MRI Measures of Lung Water in Adults with Cystic Fibrosis

Becky Theilmann PhD
MR Physicist
Department of Radiology
Pulmonary Imaging Lab
Cystic Fibrosis

- Mutation in the CFTR gene
- Retained mucus
- Infections, inflammation, edema
- Median age of death ~ 41 years

**Hypothesis:** CF abnormalities ≈ excess lung H₂O

**GOAL:** Establish, evaluate, and translate MRI technique to monitor disease status in CF

- Designed for any 1.5T clinical MRI
- Breath-hold imaging (GRE sequence)
- MRI signal intensity = absolute water content
CENTRAL REGION (large airways)

Lung Water Content Ra = oo

Large Airway Ventilation Heterogeneity $S_{cond}$ (1/L)

Controls (n=12)
Mild CF (n=4)
Moderate CF (n=5)
Severe CF (n=3)
Probabilistic Library - Lung Water Content
Acknowledgements

- Chantal Darquenne
- Douglas Conrad
- Ann R Elliott
- Theresa Morrison
- Denise Y Yu

- BR Thompson
- CR Stuart –Andrews
- UCSD Adult CF Clinic

- Supported by
  - R21 EB015579
  - UL 1 RR031980