### LUNG CANCER

**Real-time differentiation between malignant and benign lesions**

- **nCLE for diagnosing malignant pleural mesothelioma**
  - Abstract ERS, 2018, Dr. Wijmans, Pr. Annema et al.
  - 14 biopsy procedures (2 surgery, 2 thoracoscopy, 3 CT, 6 ultrasound, 1 EUS-guided)
  - nCLE criteria of bright linear bands distinguished fibrotic pleural tissue from tumor-areas (dark-enlarged pleomorphic cells/dark clumps).

- **Probe-based confocal laser endomicroscopy in solitary pulmonary nodules**
  - PLoSOne, 2017, Drs Hassan, Pr Thiberville et al.
  - 48 patients with solitary peripheral pulmonary nodules (SPN)
  - The diagnostic accuracy for lung cancer using r-EBUS coupled with pCLE imaging of «Solid Pattern» was 79%.
  - The kappa test for interobserver agreement for the identification of «solid pattern» is 0.74.

- **Real-Time nCLE Optical Biopsy of Lung Cancer**
  - ATS, 2016, Dr Wijmans, Pr. Annema et al.
  - When used with Fluorescein, nCLE imaging of the lung tumor revealed dark aggregates located within alveolar structures compatible with tumor cells. This technique may enable real-time diagnosis and staging of lung cancer.

- **Comparison of pCLE with histopathology**
  - Respirology, 2015, Dr Wellikoff et al.
  - 25 patients
  - When combined with endobronchial electro-navigation, pCLE criteria of irregular tissue architecture with disorganization and fragmentation as well as «black holes» seems to correlate with malignancy.

### LUNG TRANSPLANTATION

**Earlier identification of transplant rejection**

- **Use of Confocal Alveolar Endomicroscopy in recipients of single lung transplantation**
  - Transplantation, 2018, Dr. Keller et al.
  - 24 patients (30 procedures, 8 cases of acute lung rejections)
  - Significant correlation between pCLE and histopathology for acute cellular rejection using number of blood vessels with perivascular cellularity (PVC)
  - Highly reproducible criteria with inter-observer reproducibility of 0.77 after agreement for PVC
  - pCLE diagnostic performance for an expert reaches Se of 100% and Sp of 85%.

### Cellvizio Images

![Healthy Alveoli](image)
![Compact solid pattern with loss of architecture](image)
![Dark aggregates](image)
![Alveoli and macrophages](image)
![Alveoli with negative perivascular cellularity](image)
![Alveoli with perivascular cellularity (PVC)](image)

Courtesy of Prof Luc Thiberville, CHU Charles Nicolle, Rouen, France, Dr Wellikoff, LSU Shreveport, LA, USA, Dr Keller, Mayo Clinic Jacksonville, FL, USA
### INTERSTITIAL LUNG DISEASES

| Feasible and safer detection and differentiation of morphological changes |

### CHRONIC OBSTRUCTIVE PULMONARY DISEASES AND ASTHMA

- Evaluation of reduced lung function
- Evaluation of type and degree of airway remodeling in chronic airway diseases

### pCLE differentiating underlying cause of CT-ground glass opacities in ILD patients\(^1\)

**Abstract ERS, 2018, Dr Wijmans, Pr. Annema et al.**

**Twenty non/former smokers** with ILD scheduled for lung biopsies
- pCLE seems to differentiate between 2 key underlying histological patterns: «Cellular» pattern corresponding to interlobular cellular infiltrates and «increased fiber» pattern corresponding to fibrotic tissue areas

### CLE as a guidance tool for Transbronchial Lung Cryobiopsies\(^2\)

**Respiration, 2018, Dr Wijmans et al.**

**14 patients**
- Differentiate between mild and dense fibrotic lung
- Make distinction between the pleura and the alveolar airspaces, which accordingly could **diminish the complication rate**

### Imaging parenchymal lung diseases with pCLE\(^3\)

**Respiratory Medicine, 2012, Dr Newton et al.**

**5 healthy non smokers, 13 COPD, 24 diverse ILDs**
- pCLE can detect morphological changes evident in specific ILDs: loss of distinctiveness and autofluorescence

### In vivo pCLE in amiodarone-related pneumonia\(^4\)

**European Respiratory Journal, 2012, Dr Salaün et al.**

**36 patients** with or without ILD, and under amiodarone or not
- pCLE appears as a valuable tool for the in-vivo diagnosis of amiodarone-related pneumonia (AMR-IP) in subacute ILD patients
- pCLE is able to discriminate patients with amiodarone-related pneumonia from other ILDs

### Fluorescein-aided* pCLE of the Lung\(^5\)

**Interv. Pulmo, 2011, Dr Fuchs et al.**

**15 patients** with various ILDs and 4 healthy patients
- pCLE is a feasible and safe way to detect cellular structures in the lung periphery: normal tissue is surrounded by foam, but dark neoplastic and inflammatory cells can be identified adjacent to the alveolar wall.

*Off label

### Cellvizio Images

<table>
<thead>
<tr>
<th>Organized Pneumonia</th>
<th>Cellular structure in alveolar space</th>
<th>Fibrosis (Increased fibers)</th>
<th>Asthma (lamellar pattern)</th>
<th>Alveoli with Emphysema (loss of septal wall)</th>
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Bibliography

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