

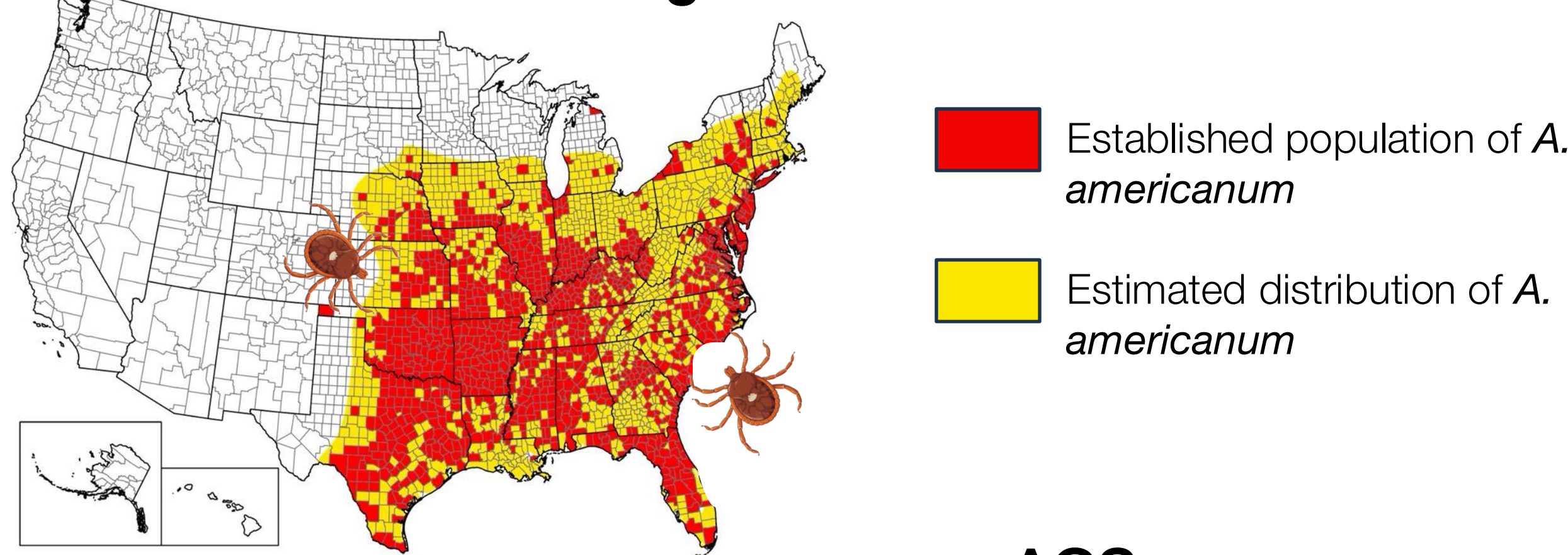
## Introduction

- Bites from the lone star tick have been found to be a “causative factor” of Alpha-Gal Syndrome (AGS), allergic reactions to dietary mammalian meat.
- While the lone star tick species range is primarily eastern North America, most AGS cases are found in the northern region of this species range.
- We hypothesized that the high prevalence of AGS in northern states are likely due to the differences of the northern lone star ticks.

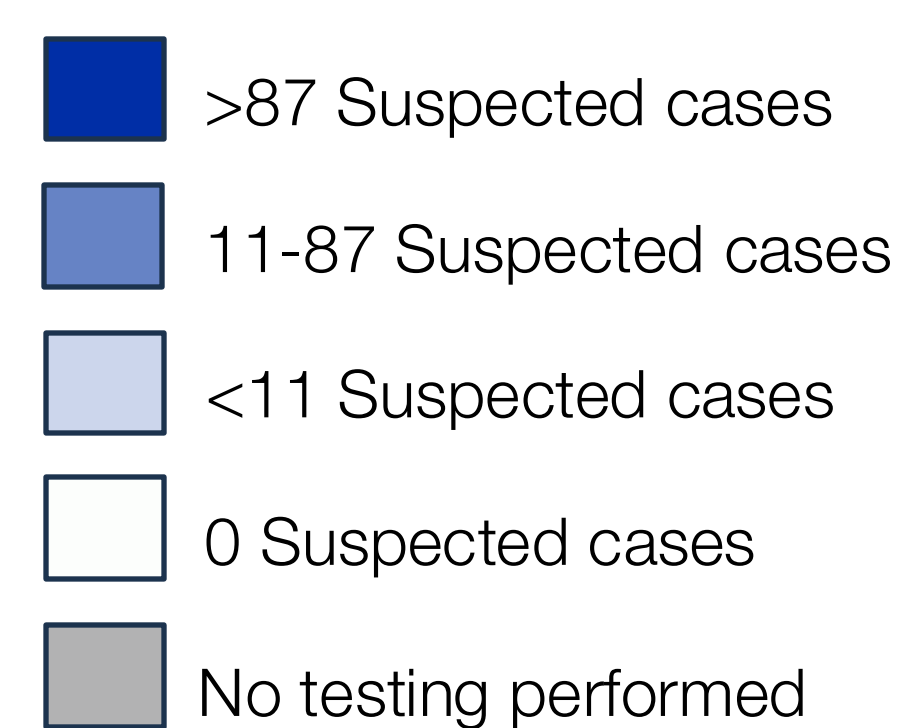
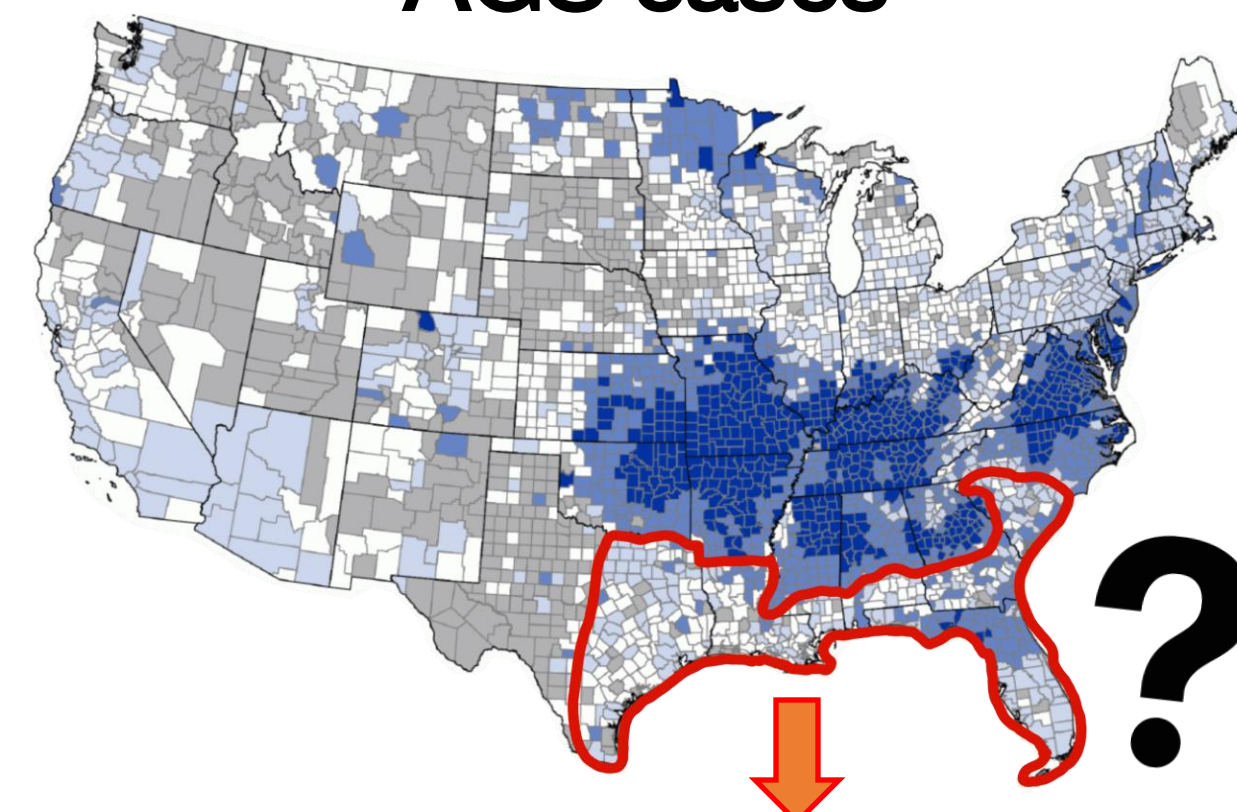
## Objective

- Compare alpha-gal content in the salivary glands of ticks from Kansas to ticks from South Carolina.
- Compare Alpha-gal content in ticks fed human and bovine blood.

### Lone Star tick range



### AGS cases



**Low AGS prevalence in southern states despite widespread lone star tick populations**

## Methods

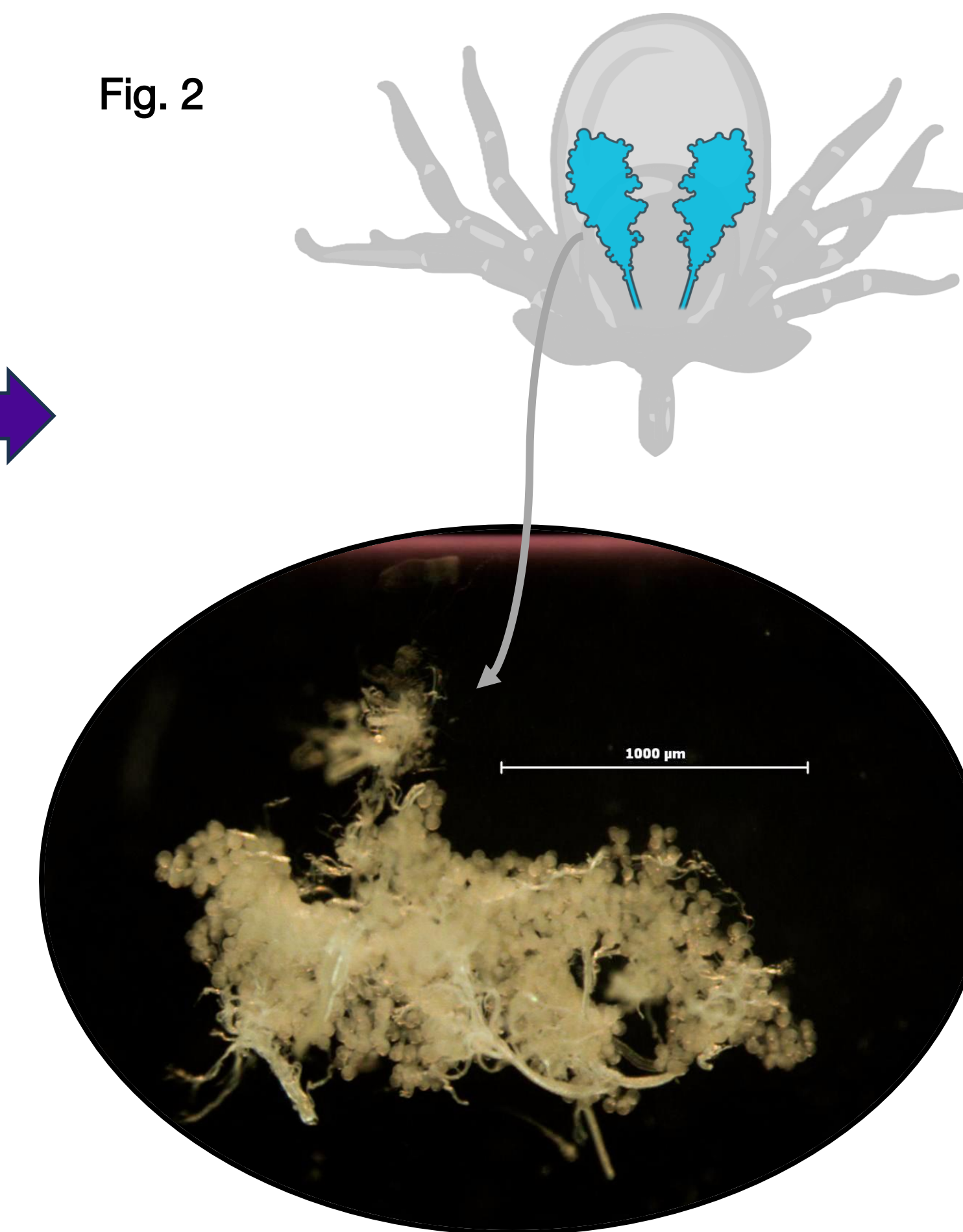
1. Feed ticks from different geographical regions human blood and bovine blood via artificial feeding chambers.

Fig. 1



2. Extract the salivary glands of the partially fed ticks.

Fig. 2



3. Quantify alpha-gal content in the salivary glands using indirect ELISA.

Fig. 3

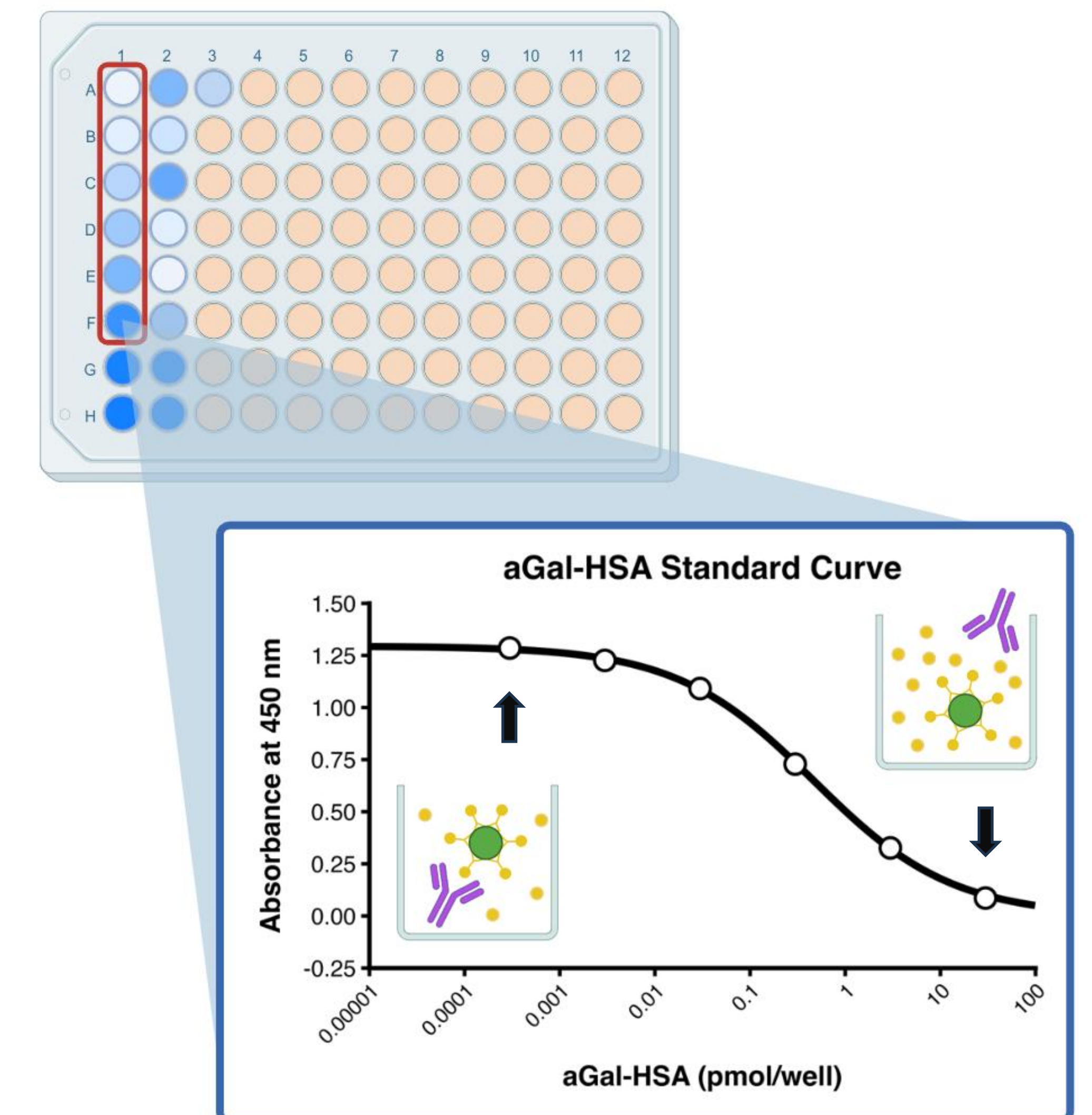
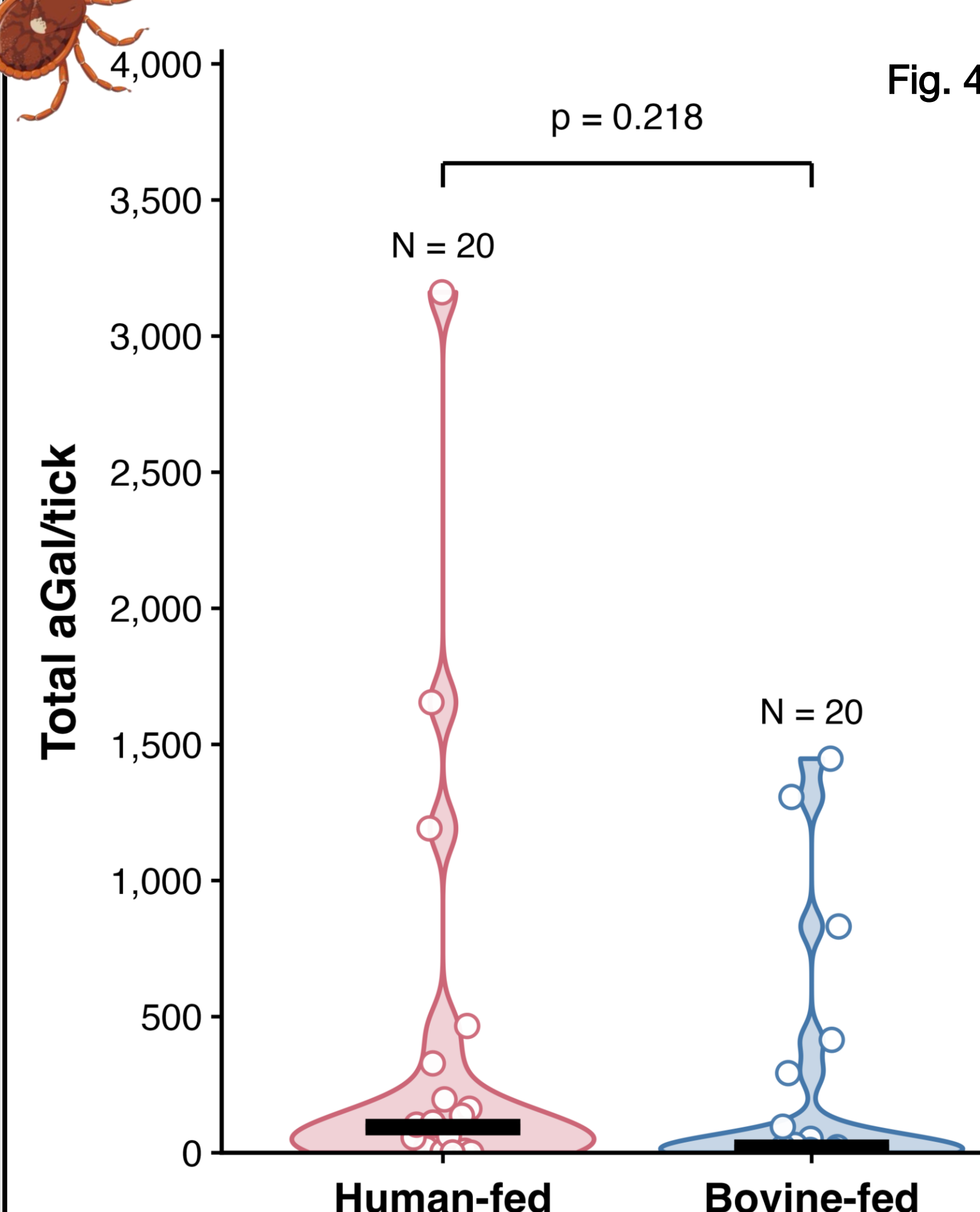


Fig. 1:  
Artificial tick feeding chamber

Fig. 2:  
Salivary glands in tick and removed salivary gland.

Fig. 3:  
Indirect ELISA with standard curve showing more color= less Alpha-gal.



- The individual carrying the **highest** alpha-gal amount belongs to the group fed with human blood.
- Ticks can carry comparable levels of alpha gal **independently** of the blood source ( $p > 0.05$ ).

Fig. 4:  
Violin plot of Alpha-gal quantity in lone star ticks fed human and bovine blood.

## Discussion

- Ticks showed more alpha-gal variation when fed **human blood** compared to bovine blood. This is of interest because the source of the variation **might** be caused by a tick genetic component.
- Further study of different locational ticks could help in solidifying the hypothesis that there is a difference in alpha-gal production. We can test this by collecting ticks from different AGS case densities. There **may** be more alpha-gal in ticks in higher AGS-prevalent areas.
- Behavioral differences were noted: South Carolina ticks congregated at the top of the feeding chambers and did not want to descend to feed, humidity was increased to alter behavior. Although unsuccessful, more feedings were attempted by females after the change.