

Analysis of levels and degradation of surfactant protein D (SP-D) in bronchioalveolar lavages (BAL) samples from season two of the bronchiolitis endotracheal surfactant study (BESS)

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Introduction and aims

- Bronchiolitis is a common lung infection in young infants and children causing inflammation and disrupting the airway-epithelial barrier in the lungs.
- This barrier is composed of cells which normally secrete pulmonary surfactant, a complex of lipid and surfactant proteins (SP-A, SP-B, SP-C, SP-D). SP-D has been proposed as a marker of lung injury in several adult respiratory diseases such as pneumonitis and COPD (Chronic Obstructive Pulmonary Disease).
- This study is part of the **blinded** Bronchiolitis Endotracheal Surfactant Study (BESS) designed to determine the efficacy and safety of endotracheal surfactant therapy to reduce total duration of Mechanical Ventilation in the treatment of critically ill infants with bronchiolitis.
- Here we aim to use levels and degradation of SP-D in BAL samples to evaluate lung integrity of enrolled patients.**

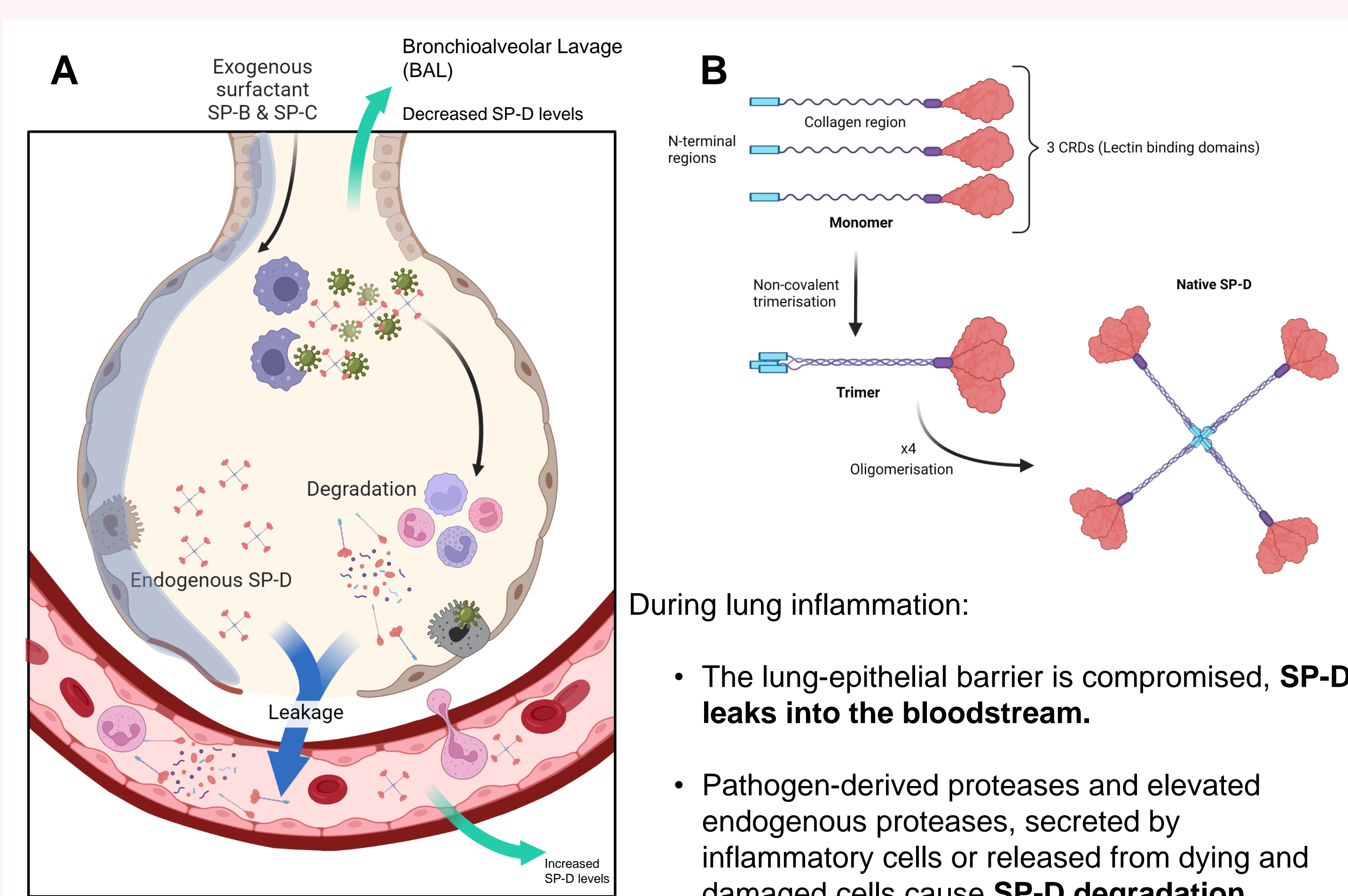
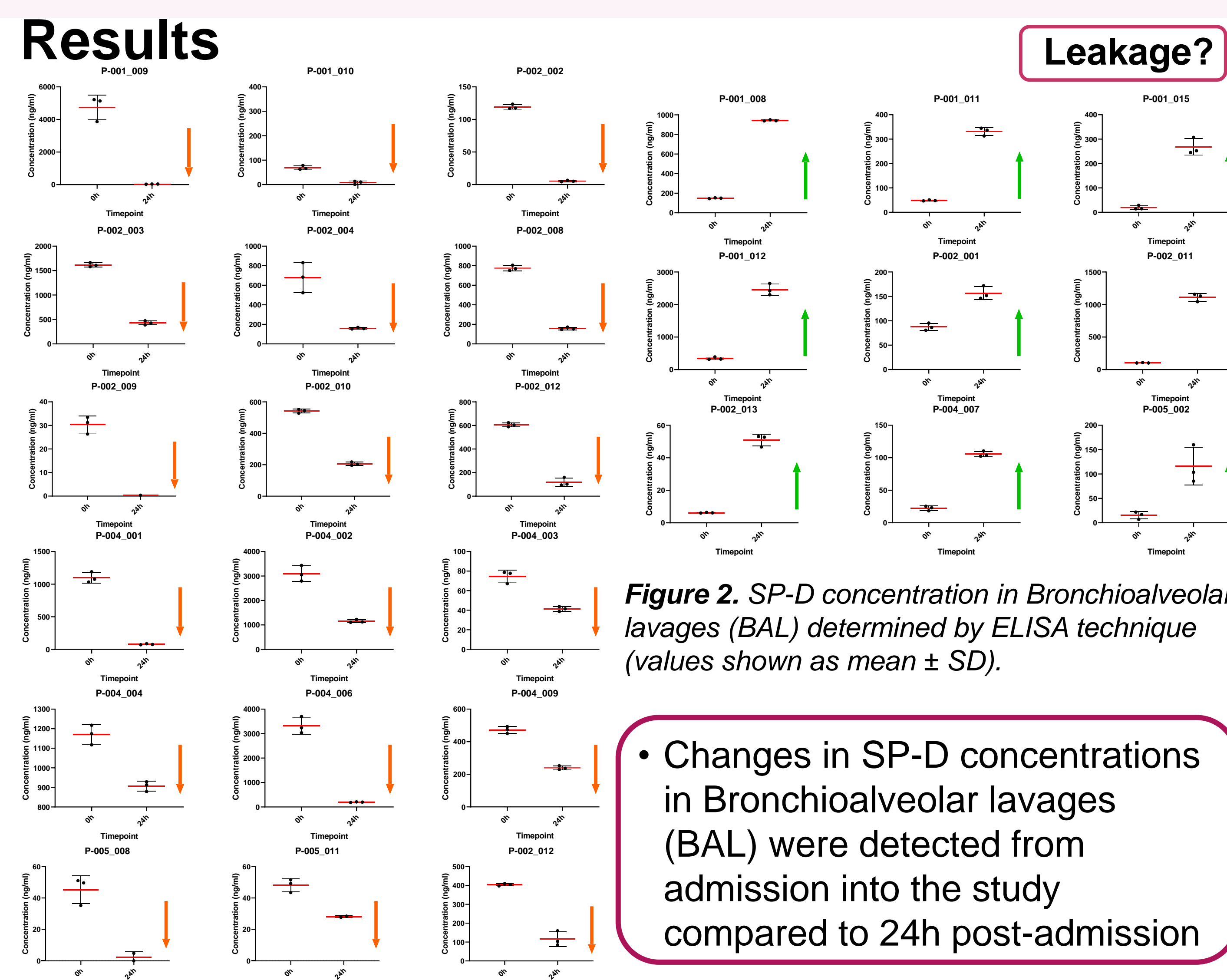


Figure 1. A. SP-D role as a biomarker for lung injury. B. SP-D monomers trimerise and associate into higher oligomers. Created with BioRender.com

Results



- Changes in SP-D concentrations in Bronchioalveolar lavages (BAL) were detected from admission into the study compared to 24h post-admission

Methods

- BAL samples taken at times T=0h and T=24h were analysed.
- Enzyme-linked immunosorbent assay (ELISA) was used to quantify SP-D concentration in patient BAL samples.
- SDS-PAGE and Western Blotting was used to identify any protein degradation.

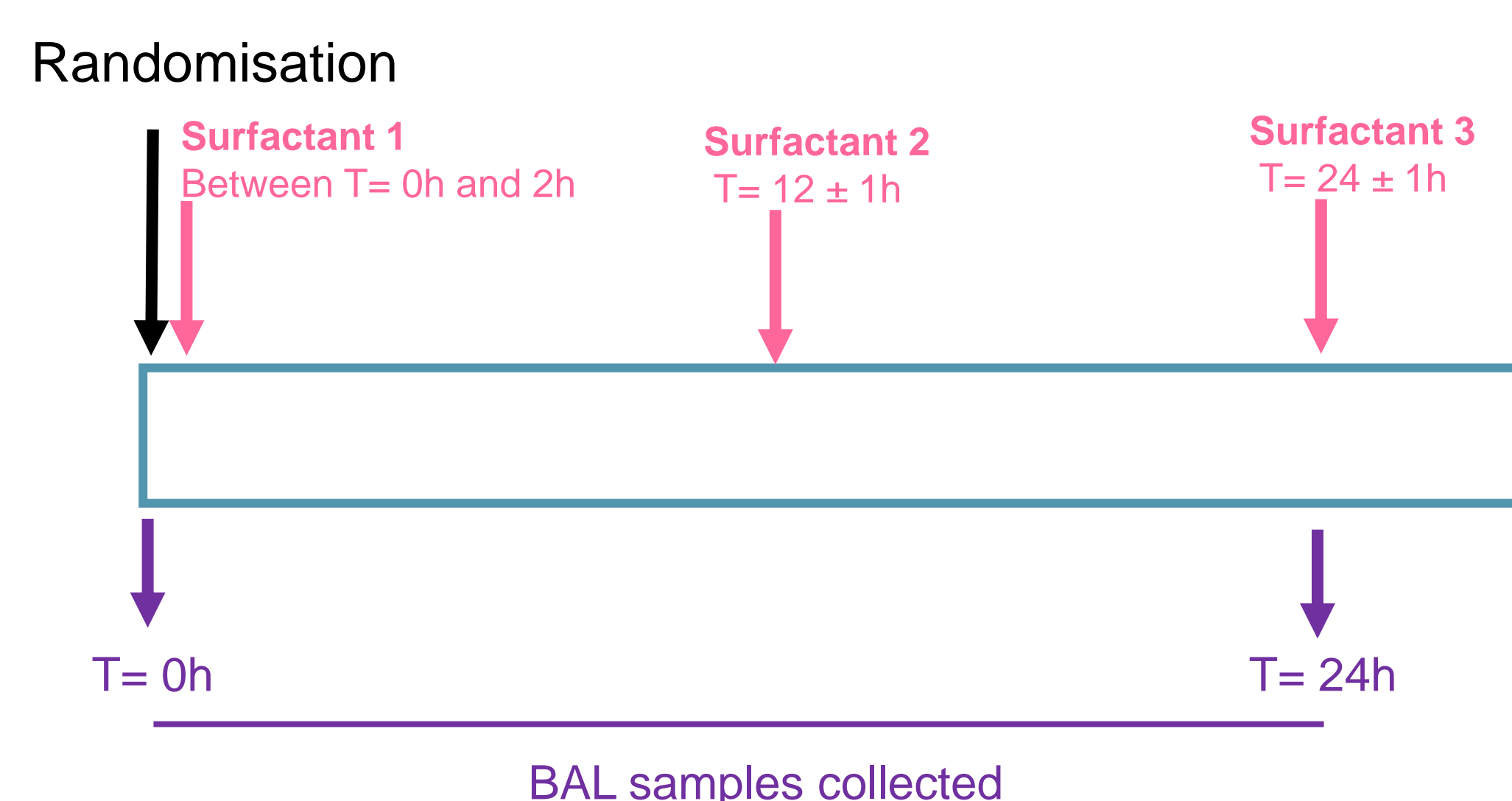
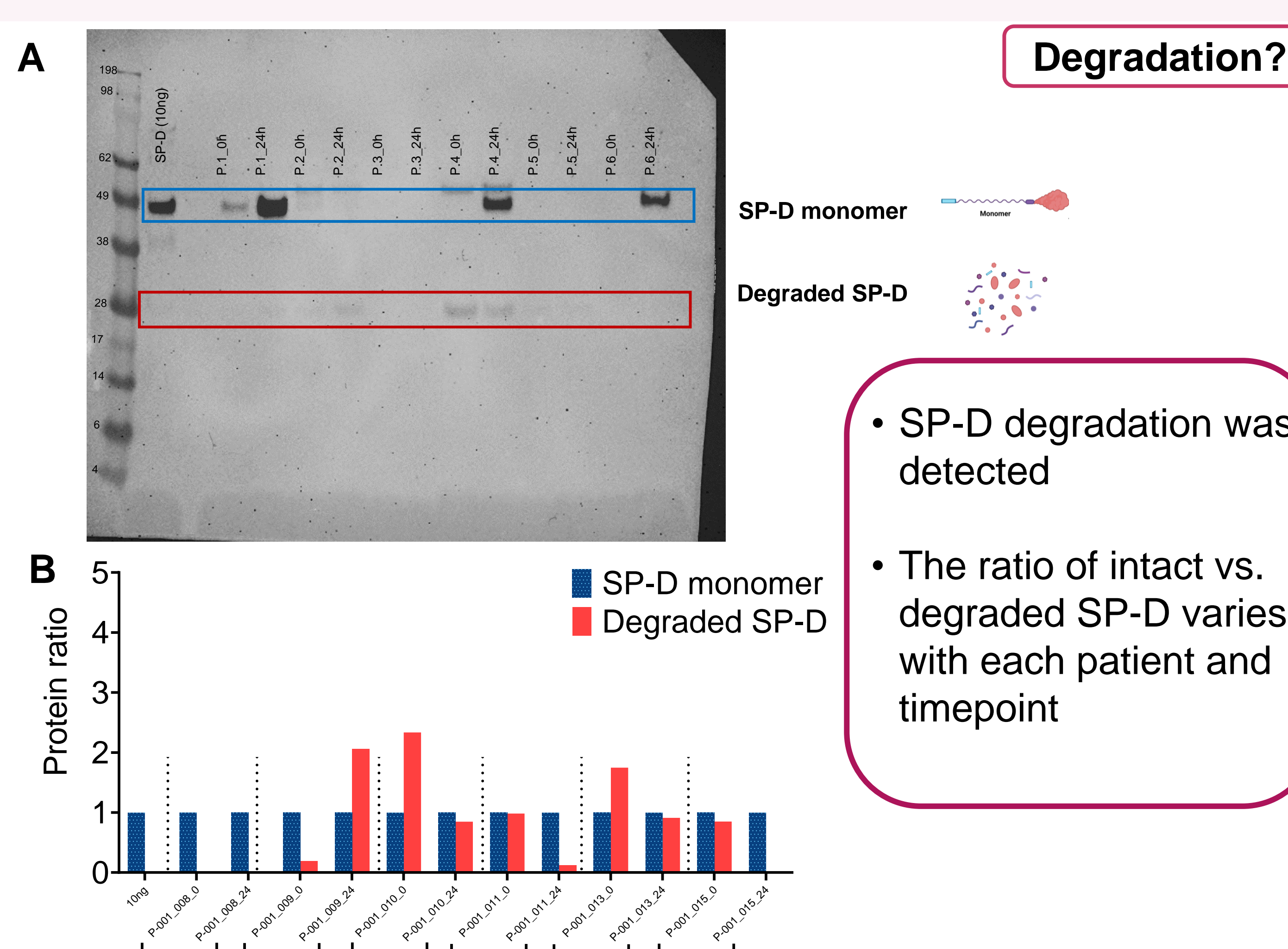


Figure 2. Schematic of the surfactant administration and sample acquisition. 'A phase-2 blinded randomised air-placebo-controlled trial of endotracheal surfactant (poractant alfa) in critically ill infants with bronchiolitis. IRAS Ref: 220853.

Conclusions

- Decreased levels of SP-D over time could indicate leakage of pulmonary surfactant caused by damage to the airway-epithelial barrier in diseased lungs.
- The identification of degraded fragments can be associated with the secretion of proteases secreted by cells involved in inflammatory processes.
- The results indicated that levels of SP-D together with the ratio of degraded and intact SP-D in BAL samples may be useful indicators of the lung disease progression.
- Interpretation of these findings will be clearer once the study is unblinded.



- SP-D degradation was detected
- The ratio of intact vs. degraded SP-D varies with each patient and timepoint