



Improving lung health by carbohydrate-directed changes in intestinal microbiota in calves: the *ex vivo* model



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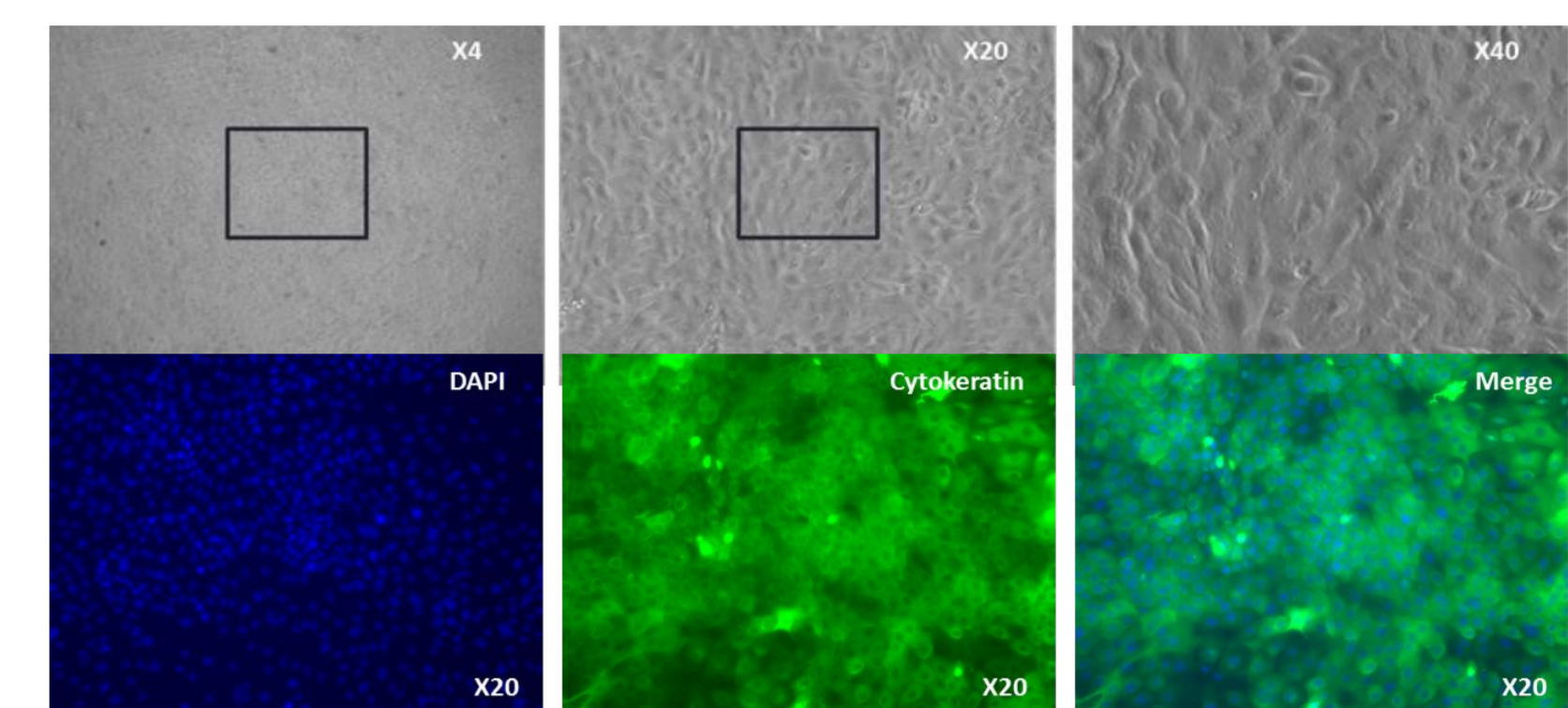
Aims

- Optimizing the *ex vivo* bovine model with bovine primary bronchial epithelial cells
- Oligosaccharides pre-screening in the *ex vivo* bovine model with primary bronchial epithelial cells prior to the *in vivo* study in calves
- Gain insight in the direct mechanisms of oligosaccharides on bovine primary bronchial epithelial cells from calves

Bovine primary bronchial epithelial cell model

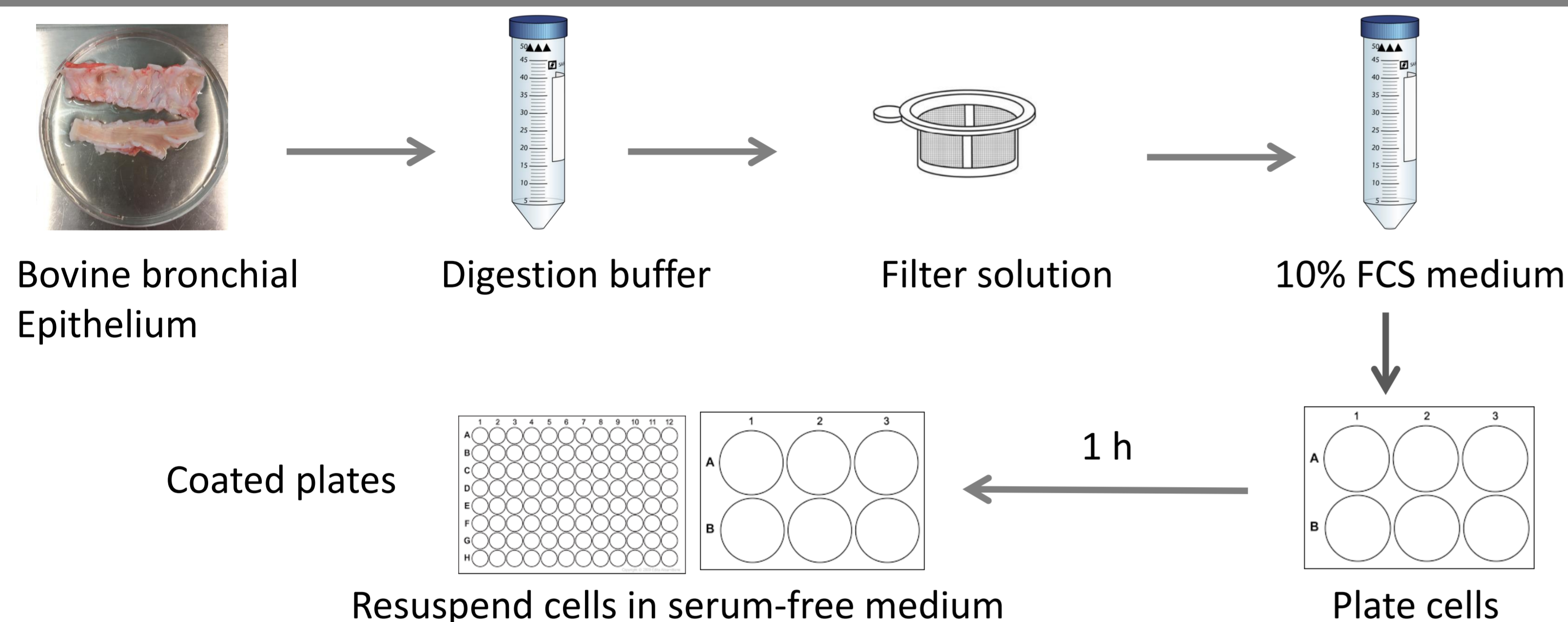
Live cells

Cytokeratin staining



Clear network with attached cells + cytochrome-positive cells
Uniform bronchial epithelial cell population

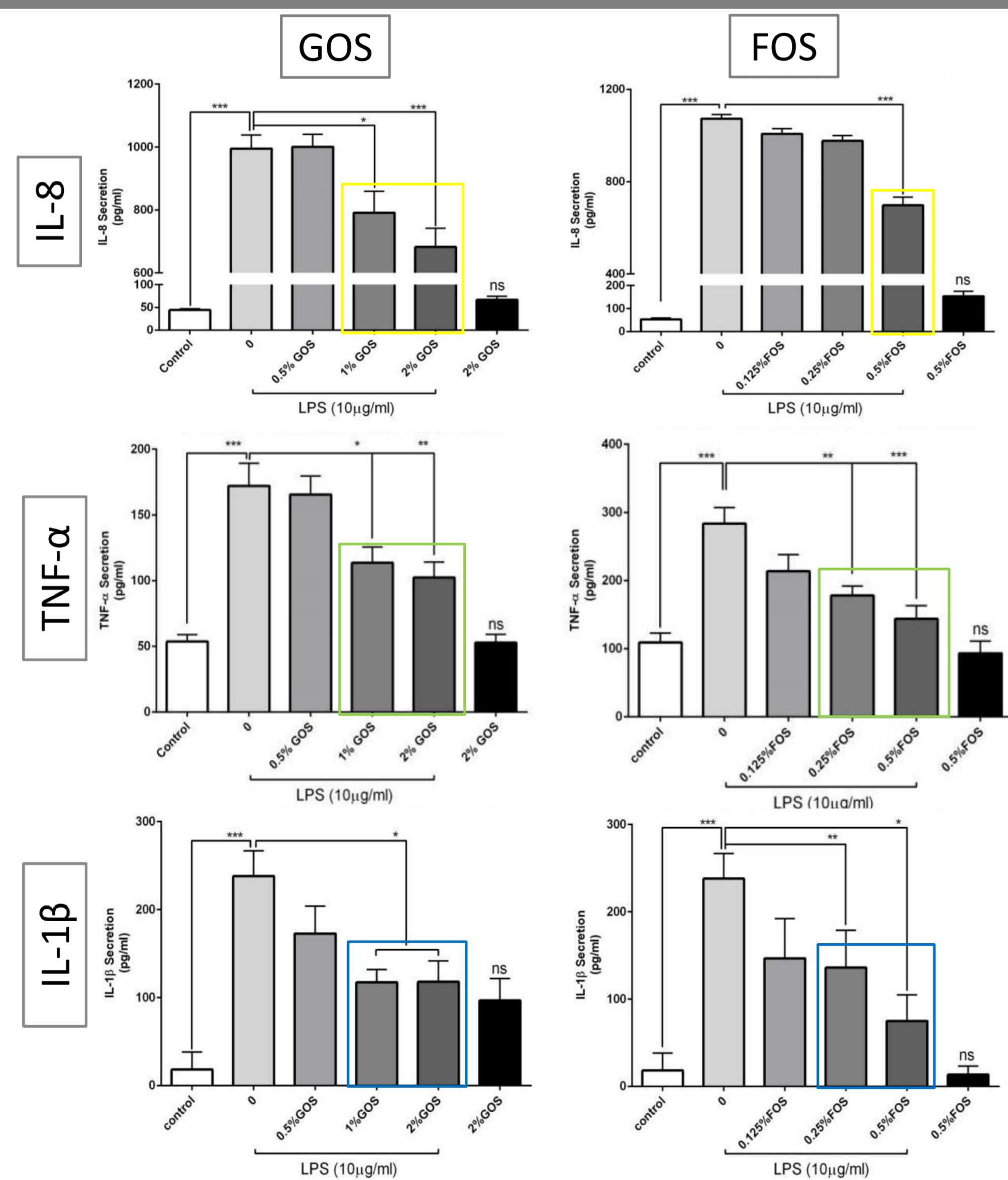
Materials & methods



Stimuli used (24h):

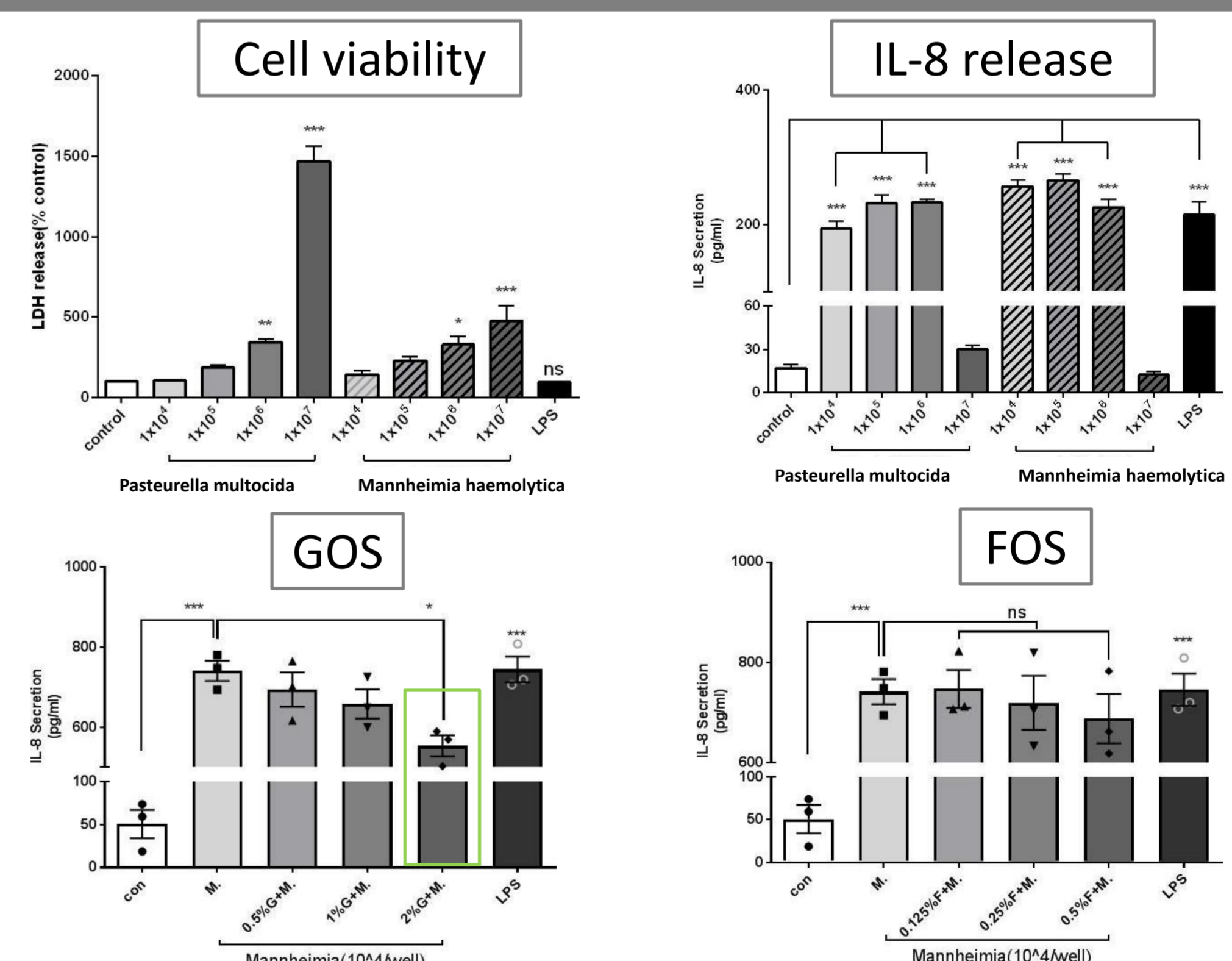
- LPS
- Pathogens responsible for BRD in calves:
 - Mannheimia haemolytica (Gram-)
 - Pasteurella multocida (Gram-)
- Oligosaccharides used (24h pre-incubation + 24h during stimuli):
 - Galacto-oligosaccharides (GOS)
 - Fructo-oligosaccharides (FOS)
- Parameters:
 - Cell viability
 - Cytokine release (IL-8, TNF- α , IL-1 β)

Results LPS stimulant



- 10 μ g/ml LPS does not affect cell viability and can increase IL-8, IL-1 β , TNF- α release of bovine primary bronchial epithelial cells
- Oligosaccharides, GOS and FOS, can reduce the LPS-induced cytokine release (IL-8, IL-1 β , TNF- α) in bovine primary bronchial epithelial cells

Results Mannheimia stimulant



- Pasteurella multocida and Mannheimia haemolytica (1 x 10⁴ CFU) do not affect cell viability and can increase the IL-8 release of bovine PBECS
- 2% GOS can significantly inhibit the Mannheimia-induced IL-8 release in bovine primary bronchial epithelial cells

Conclusion + future plans

- Oligosaccharides can work as anti-inflammatory compounds against the inflammatory reaction induced by LPS and pathogens in the lungs of calves
- Pre-screening of other oligosaccharides in the *ex vivo* model with primary bovine bronchial epithelial cells + unravel the working mechanism