

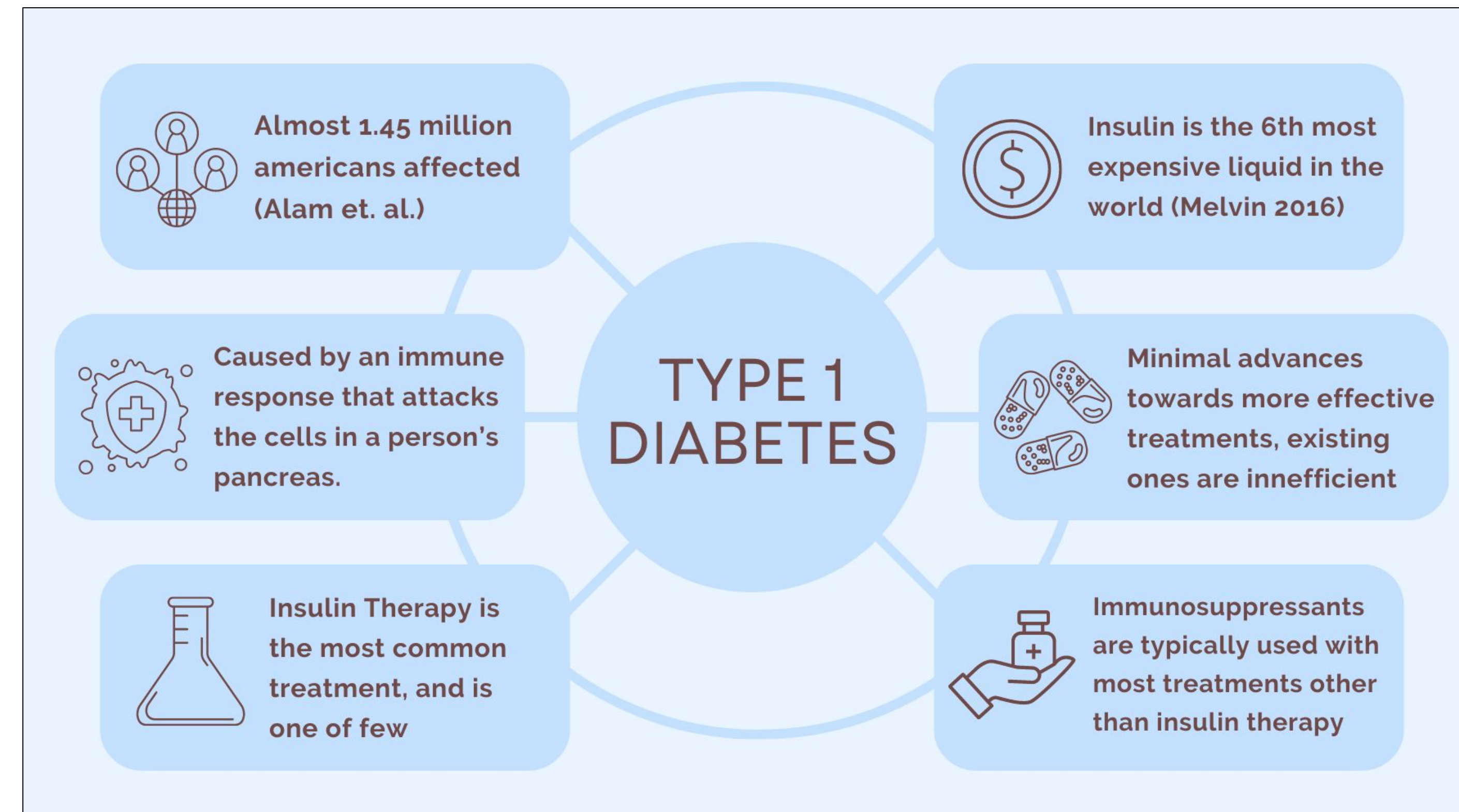


Efficacy of Gene Editing Without Immunosuppressants As a Treatment for Type 1 Diabetes



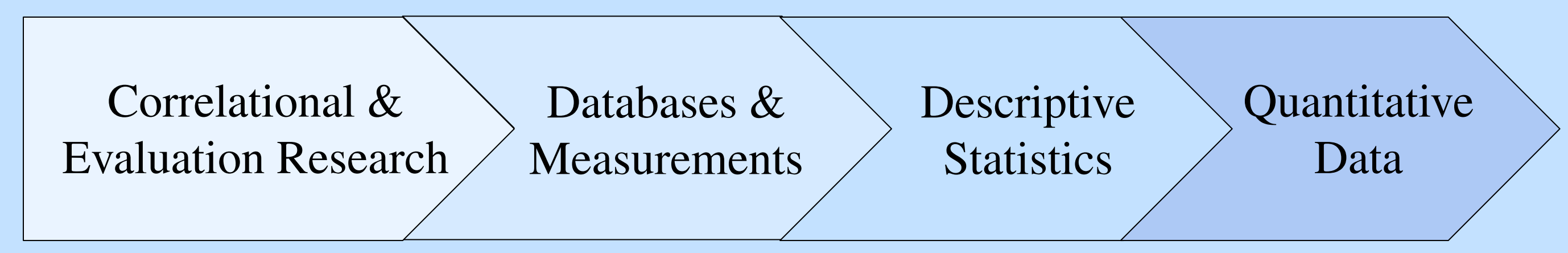
Lucy Griffin
Palo Alto High School, Student

INTRODUCTION



RESEARCH METHODOLOGIES

- Databases such as Pubmed, Jstor, Cell Stem Cell, and Google Scholar were used to gather studies containing meaningful data.
- Data such as how long a treatment lasts and the number of hyperglycemic events were collected, and calculated to find the average number of weeks a treatment lasts
- Data was collected from both studies that used Immunosuppressants and studies that did not use them



DATA AND FINDINGS

- Collected data from 5 studies, including 6 trials in rodents/models.
- On average, treatments without immunosuppressants (Group 1) lasted ≈ 1.5 weeks longer than ones with immunosuppressants (Group 2).
- High variability within both groups \rightarrow Group 1 ranged from a treatments lasting 3 weeks to treatments lasting 17 weeks. Group 2 ranged from 2 - 8.57 weeks.
- Minimal studies using immunosuppressants were available and included data, which resulted in only 2 studies in Group 2, but 4 in Group 1.
 - Caused skewed data favoring Group 1, when it should have favored Group 2 because of the nature of immunosuppressants

CONCLUSIONS AND ANALYSIS

➤ Differences between Group 1 & Group 2

- Calculated based on the average number of weeks the subjects blood sugar is below 200 mg/dL.
- Group 1 averaged 1.5 weeks longer than Group 2

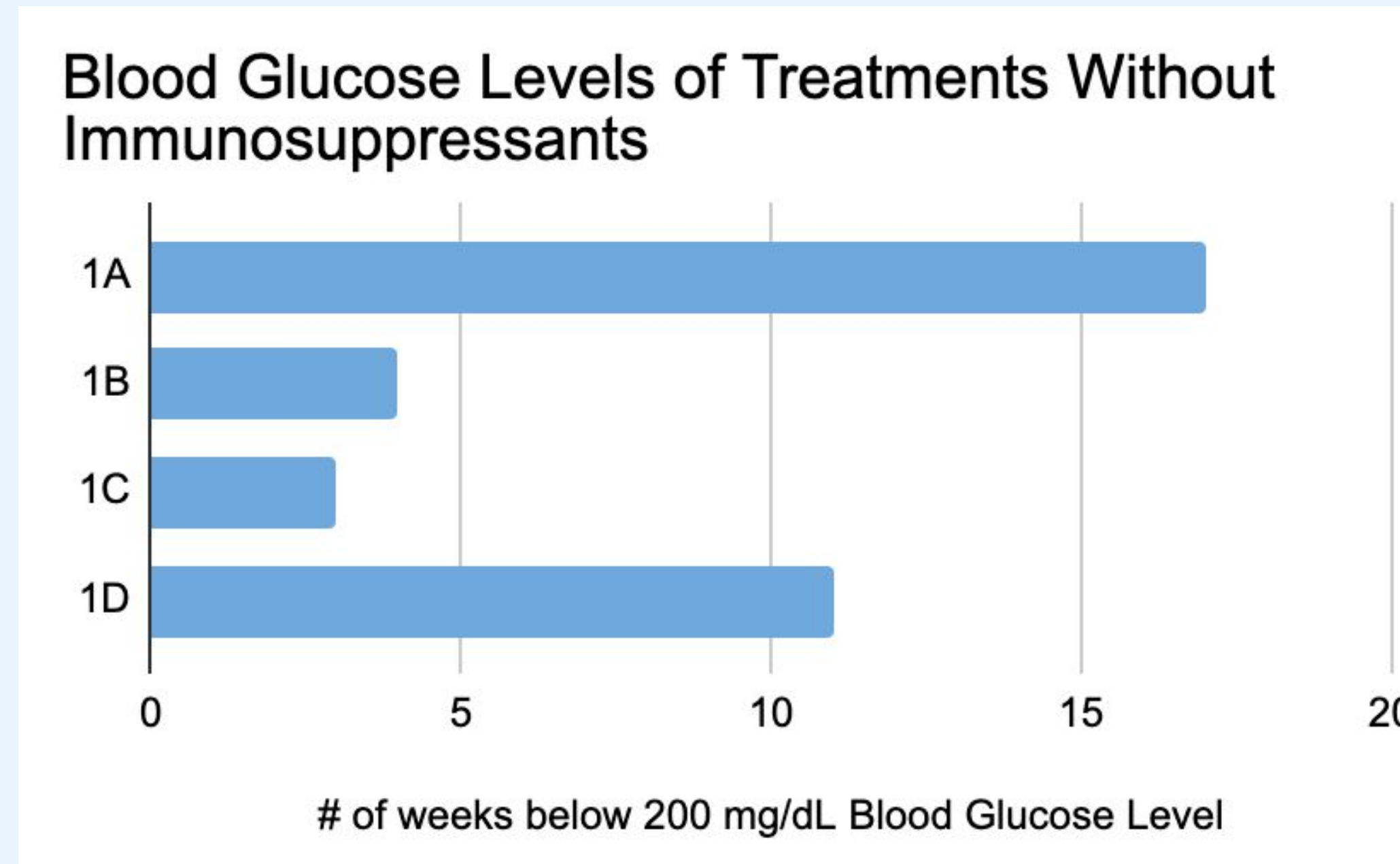


Figure 1: In data gathered from 4 trials, this chart depicts the number of weeks a treatment without immunosuppressants lasts in a healthy blood glucose range

- Group 1 consisted of treatments without immunosuppressants
- Group 2 consisted of treatments with immunosuppressants

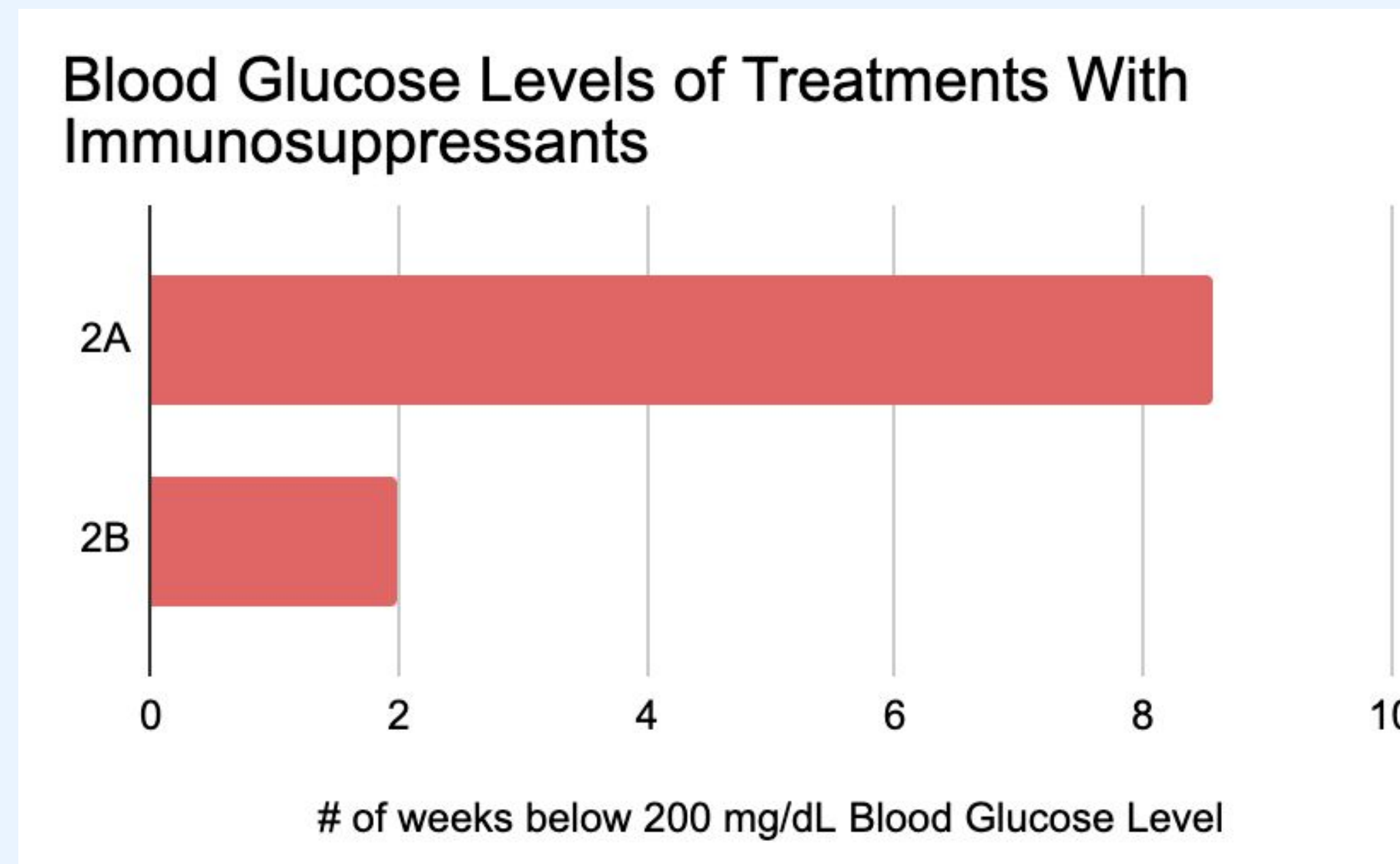


Figure 2: In data gathered from 2 trials, this chart depicts the number of weeks a treatment with immunosuppressants lasts in a healthy blood glucose range

➤ Conclusion/Expected Results

- Due to the nature of immunosuppressants, the treatments that included them should have lasted longer
 - Immunosuppressants decrease the body's immune response, and can prevent the body from rejecting bone marrow, organ, or cell transplants (National Cancer Institute).
- In the case of Type 1 Diabetes, immunosuppressants should have delayed the rejection/disposal of implanted islet cells
 - Hypothetically, this would give more time for islet cells to thrive and produce insulin, resulting in an extended number of weeks in a healthy blood sugar range
- For an unknown reason, the the data gathered from studies using immunosuppressants showed those treatments did not last as long as other treatments without immunosuppressants

IMPLICATIONS AND NEXT STEPS

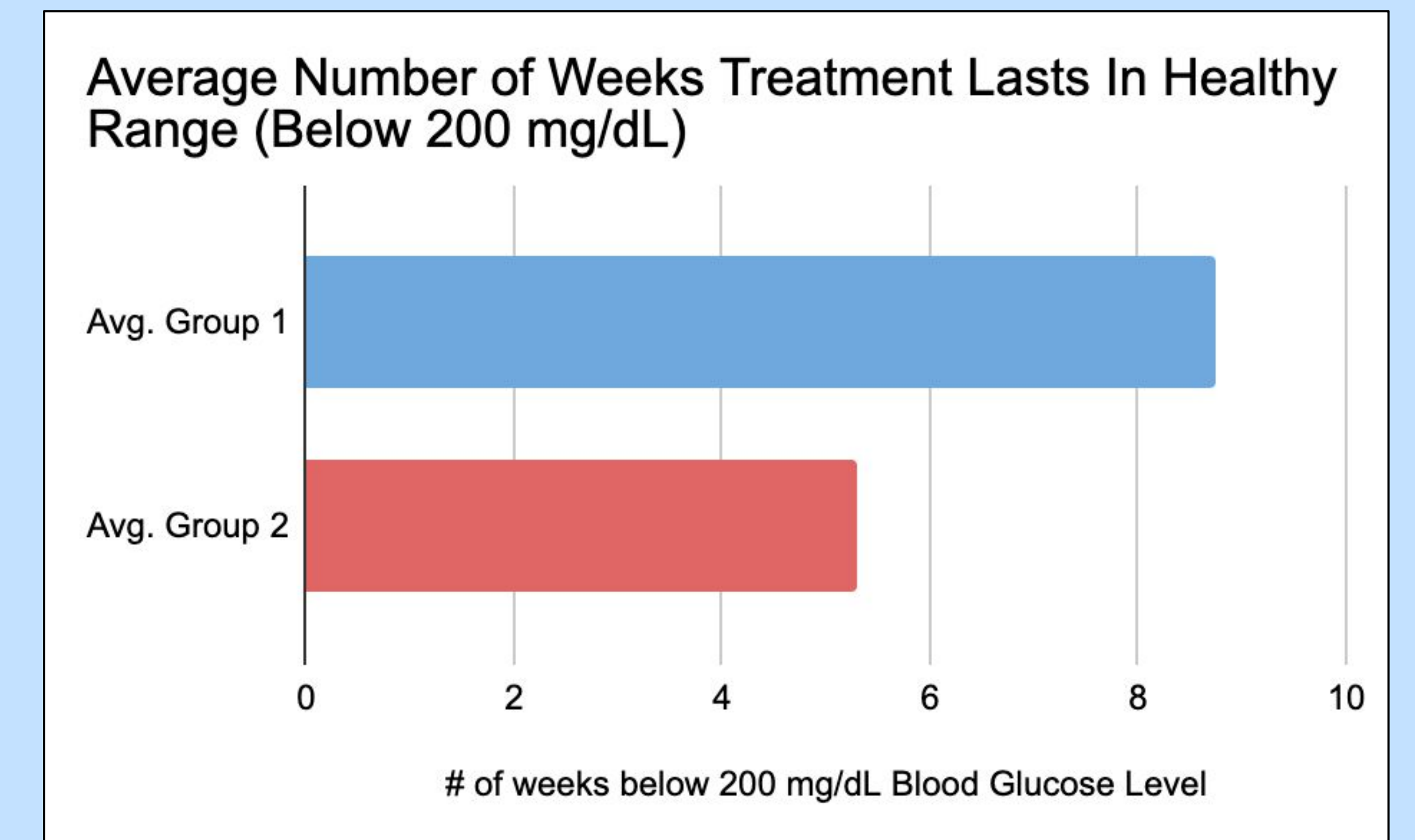


Figure 3: Graph showing the average number of weeks a treatment without immunosuppressants lasts (G1), compared the the average number of weeks a treatment with immunosuppressants lasts (G2).

➤ Next Steps:

- Increased research and funding for both treatments with and without immunosuppressants to determine effectiveness of the two.
- Development of targeted immunosuppressants, specifically ones that only suppress the part that causes an attack on the pancreatic cells

ACKNOWLEDGEMENTS / REFERENCES

Special thanks to Ms. McDaniel and the AAR Program for helping make this project possible.

Works Cited:

