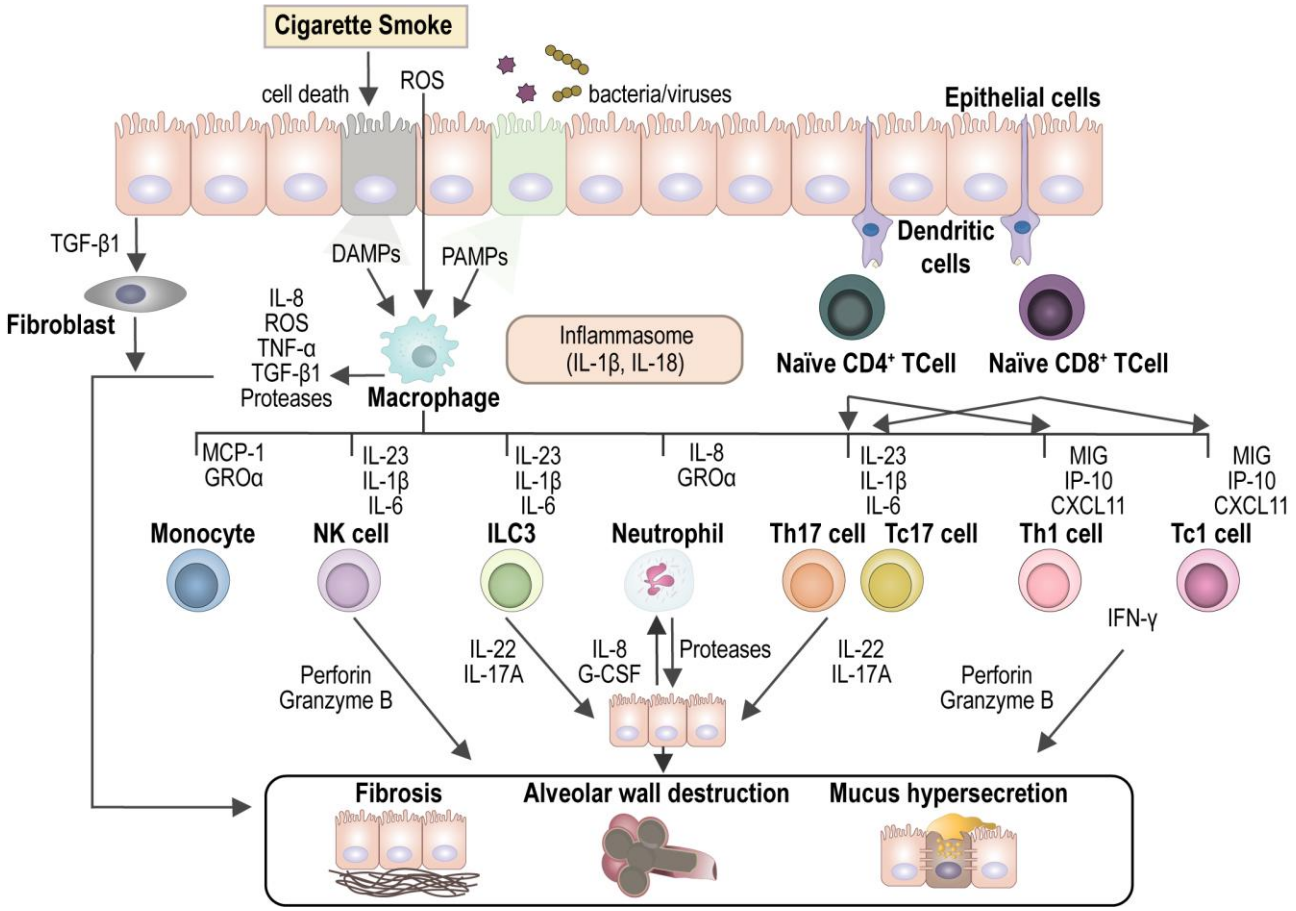
# Inflammation is centrally involved in COPD pathogenesis

- COPD marked by **exaggerated immune cell infiltrates** in lungs[1,2]
- Immune cells often exhibit **modified cytokine production**[3-6]
- Relative importance each of these factors is unknown



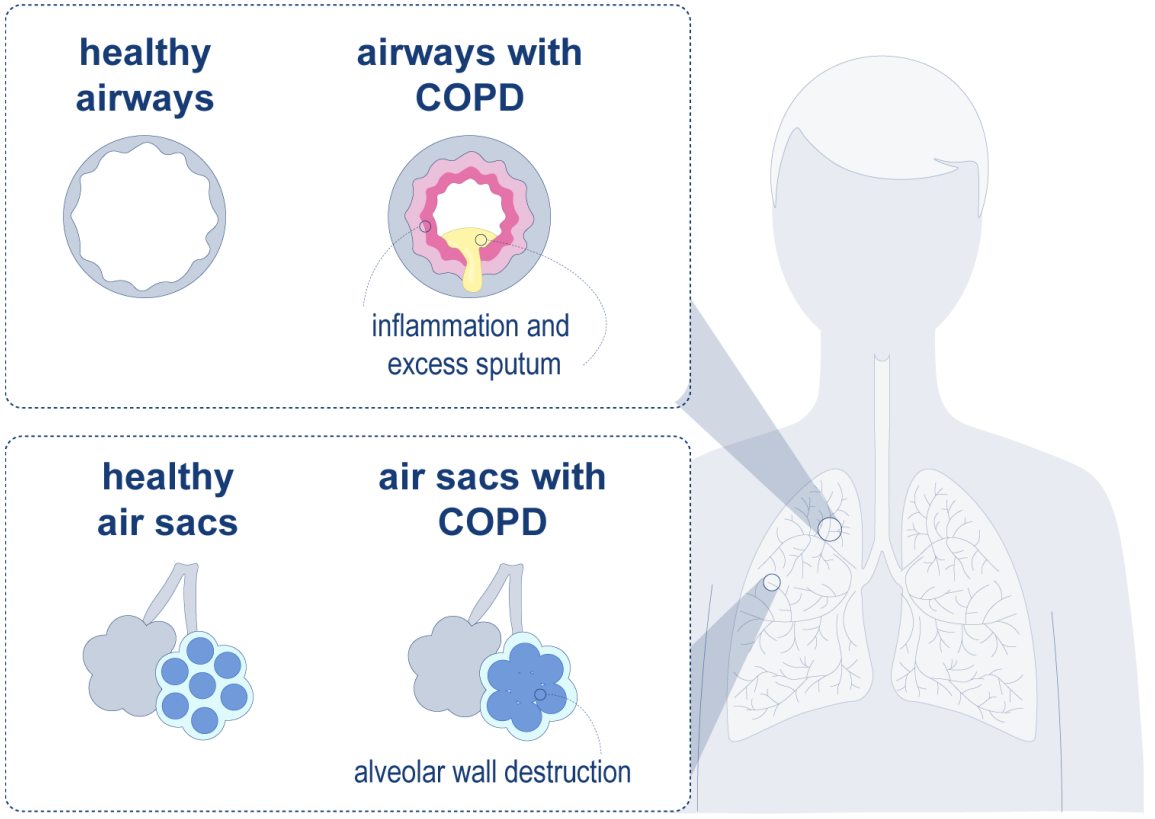

Adapted from Hikichi, M., et al. J Thorac Dis (2019)

[1] Barnes P.J. *J. Allergy Clin. Immunology* (2016).
[2] Wang, Y. et al *Int. J. COPD* (2018).
[3] Caramori, G. *Semin. Immunopathol.* (2016).
[4] Caramori, G. et al *Int. J. COPD* (2014).
[5] Moon, J. et al. *Expert Rev. Proteomics* (2018).
[6] Bradford. et al. *Respir. Research* (2017).

# Chronic obstructive pulmonary disease (COPD) is a leading public health burden

- Pulmonary disease characterized by:
  - Irreversible **airflow obstruction**
  - Progressive **lung function decline**
- Linked to history of **cigarette smoking**
- **6th** leading cause of death in US[1]

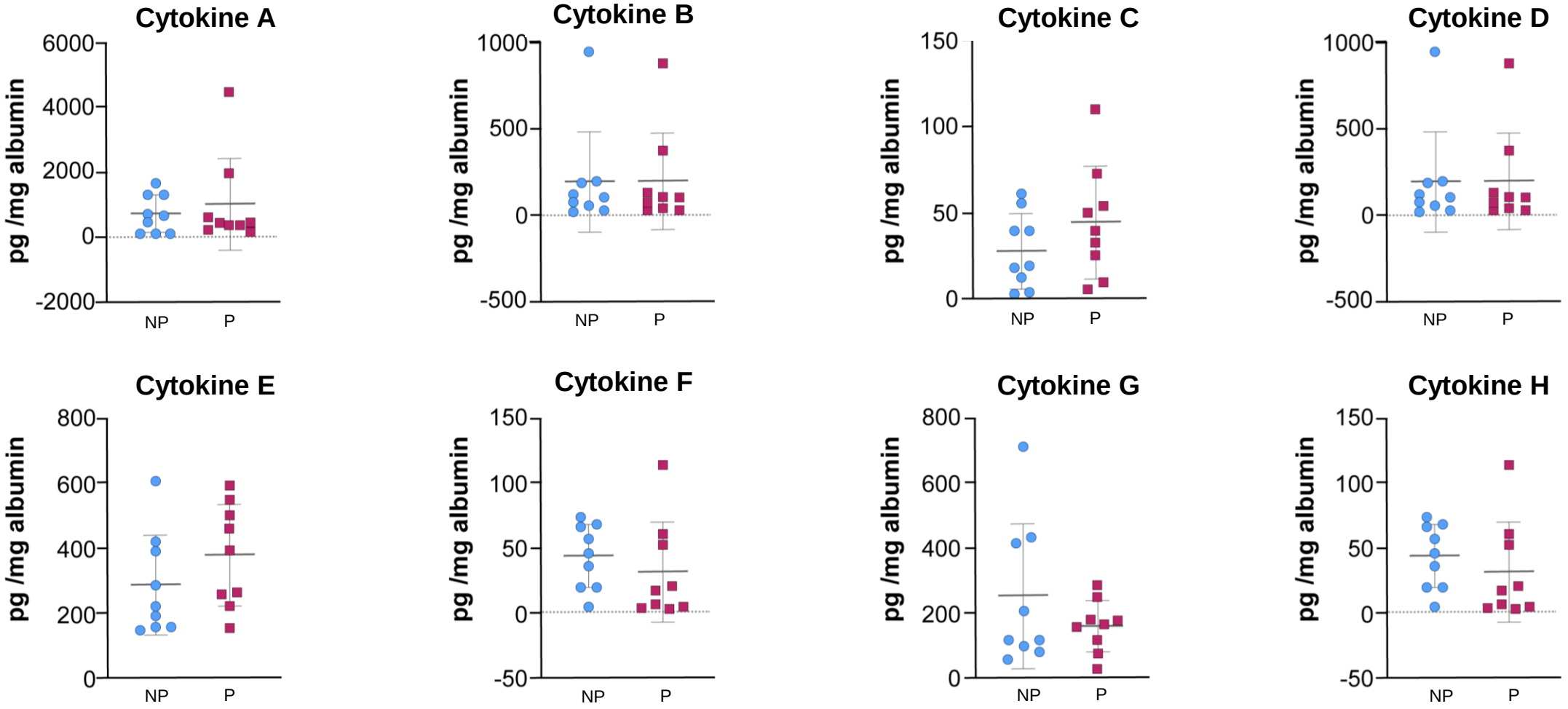
**No cure** or therapeutics capable of **reversing disease progression**




Adapted from www.blf.org.uk

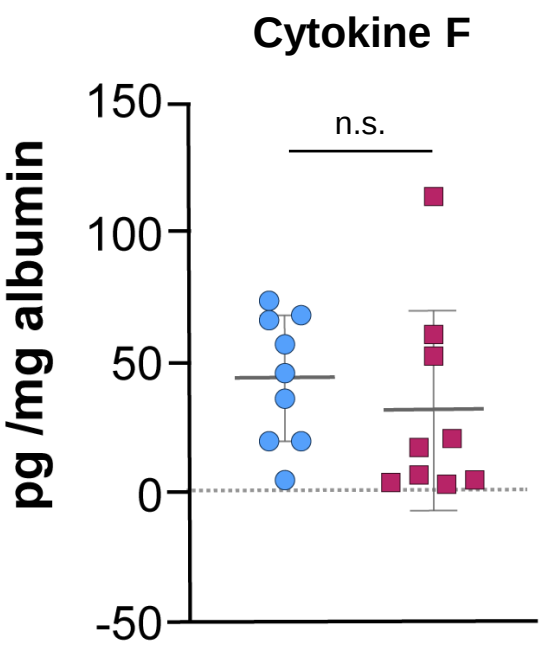
[1] Xu J. et al. *NCHS Data Brief* (2022)

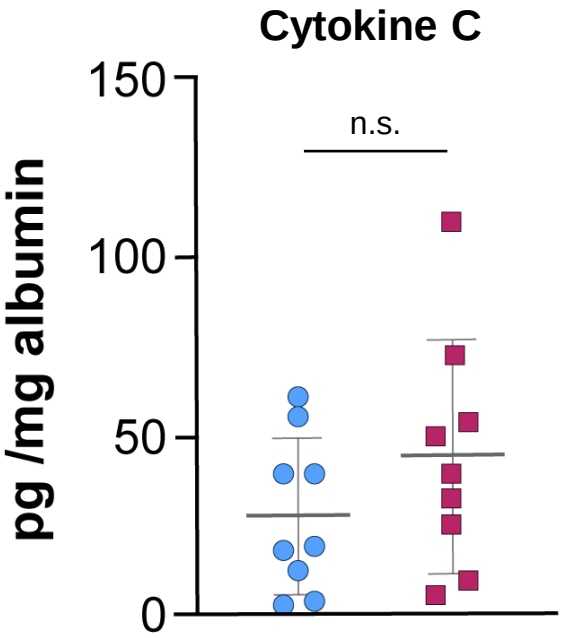
# No individual cytokine could differentiate between disease progression

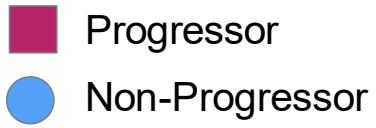


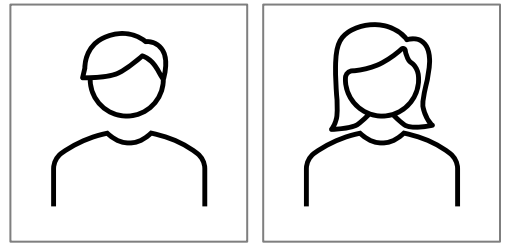

NP = Non-progressor
P = Progressor

# No individual cytokine could differentiate between disease progression



Also, no difference in cytokines A, B, D, E, G, H

In collaboration with X and Y

# Conclusions

- **Identified biomarker signature that predicts disease progression** up to X years before functional decline
- Individuals likely to progress show **dysregulated activation of pathway Z**
  - Observation was validated in an independent cohort
- Blood-only biomarkers lacked validation, underscoring the need for cross-compartment integration in future studies

# Conclusions

- **Developed a predictive modeling framework** for COPD progression, adaptable across other complex lung disease datasets
- **Identified biomarker signature predicting progression** (X% accuracy), supporting improved patient stratification
- **Pinpointed pathway Y as central axis of dysregulation**, prioritizing mechanistic targets for follow-up studies