

# Non-hemolytic and hemolytic Group B *Streptococcus*: interactions with cells *in vitro*

Olivia S Harlow<sup>1</sup>, Ethan Houskamp<sup>1</sup>, Natalie Anumolu<sup>1</sup>, Shannon Manning, PhD<sup>2</sup>, Erica Boldenow, PhD<sup>1</sup>

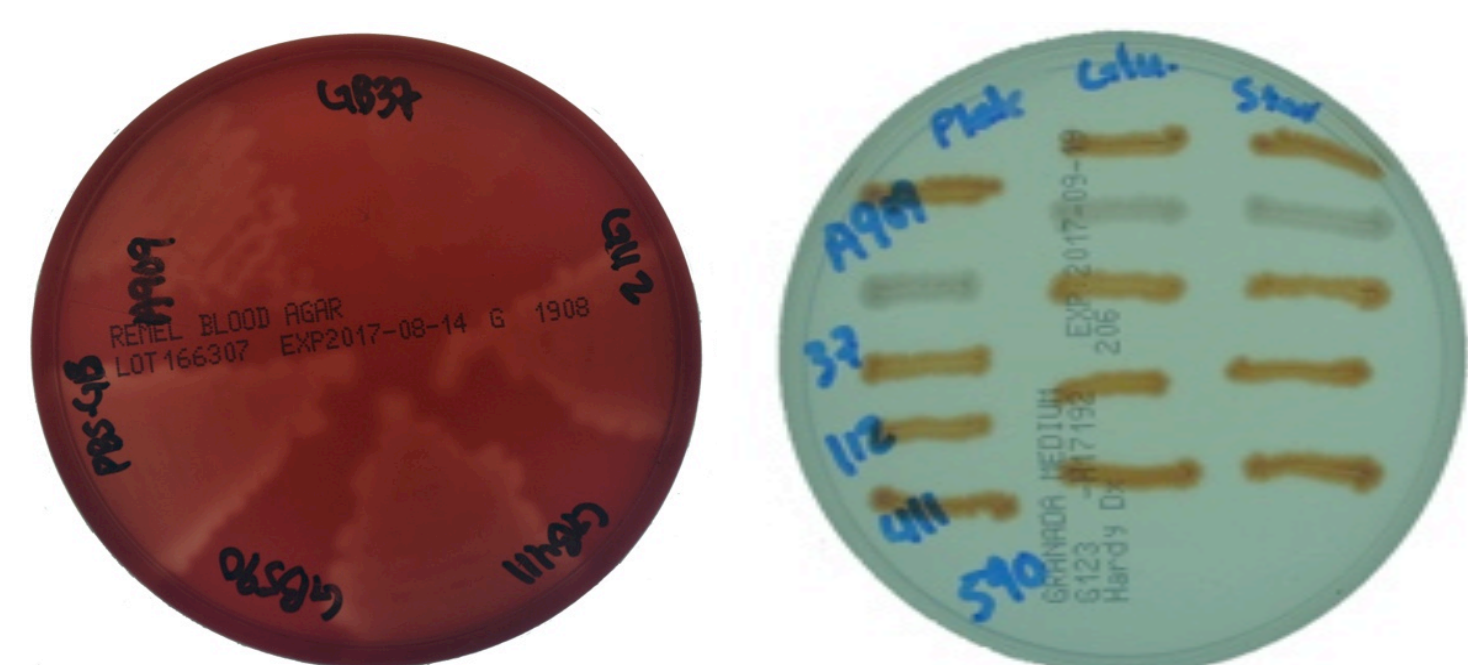
<sup>1</sup>Department of Biology, Calvin University, Grand Rapids, Michigan, <sup>2</sup>Department of Microbiology and Molecular Genetics, Michigan State University, East Lansing, MI

## Background



<https://www.rocking-mama.com/2018/01/17/baby-basics/>

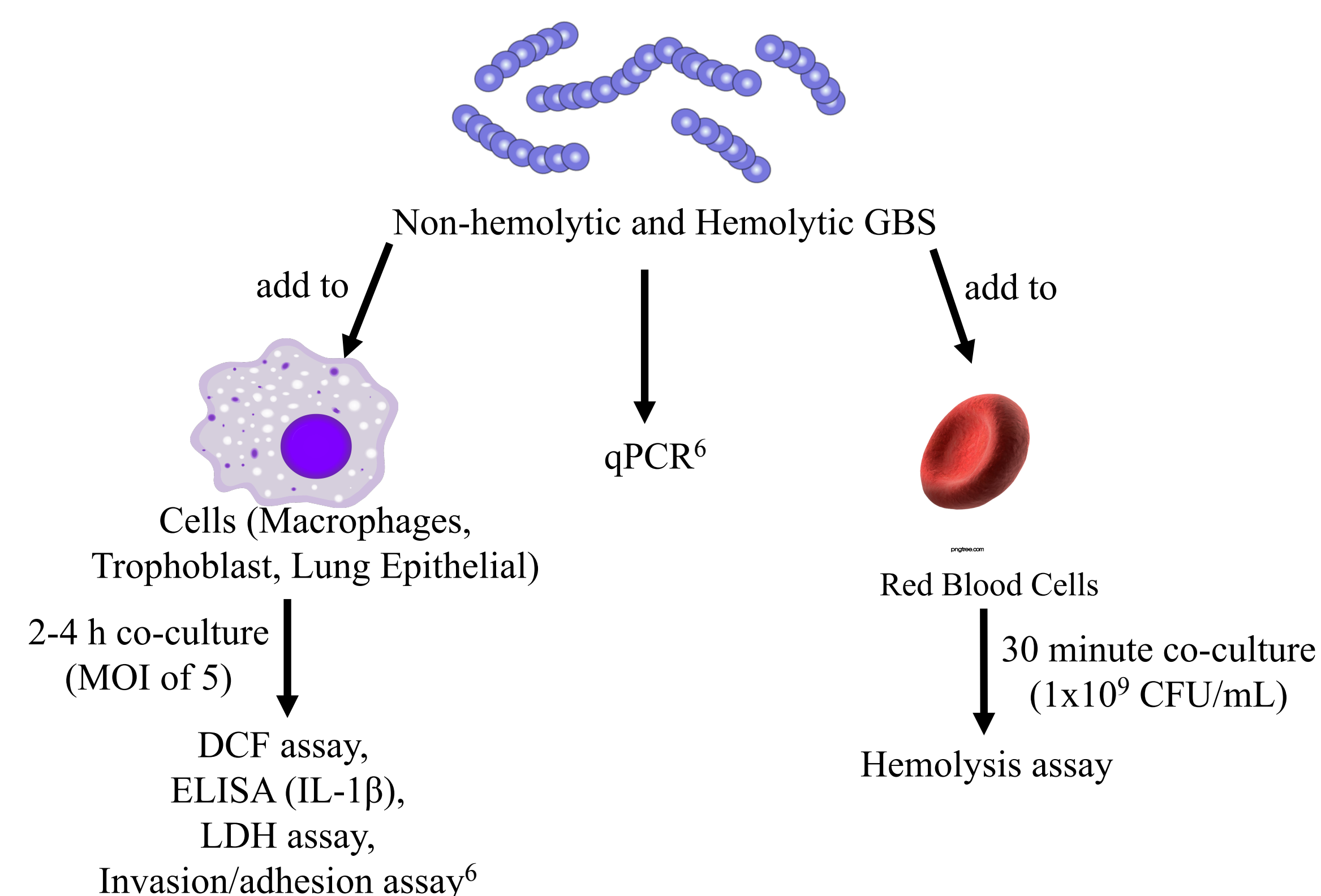
- Group B *Streptococcus* is a leading infectious cause of neonatal morbidity and mortality in the US<sup>1</sup>
- Ascending infection in the mother can cause adverse birth outcomes<sup>2,3</sup>
- GBS is defined as being beta-hemolytic, but about three percent of strains are non-hemolytic<sup>4</sup>
- Recent data suggests that non-hemolytic strains can also pose health risks to infants<sup>5</sup>
- Previously, we have seen that non-hemolytic strain GB37 displays hemolytic activity in liquid suspension



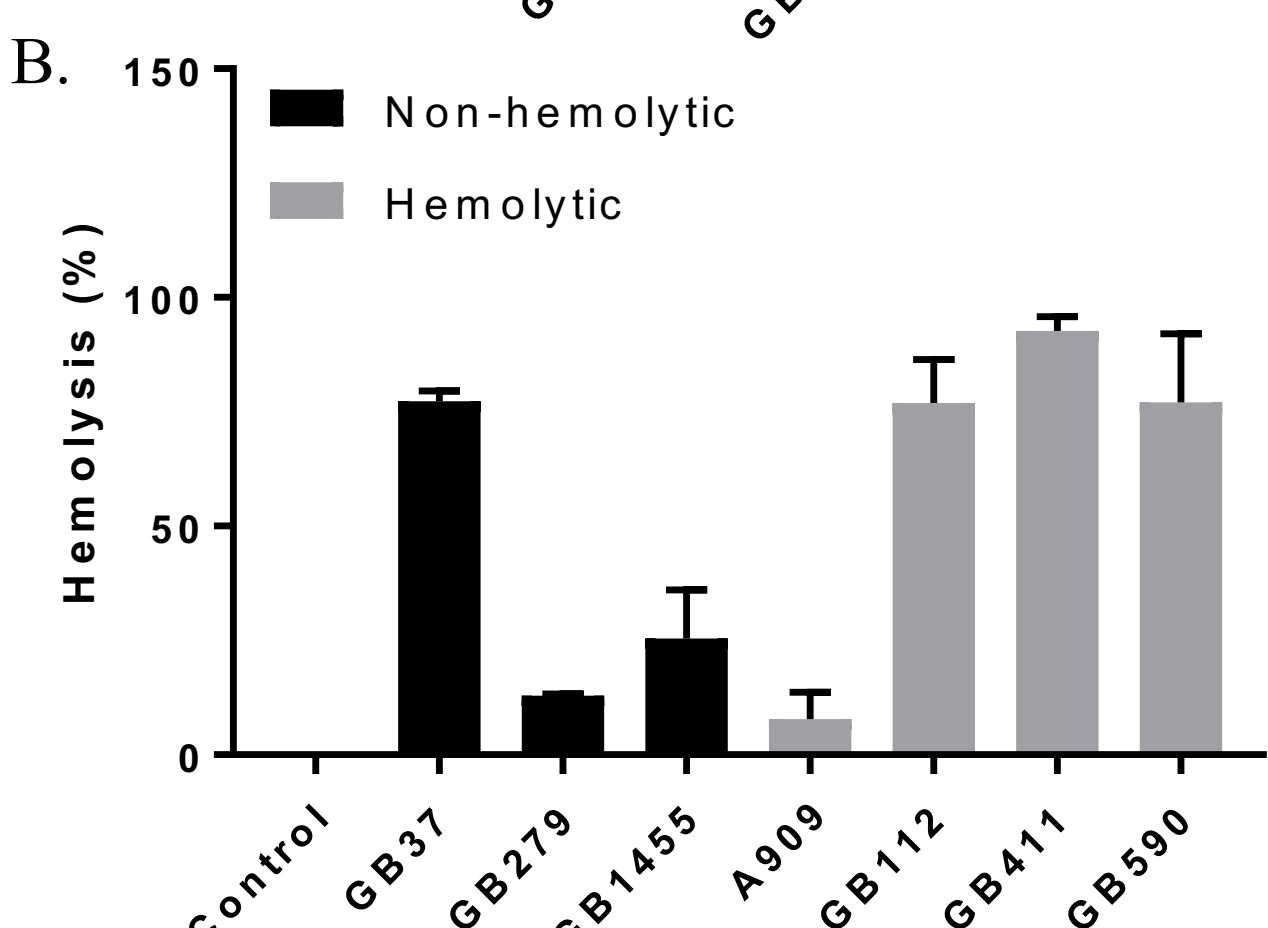
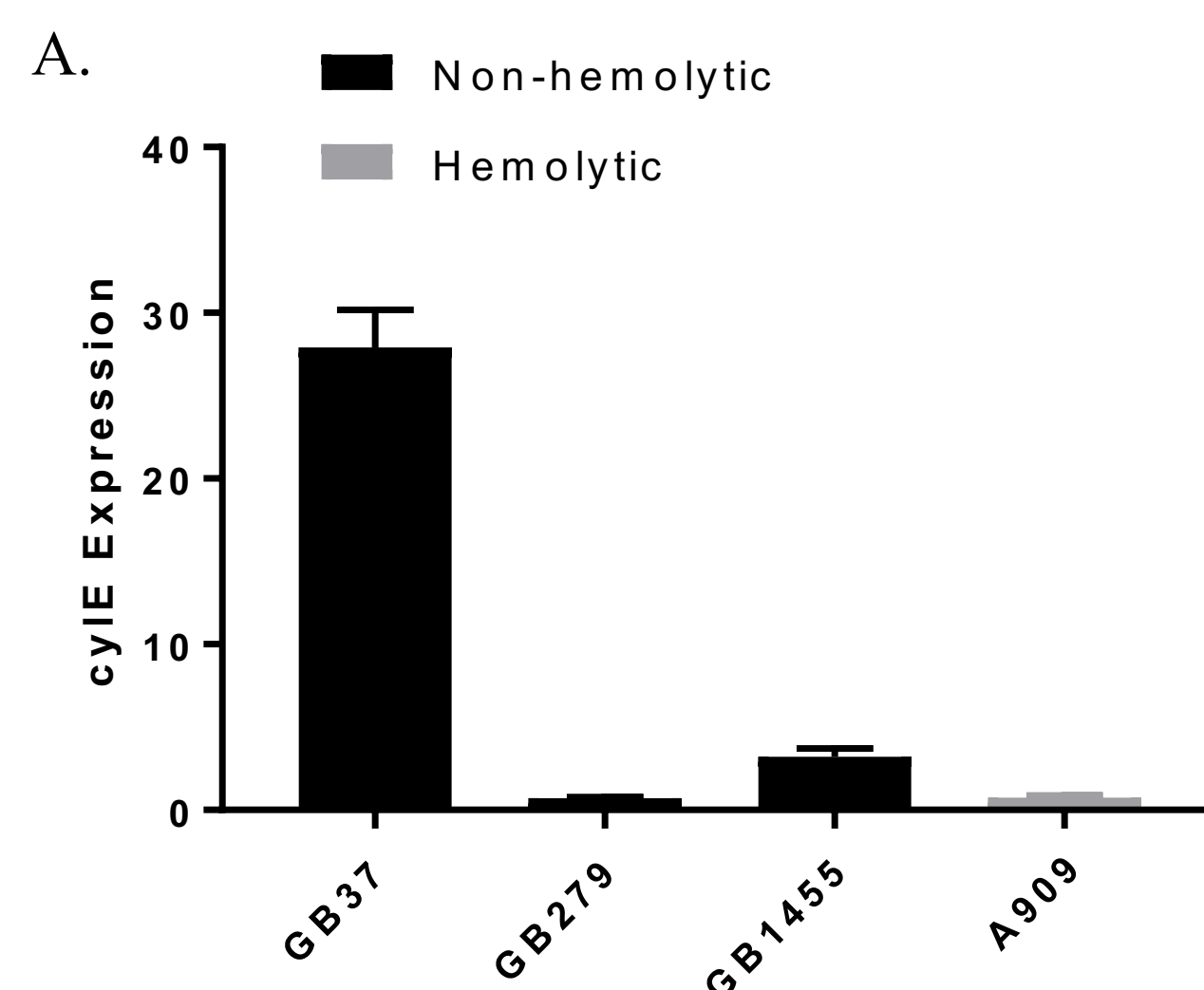
**Figure 1.** A909, GB112, GB411 & GB590 show characteristic hemolytic clearance and pigmentation whereas GB37 shows none.

- We hypothesize that non-hemolytic strains cause inflammation, oxidative stress, and invasion/adhesion in cells similarly to hemolytic strains

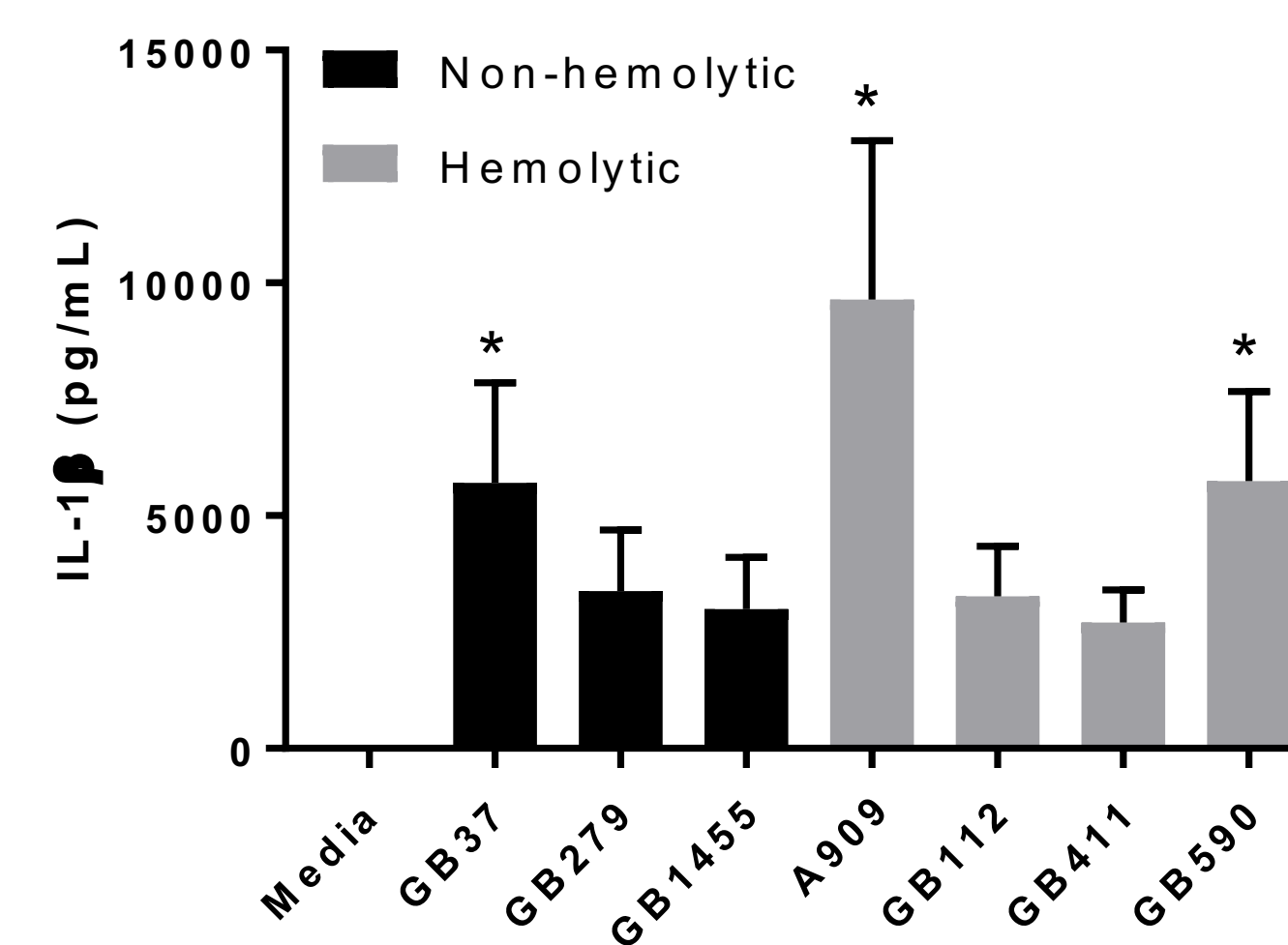
## Methods



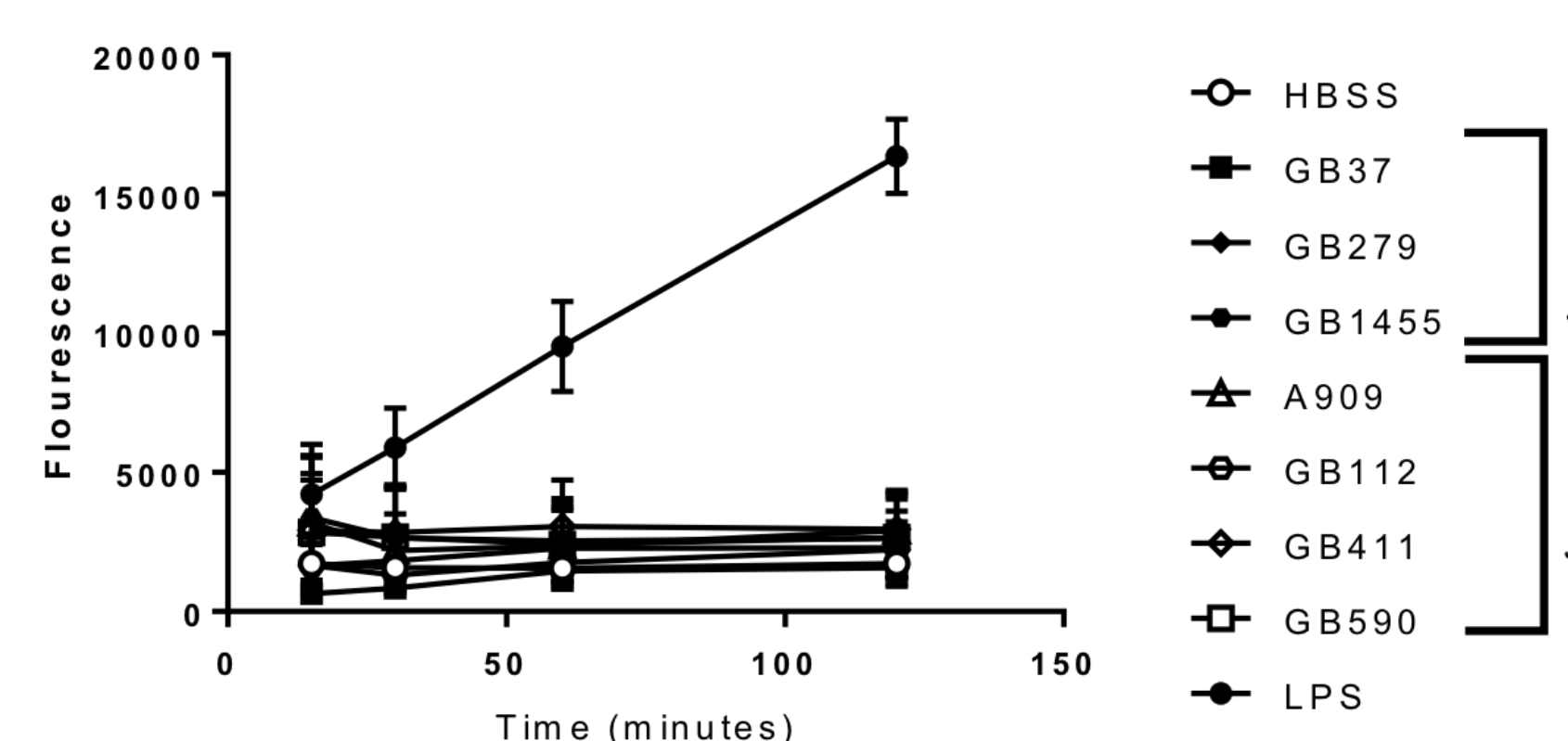
## Results



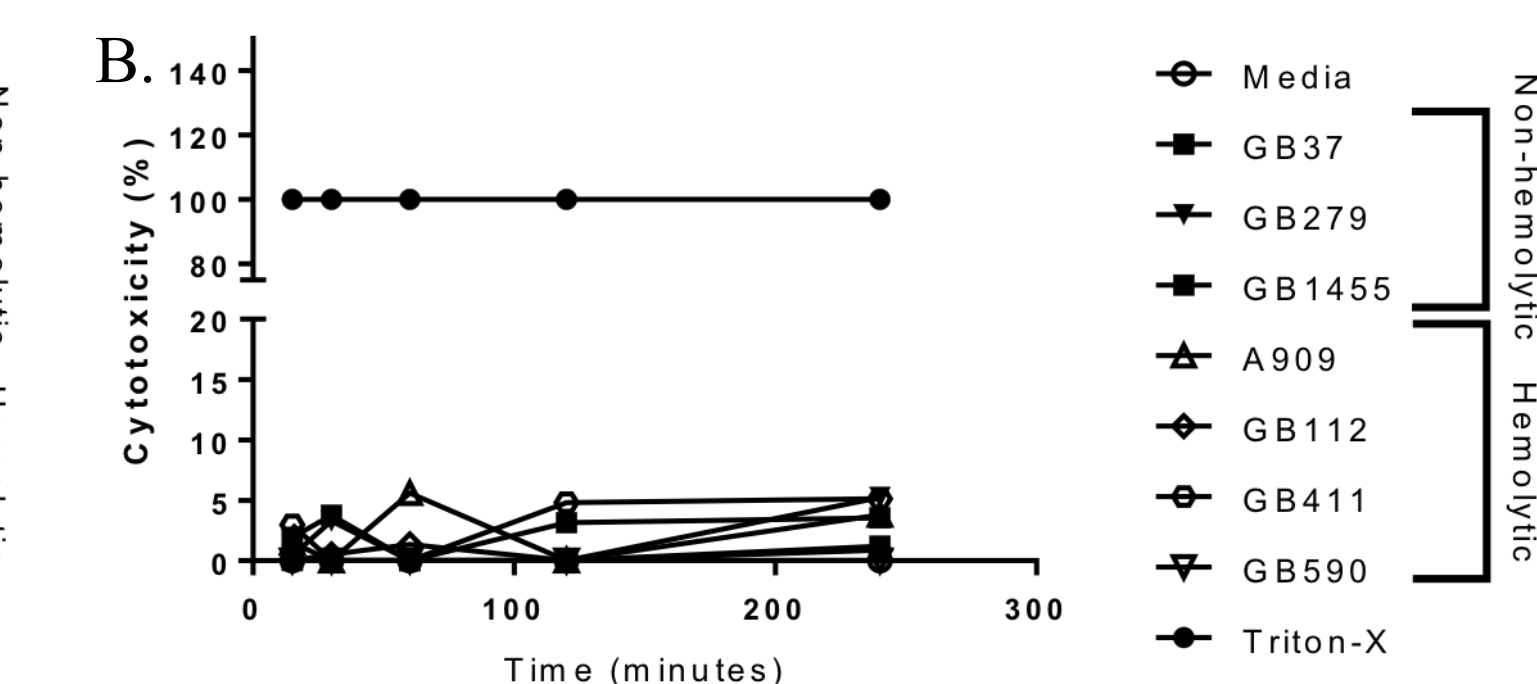
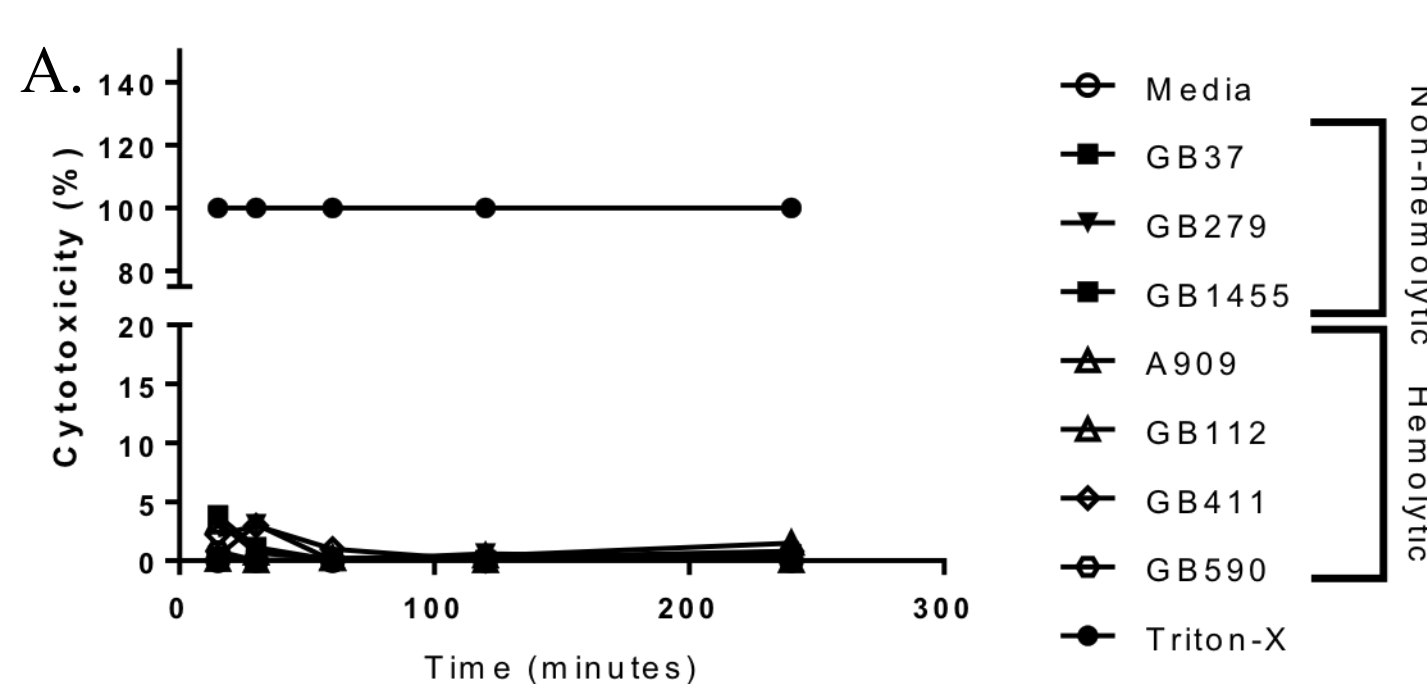
**Figure 2.** GBS hemolytic activity correlates to differential *cyIE* expression. A. GB37 upregulates *cyIE* in liquid culture. (Mean +/- SEM, N=3 for GB37, N=2 for remainder) B. GB37 has hemolytic activity in liquid culture. (Mean +/- SEM, N=2)



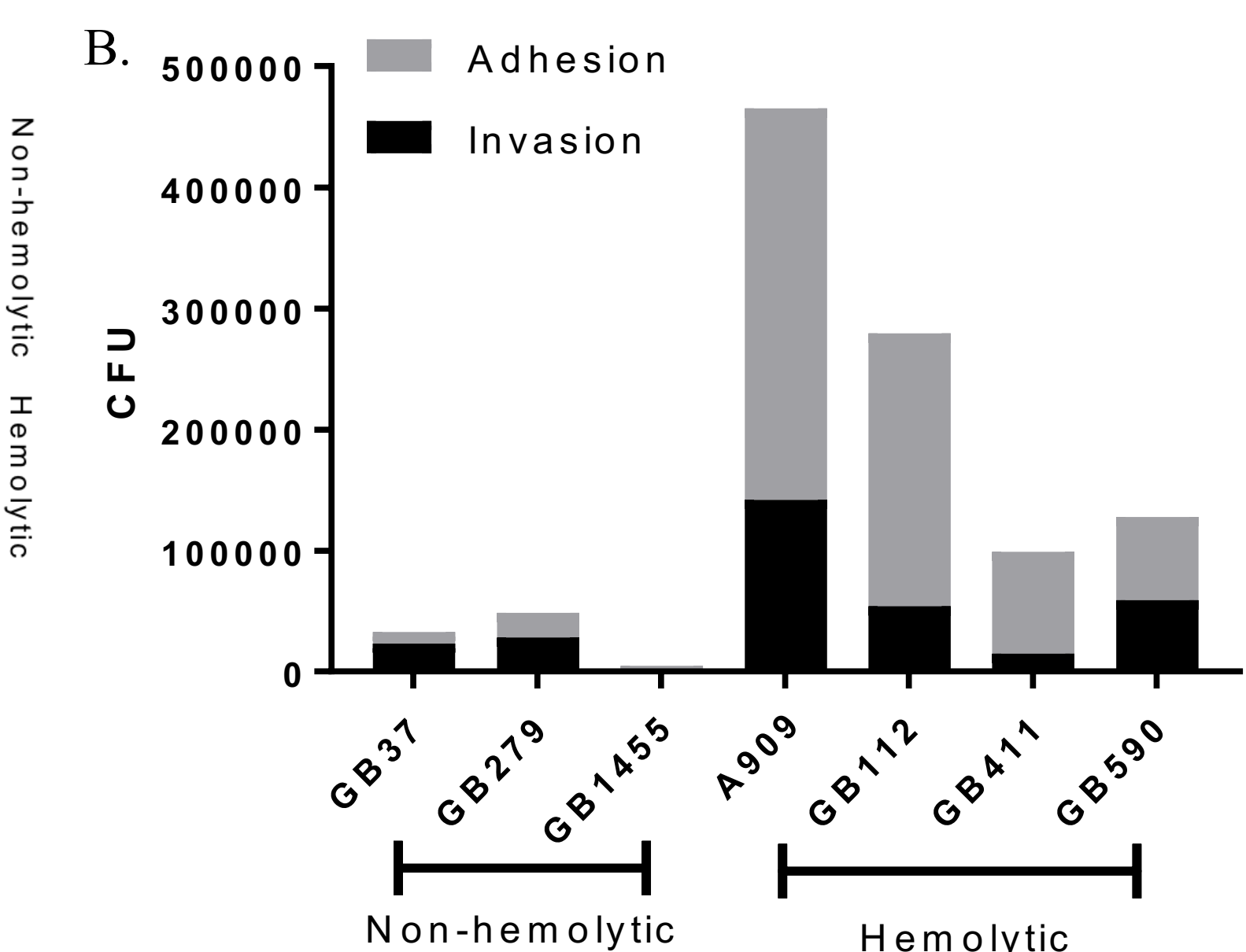
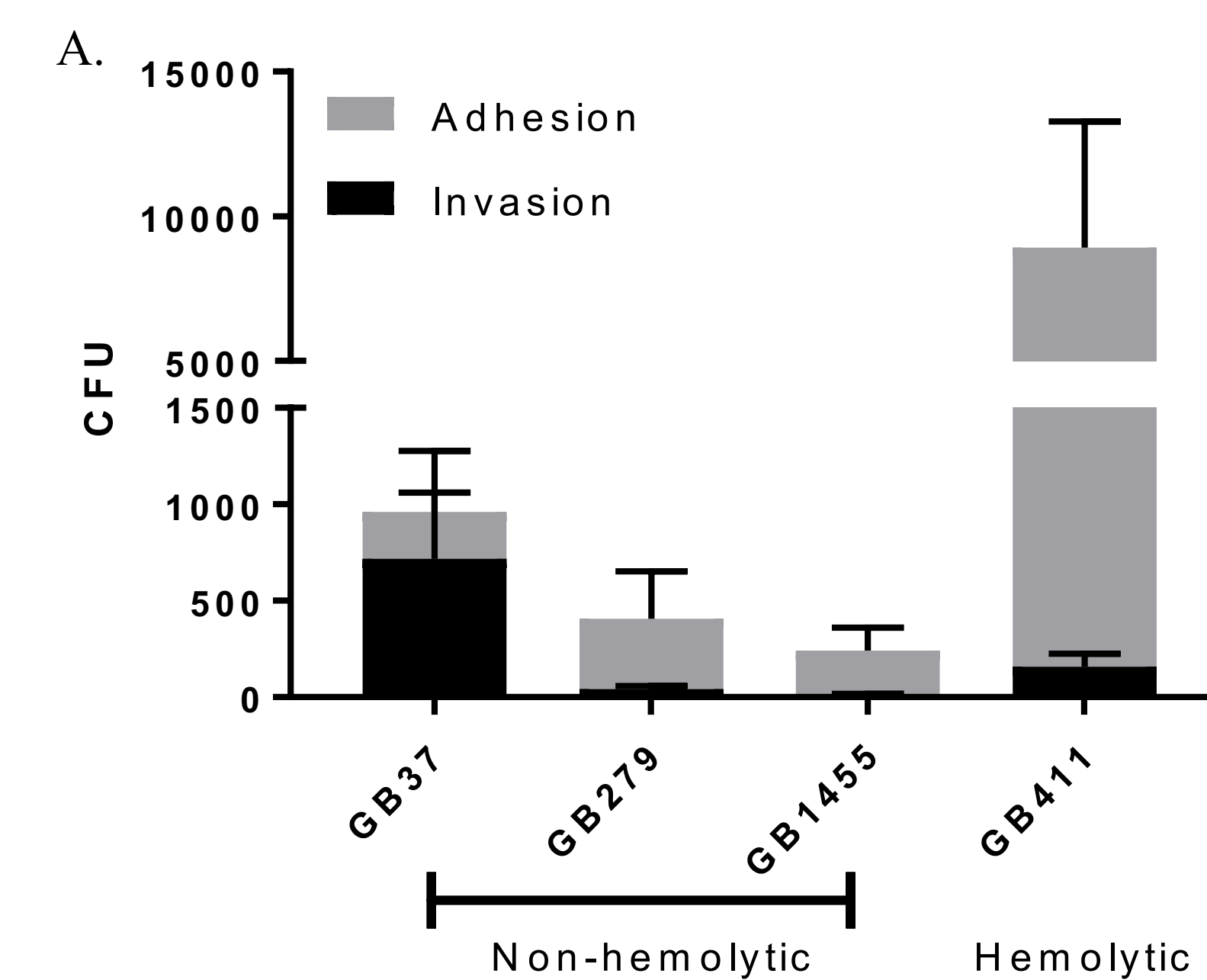
**Figure 3.** GBS causes IL-1 $\beta$  release in macrophages (THP-1) independent of hemolytic activity. (Mean +/- SEM, N=5, \*p<0.05, Friedman's test)



**Figure 4.** GBS does not cause ROS in either trophoblast cells (HTR-8) or macrophages (THP-1, data not shown). (Mean +/- SEM, N=2)



**Figure 6.** Neither trophoblast cells (A, HTR-8) nor lung epithelial cells (B, A549) exhibit cytotoxicity when co-cultured with either hemolytic or non-hemolytic GBS over a period of 4 hours. (Mean +/- SEM, N=1)



**Figure 5.** Hemolytic GBS invades and adheres to cells better than non-hemolytic GBS. A. GB411 shows more adhesion to trophoblast cells (HTR-8), whereas GB37 invades greater than other strains. (Mean +/- SEM, N=5, two-way ANOVA) B. Non-hemolytic GBS do not adhere to or invade lung epithelial cells (A549) as well as hemolytic GBS. (Mean +/- SEM, N=1)

## Conclusions

- GB37 relies on *cyIE* upregulation to cause hemolysis of RBCs in liquid culture
- IL-1 $\beta$  is released from macrophages independent of hemolytic activity
- Invasion/adhesion less prominent in non-hemolytic strains, but neither strain type causes cell death
- Because no significant ROS seems to be produced in response to GBS, ROS is likely not required as a mechanism of GBS-prompted inflammation

## Acknowledgments and References

We thank Lori Keen for her outstanding managerial support, and Dr. Shannon Manning for our GBS strains. We also thank Calvin University and the Wierda family for supporting this research.

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