

# Ciliary beat frequency analysis assay for lung small airway epithelium cells (SAEC)



Quantitative, rapid and comprehensive assessment of lung small airway cilia function for assessment of drug efficacy and chemical safety

## What you can achieve:

- Lead compound evaluation for effect on ciliated cells
- Comprehensive, high-sensitivity beating readouts for confident decision-making
- Mimicking of respiratory conditions for predictivity of cilia function *in vivo*

## What forms the basis of the study:

- Functionally validated primary human SAECs
- Physiologically-relevant air-liquid interface culture for higher predictivity
- Newcells' CiliaBeat software for rapid, in-depth analysis of beating cilia
- Multiple readouts for in-depth assessment



## How can Newcells help?

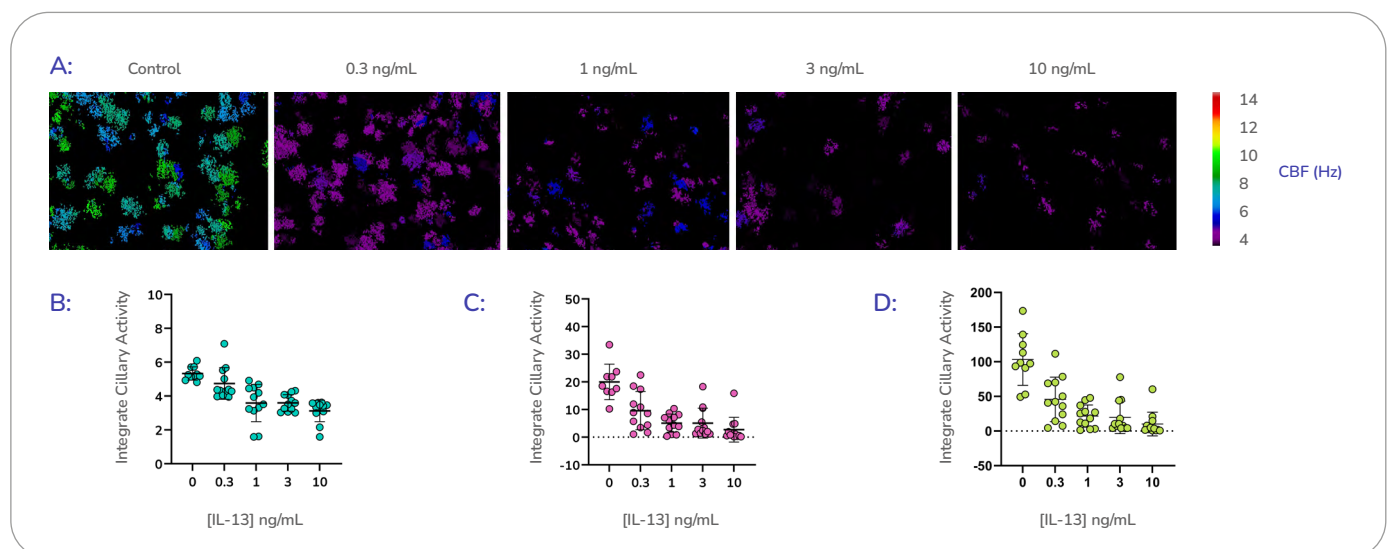
- Supporting confident decision-making in progressing your compound.
- Providing a comprehensive, high-sensitivity set of data that accurately measures the effect of your compound, on mucociliary clearance and the safety of airborne chemicals.

## Why use lung ciliary beat frequency analysis for evaluating compound efficacy and safety?

- **Confidently predict *in vivo* efficacy** through highly realistic *in vitro* evaluation of cilia function.  
→ Functionally validated SAECs in an air-liquid interface that closely mimic *in vivo* conditions.
- **Assess how respiratory disorders and biological or chemical compounds impact cilia function** and mucociliary clearance.  
→ Highly sensitive measurements.
- **Ensure rapid and accurate compound evaluation.**  
→ Brightfield images or videos captured in a temperature-controlled environment with CiliaBeat software's advanced noise filtering, guaranteeing highly accurate data.

## Evaluation of compound effects in COPD-modelled conditions

- The use of Interleukin-13 (IL-13) in this assay simulates Chronic Obstructive Pulmonary Disease (COPD)-like conditions (**Figure 1**).
- The evaluation of compound effects in COPD-modelled conditions enables prediction of the effectiveness of new drugs and chemicals in real-world clinical settings and allows for a better assessment of treatments and safety.



**Figure 1:** Accurate measurement of expected reduced cilia activity in response to increasing IL-13 concentrations A) Heat map of active cilia and beating frequency. B), C) and D) Decreased cilia beat activity measured as beat frequency, % area covered by active cilia and integrated cilia activity in response to increasing concentrations of IL-13.

## Compound evaluation with rapid, unbiased analysis and enhanced sensitivity

The assay uses the CiliaBeat software optimized for rapid data capture, automated data processing and noise filtering that allows sensitive evaluation of anti-inflammatory compounds in reversing the effects of cytokine-mediated conditions *in vivo* (Figure 2). This also allows for accurate safety testing of airborne chemicals.

When combined with the lung SAEC toxicity assay to assess cell viability and monolayer integrity, you can obtain a comprehensive dataset that supports the advancement of compounds through the development process, providing confidence in the compound's efficacy.

### Precise quantification of cilia function parameters:

- Rapid data capture capabilities for high-speed evaluation of fast-acting compounds
- Beating cilia videos recorded in just 6 seconds (Figure 3).
- Sensitivity as high as 0.25 Hz

### Customisable testing windows for accurate data:

- Options for apical or basolateral dosing
- Options for single or repeated dosing, for both acute and systemic studies

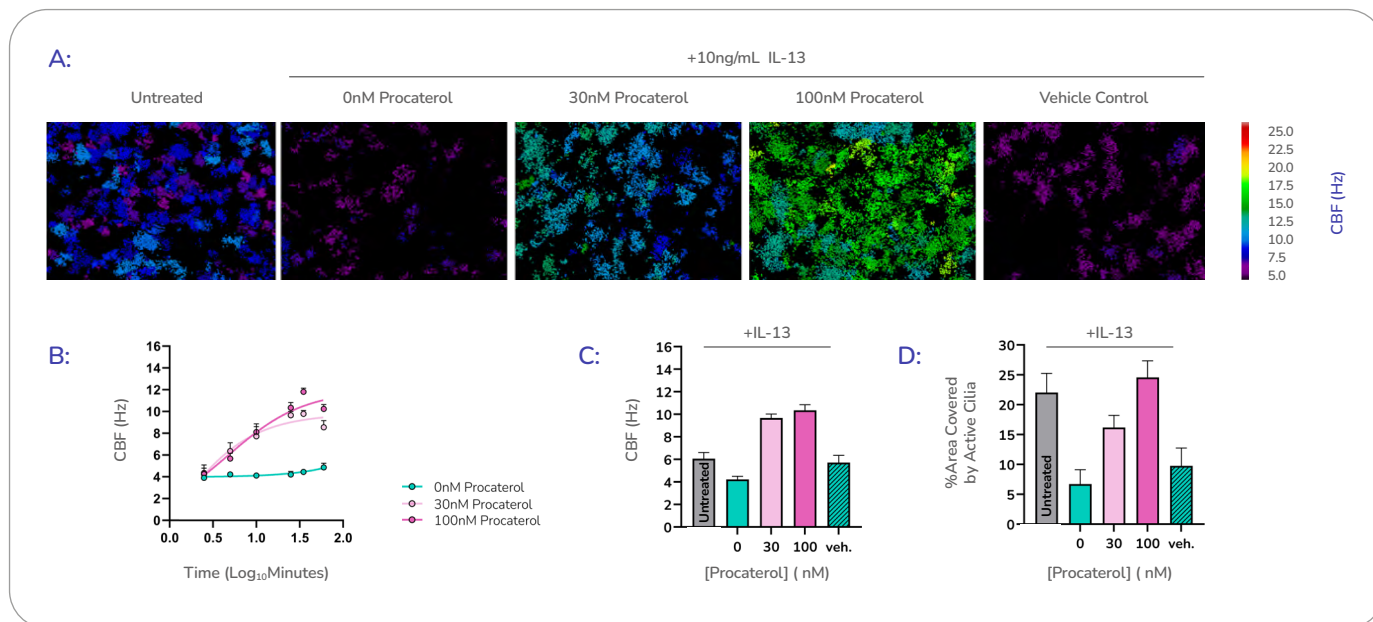


Figure 2: Measurement of dose dependent effect of cilia activating compound-Procateterol on cilia activity. A) Heatmaps showing increase in active cilia and beat frequency B) Quantification of increasing CBF with time. C) and D) Quantification of increase in active cilia and beat frequency with change in Procateterol concentration.

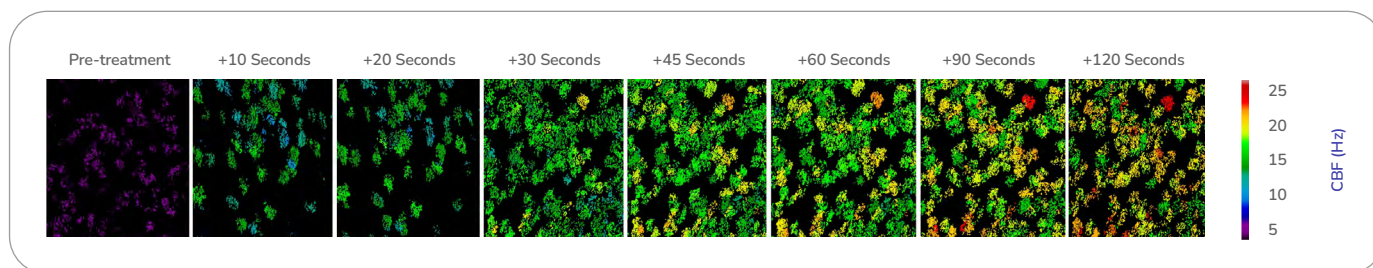


Figure 3: Analysis of compounds with rapid action - Increase in ciliary beat frequency and % of active ciliated cells area up to 120 seconds post-treatment with ATP

Cilia Beat Frequency Analysis Assay					
SKU No.	Offering	Format	Readouts	Time	Inclusions
LSCBF0000H	Ciliary beat frequency analysis assay	24-well Transwell	Ciliary beat frequency, % active ciliated area, ciliary beat frequency distribution & active ciliated cell distribution with color coded beat frequency	As specified by client	1 donor, 3 compounds, 6 dilutions with internal controls and QC included

### For more information:

If you would like further information, please contact our experts or visit our website:

info@newcellsbiotech.co.uk  
or visit: [www.newcellsbiotech.co.uk/CBF](http://www.newcellsbiotech.co.uk/CBF)

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