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Application Note

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Generation of precision cut-lung slices (PCLS) for *ex vivo* modeling of lung disease and drug testing

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Introduction

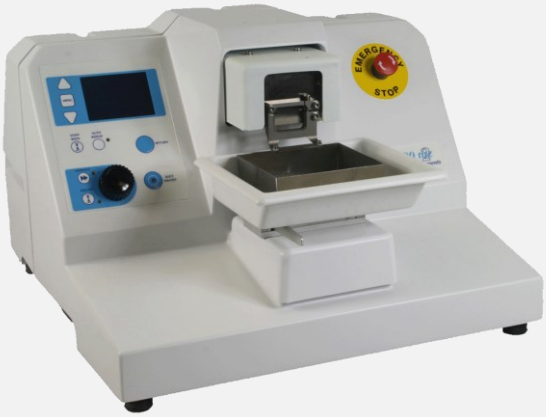
Precision-cut lung slices (PCLS) from healthy and diseased tissue represents a useful tool to study Chronic Lung Diseases (CLDs). Approaches using PCLS can aid the understanding of CLDs and the development of therapeutics.

Complex interactions between cell types and the extracellular matrix, and high-resolution (live) imaging are possible with PCLS. Further, PCLS can be generated from diseased lung tissue removed during surgery, therefore allowing studies to be made in living human tissue.

Procedures

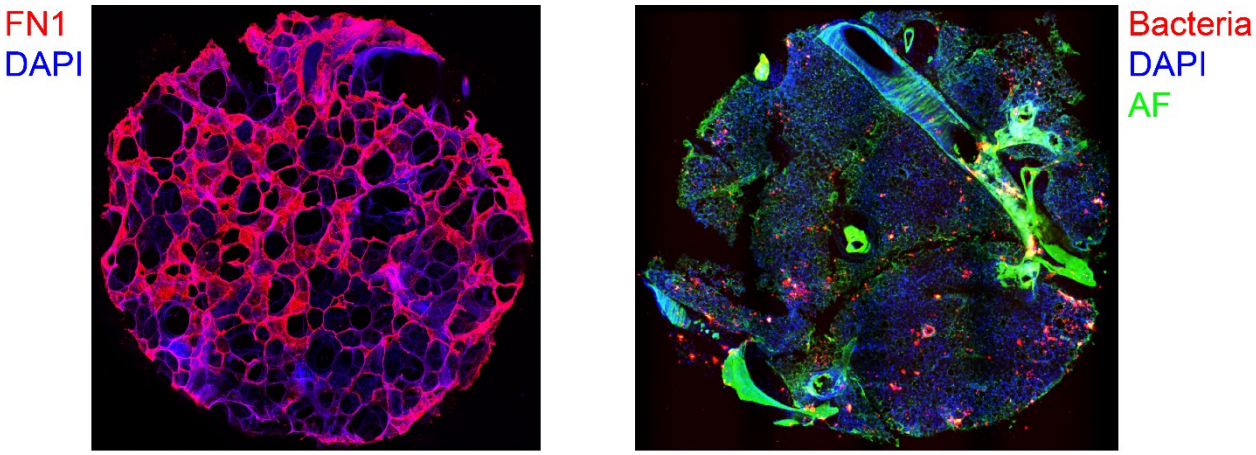
Lung tissue of animal or human origin (healthy or diseased) is filled with agarose (1.5-3 w/v %) and allowed to solidify at 4 °C. Regions of interest are then dissected and sliced using a vibrating microtome (**7000SMZ-2** Vibrotome, Campden Instruments Ltd.) at thickness of 300-500 µm. The PCLS can then be maintained *ex vivo* for 5-7 days without major losses in cell viability and native tissue characteristics. During this time window, disease characteristics can be investigated (inherent or induced) and pharmacological approaches evaluated. One of the many advantages of using PCLS for pulmonary research is the possibility to perform microscopy-based imaging with high spatiotemporal resolution (see figure on next page).

Product Focus: 7000smz-2 Vibrotome



Our top of the range high precision, vibrating microtome (vibrotome for short), this is the finest tissue slicer in the world for preparations for visual patch clamping or high-resolution imaging.
Using our microtomes, research detailing sectioning for visual patching of neurological tissue, heart, lung, and tissue scaffolds have all been published. The **7000smz-2** microtome represents significant advances with higher precision at a lower cost.

For more information click visit https://campdeninstruments.com/products/7000smz-2-vibrotome



PCLS treated with fibrosis cocktail PCLS infected with *L. pneumophila*

Specific examples

Our lab utilize *ex vivo* culture of PCLS for several purposes. One example is disease modeling of lung fibrosis; this is accomplished by treatment of PCLS with a fibrosis cocktail which induces an early stage-like fibrotic response within 48 hours. This model can be used to study both mechanisms involved in disease progression and pharmacological interventions. Recently, our lab has additionally started using PCLS-based models to study acute lung diseases, such as infection by bacteria (in collaboration with Drs. Flávia Viana and Gunnar Schroeder at Queen's University Belfast, Northern Ireland) or viruses (in collaboration with Dr. Lena Uller at Lund University, Sweden).

References

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