

Alcohol-associated impact of sIgA-coated intestinal bacteria on pulmonary host defense during *S. pneumoniae pneumonia*

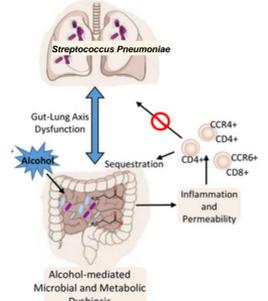
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Introduction

- Alcohol and Pneumonia
 - Independent risk factor for bacterial pneumonia¹
 - Associated with increased mortality
- Alcohol and Gut Microbiota
 - Causes microbiota dysbiosis
 - Lowers IgA levels in the intestinal lumen²
- sIgA-coated bacteria and disease
 - IgA coating of bacteria in the gut correlates with inflammatory response³



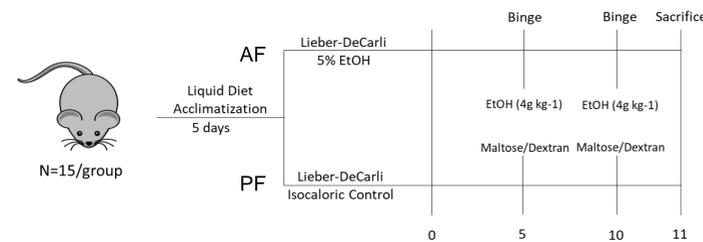
Objectives

GOAL: To determine alcohol's effect on sIgA levels in the intestinal tract and coating of bacteria and to determine the effect of sIgA coating on alcohol-related pneumonia.

Hypothesis: Alcohol administration alters sIgA coating of GI bacteria. sIgA coating of bacteria reduces lung clearance of *Streptococcus pneumoniae*

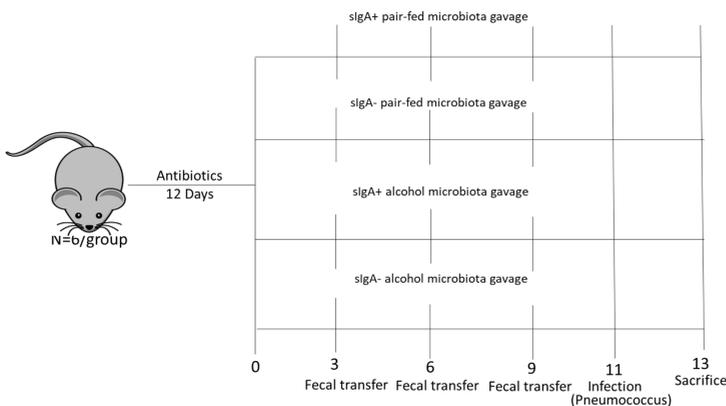
Methods

Part 1: Determining the effects of alcohol on sIgA levels



Outcomes: IgA levels (serum, duodenum, colon), plasma cells in small intestine lumen, *plgR* (transport protein) gene expression

Part 2: Determine impact of sIgA-coated bacteria and alcohol on pulmonary host defense through fecal material transfer



Outcomes: Bacterial Burden, Immune Cell abundance in Lung and Small Intestinal Lamina Propria

Results

1: IgA levels in serum and intestinal tract

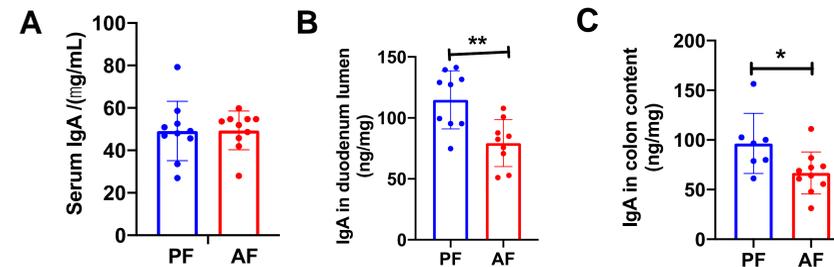


Figure 1: There were lower IgA levels in the lumen of the duodenum (B) and colon (C) in alcohol mice when compared to pair fed mice.

2: Plasma Cells in Intestine Lamina Propria

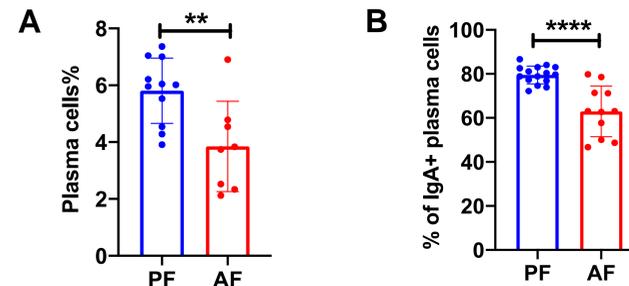


Figure 2: There were decreased levels of plasma cells (A), specifically IgA+ plasma cells (B) in alcohol-fed mice in the intestinal lamina propria.

3: Gene Expression of sIgA transporting protein-*plgR*

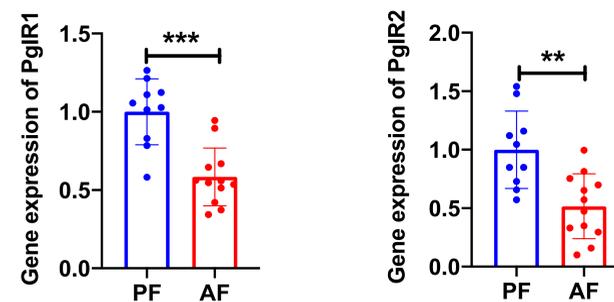


Figure 3: There was a reduced expression of *plgR* in alcohol-fed mice.

4: *Streptococcus pneumoniae* burden in the lung

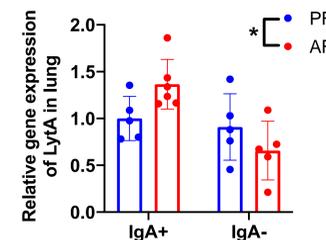


Figure 4: Relative gene expression of *LytA*, a *streptococcus pneumoniae* gene, in the lung.

5: Immune Cells in Lung and Small Intestine

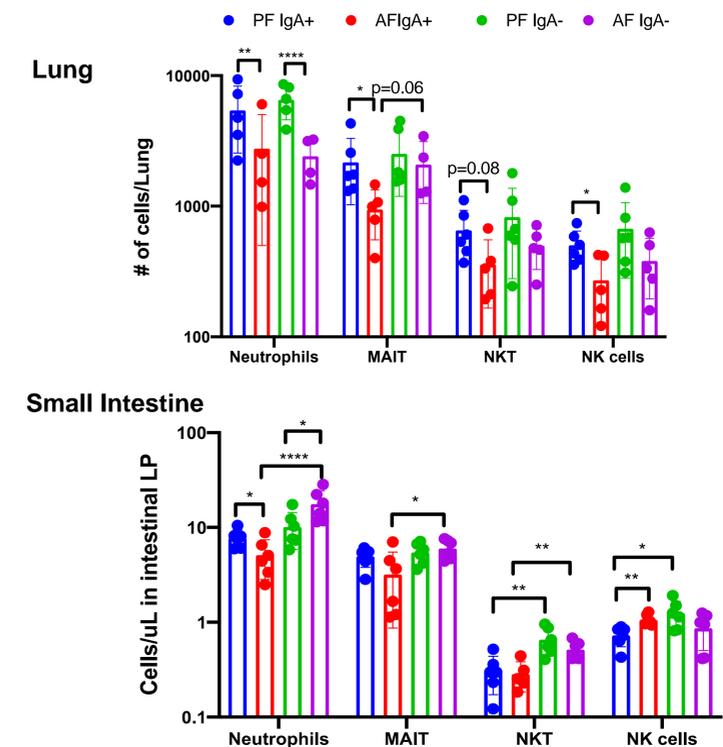


Figure 5: There were reduced number of innate immune cells in mice with AF sIgA-coated bacteria vs. PF sIgA-coated bacteria in the lungs and dysregulated cell abundance the small intestine lamina propria.

Summary

- Alcohol administration reduces IgA in the intestinal lumen by both reducing IgA production and transportation.
- Alcohol-associated sIgA-coated bacteria impaired host response against pneumonia, indicating that sIgA-coated bacteria may be mechanistic in the higher prevalence of pneumonia in patients with AUDs.
- IgA coating of commensal bacteria may represent a novel therapeutic target to mitigate alcohol-related lung infection.

Acknowledgements

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