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

Quantitative, rapid and comprehensive assessment of lung small airway cilia function for lead compound selection

What you can achieve:

- Compound evaluation for effect on ciliated cells
- Comprehensive and high-sensitivity cilia beating readouts for confident decision-making
- Mimicking 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, and high-sensitivity set of data that accurately measures the effect of your compound to predict mucociliary clearance.

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

- **Confidently predict *in vivo* efficacy** through highly realistic *in vitro* evaluation of cilia function.
  → Functionally validated SAECs cultured at air-liquid interface that closely mimic *in vivo* conditions.
- **Assess how respiratory disorders and compounds impact cilia function** to predict 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-like 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-like conditions enables prediction of the effectiveness of new drugs in real-world clinical settings and allows for a better assessment of treatments.

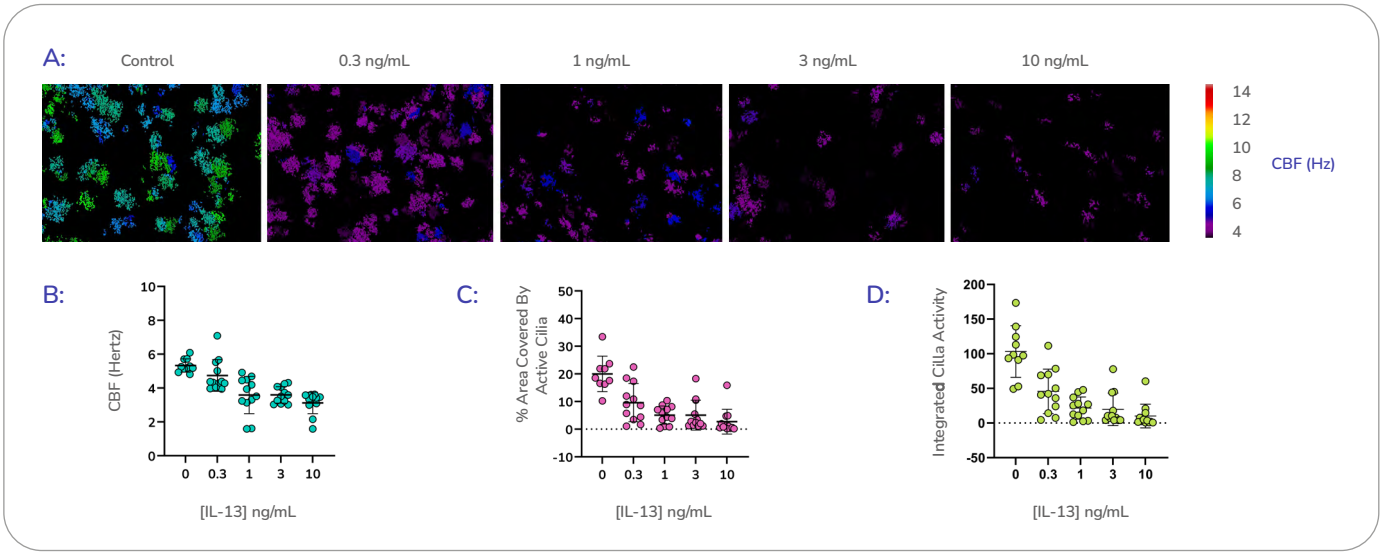

Figure 1: Accurate measurement of expected reduced cilia activity in response to increasing IL-13 concentrations A) Heatmap of active cilia and ciliary beating frequency. B), C) and D) Decreased cilia beat activity measured as ciliary beat frequency, % area covered by active cilia and integrated cilia activity, respectively 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 compounds in reversing the effects of cytokine-mediated conditions *in vivo* **(Figure 2).**

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 lead 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 & systemic studies.

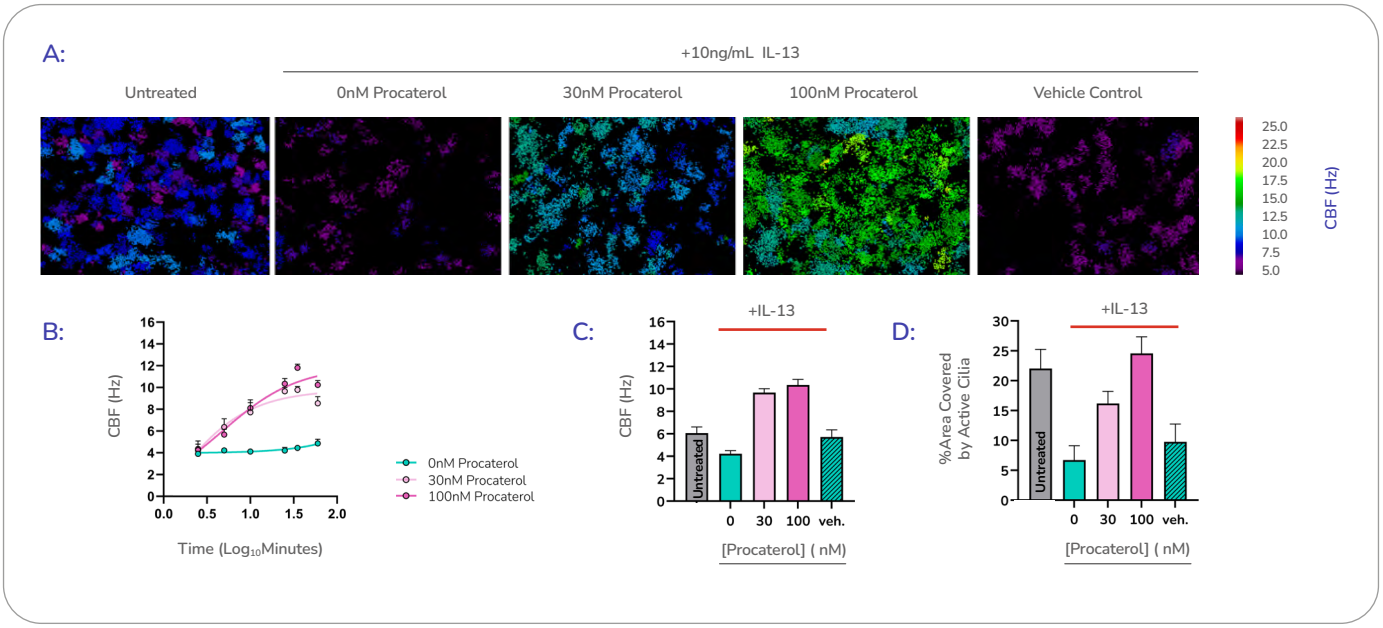

Figure 2: Measurement of dose-dependent effect of cilia activating compound-Procaterol on cilia activity. A) Heatmaps showing increase in active cilia and ciliary beat frequency B) Quantification of increasing CBF with time. C) and D) Quantification of increase in active cilia and ciliary beat frequency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

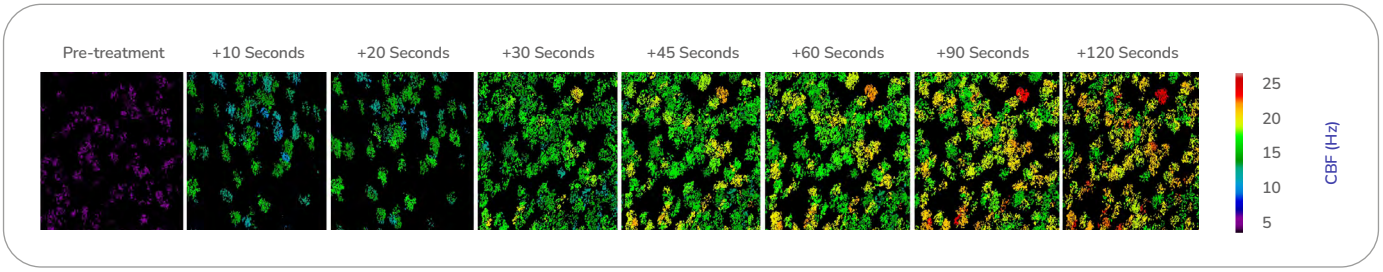

Figure 3: Analysis of compounds with rapid action - Increase in ciliary beat frequency and % of active ciliated cells area up to 120 seconds post-treatment with ATP.

Cilia Beat Frequency Analysis Assay					
SKU No.	Offering	Format	Readouts	Time	Inclusions
LSCBF0000H	Ciliary beat frequency analysis assay	24-well Insert	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

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