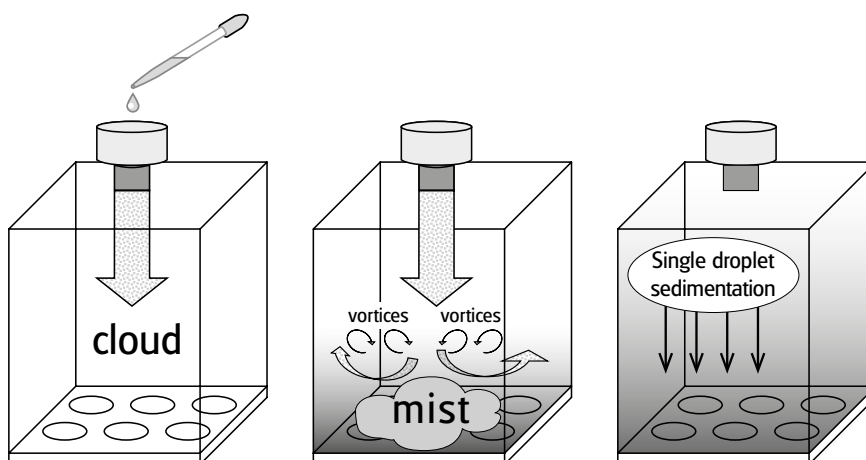
### How the Vitrocell® Cloud works

After pipetting the drug suspension, exposure to the cell cultures takes place in three phases:

Phase 1: Emission of cloud

Phase 2: Homogeneous mixing

Phase 3: Uniform gravitational settling on cell culture inserts



In the VITROCELL® Cloud Alpha System epithelial cells are not covered with cell culture media, but exposed to air, which stimulates secretion of protective lining fluids mimicking conditions in the lung. Under these air/liquid conditions *in vitro* drug testing can more realistically mimic inhalation therapy than standard drug testing under submerged conditions, since cells can be exposed directly to the drug formulation in aerosolized form. Transport of the drug across the mucus/surfactant barrier and into the cell is accounted for under physiologic conditions.

The VITROCELL® Cloud Alpha System is specifically designed for efficient, dose-controlled and spatially uniform deposition of liquid aerosols on cells cultured at the air/liquid interface. A clinically relevant nebulizer is used and – similar to clinical settings – the aerosol is delivered within a short time of 3 – 4 minutes.



Cell culture inserts  
(12-well size)



Quartz Crystal  
Microbalance

VITROCELL® Cloud Alpha 12 for 12 inserts (12-well size) with 9 places for exposure and 3 places for clean air control. Adaptors are available for 24-well sized inserts. Optional dose monitoring with VITROCELL® Quartz Crystal Microbalances.

### The Cloud Alpha Family



VITROCELL®  
Cloud Alpha 6

VITROCELL®  
Cloud Alpha 12

VITROCELL®  
Cloud Alpha 96+

VITROCELL®  
Cloud Alpha 96

VITROCELL®  
Cloud Alpha MAX

For our videos please follow these links: