

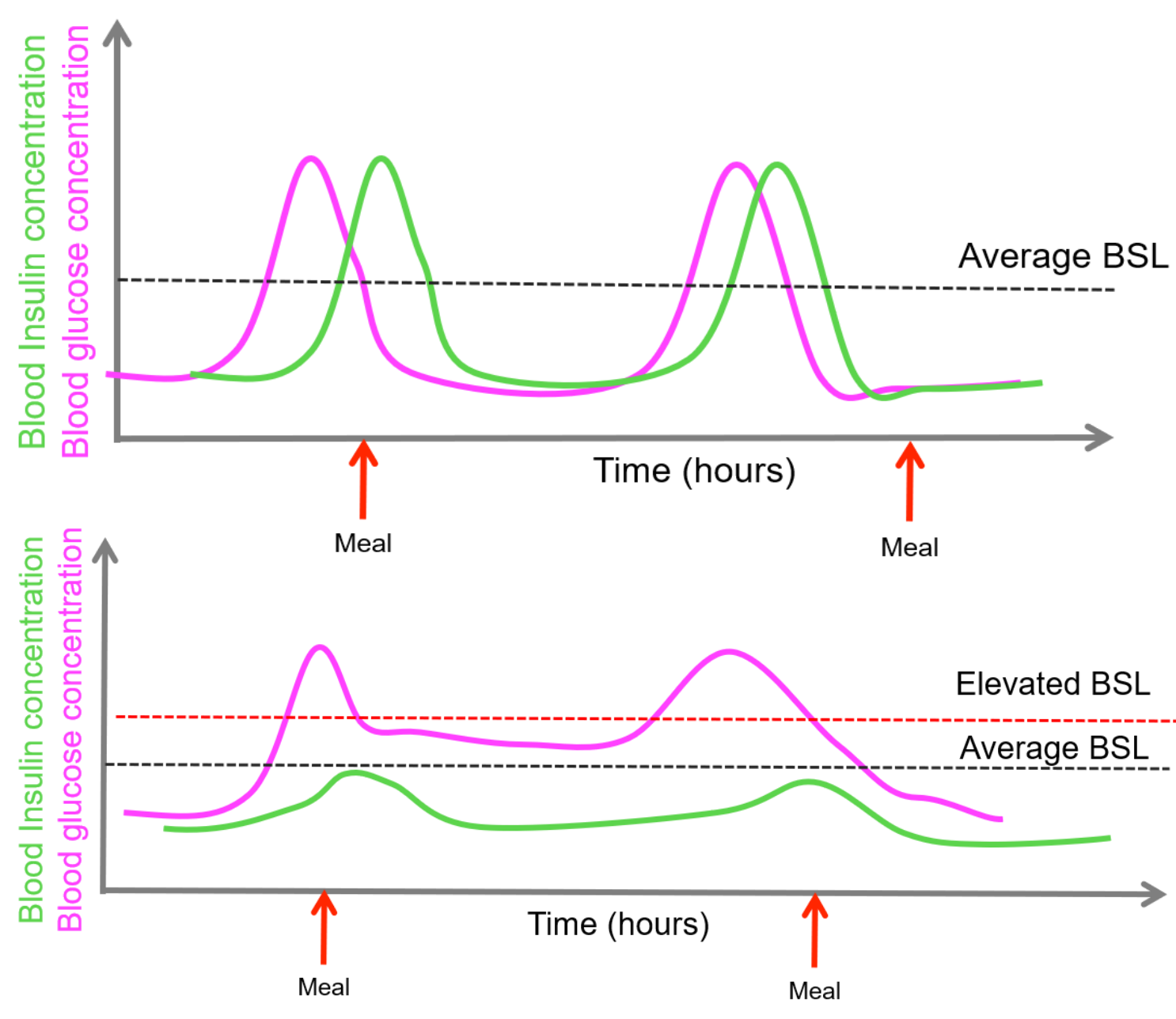
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Introduction & Aim



Current Solution

Insulin Injection

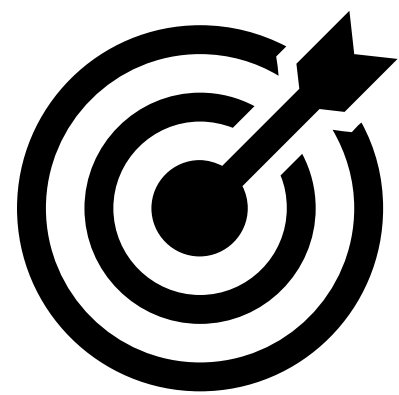


- Expensive
- Skin infection
- Severe hypoglycemia
- Inconvenient

Insulin Pump

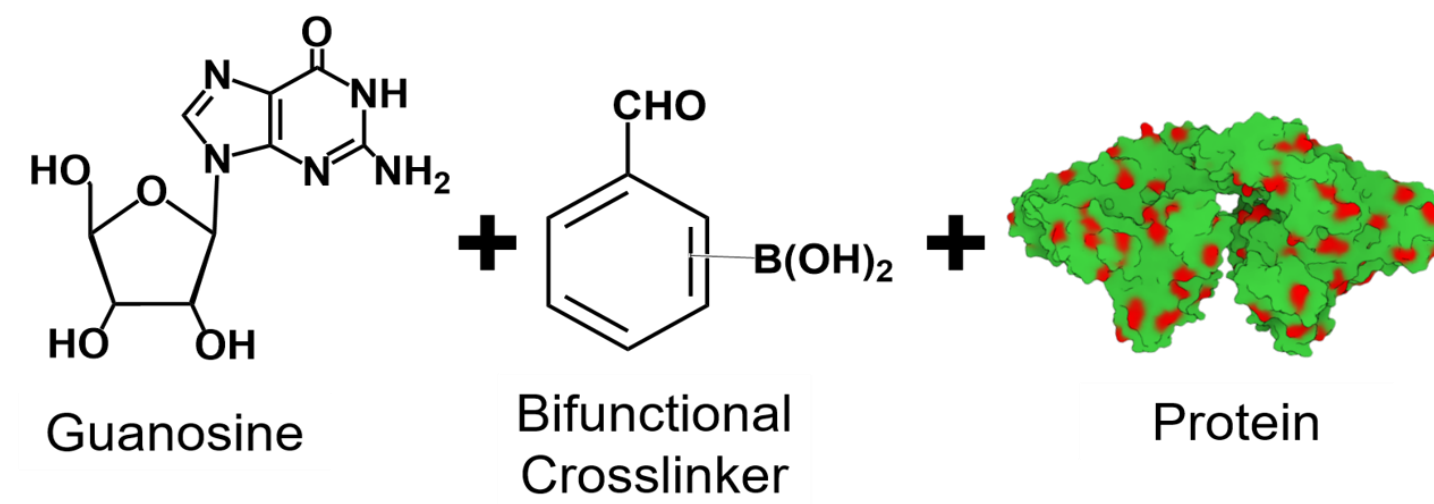


Aim



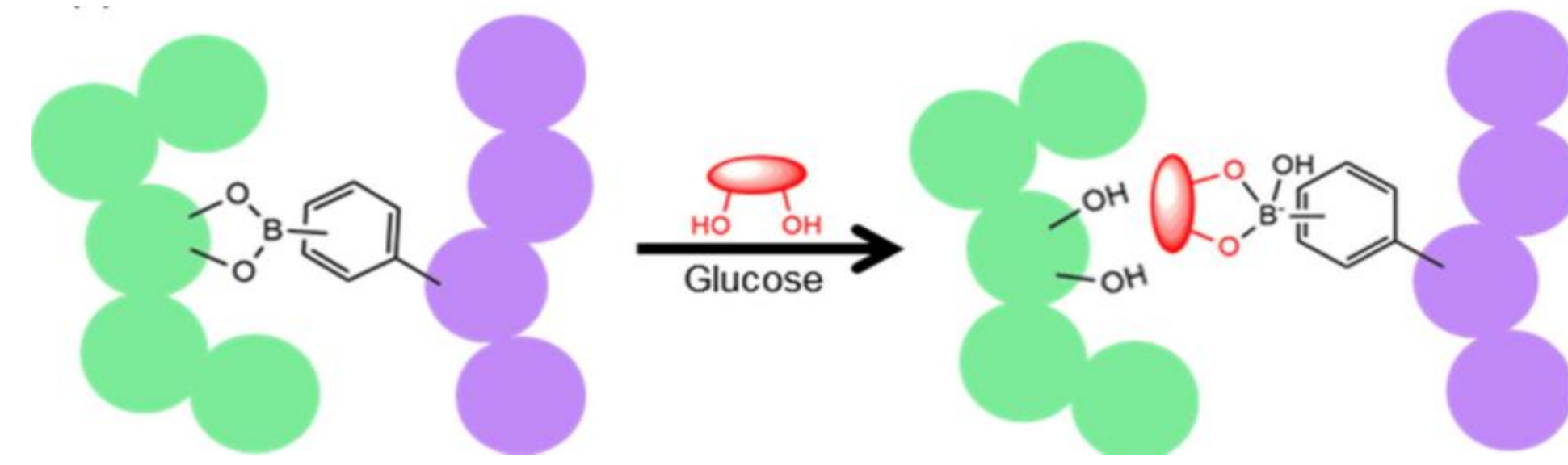
To design a glucose-responsive biomaterial capable of self-regulated insulin release, mimicking the natural feedback-controlled function of the pancreas.

Materials & Methods

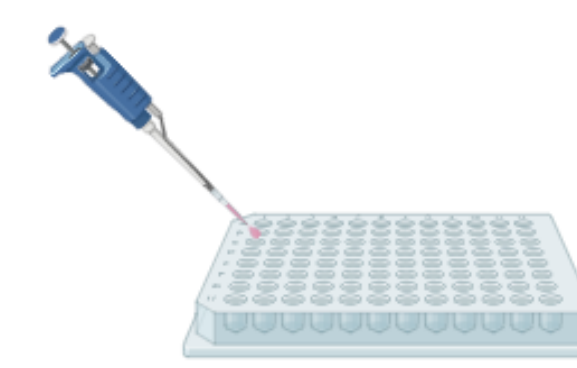


- Supramolecular Interactions
- Schiff base linkage
- Boronate ester

Mechanism

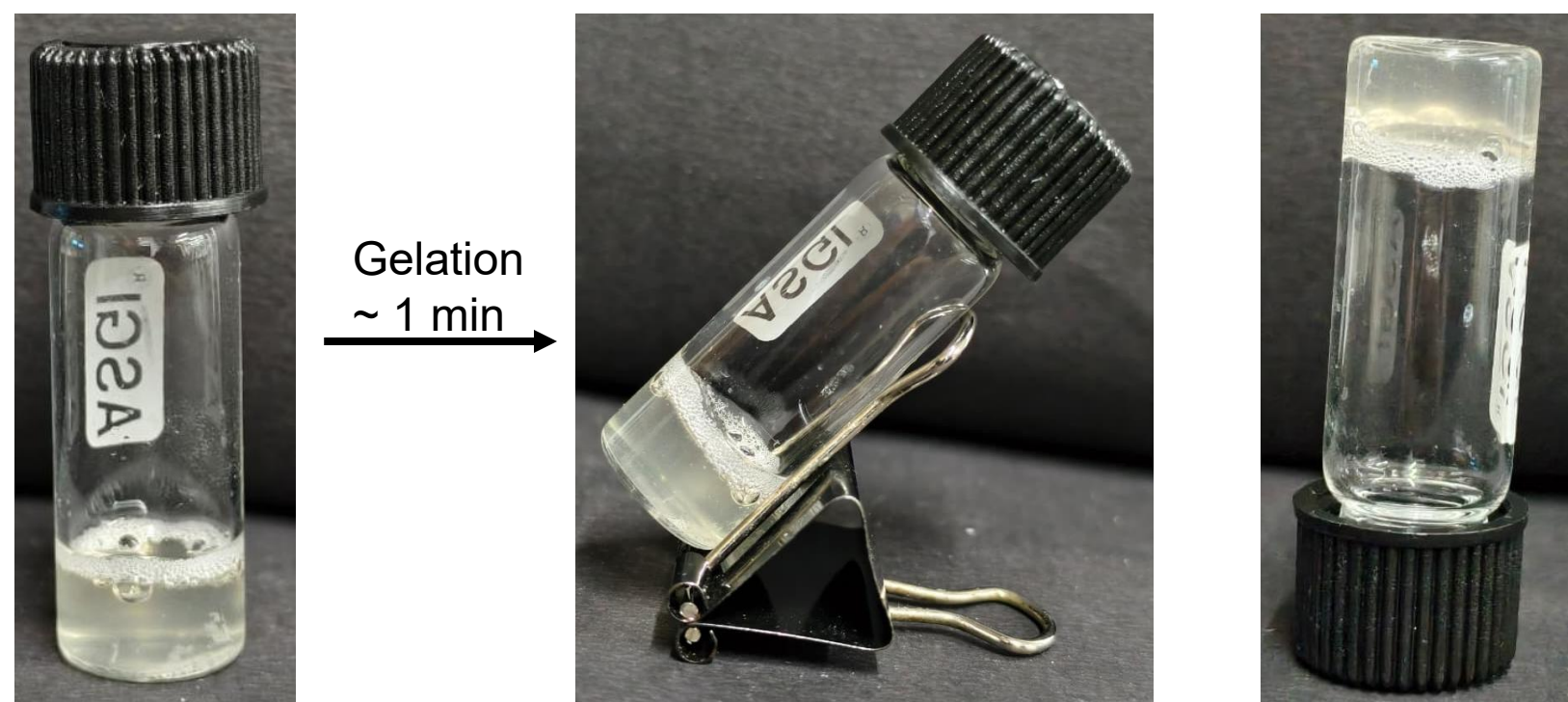


In Vitro and In Vivo Studies

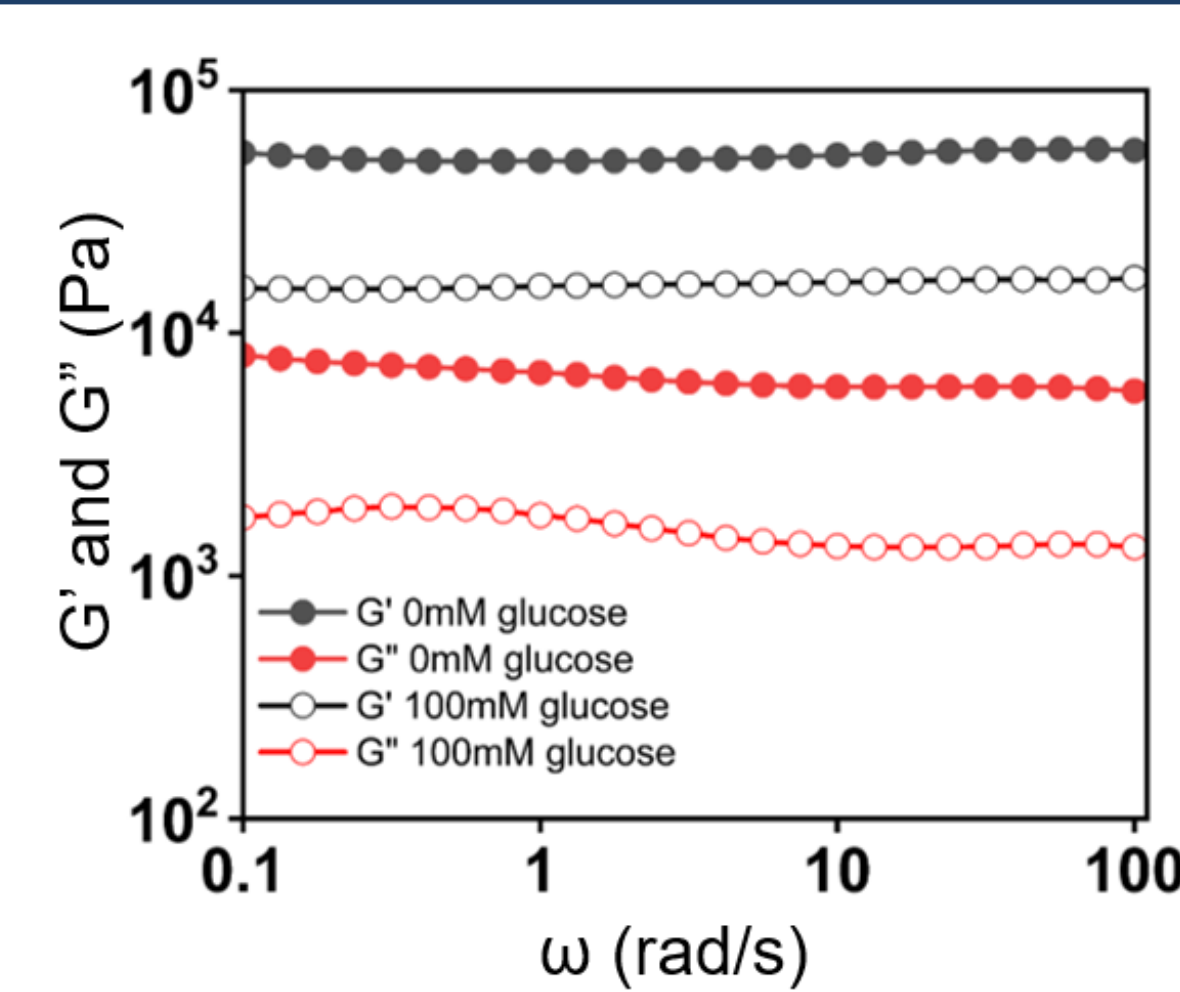
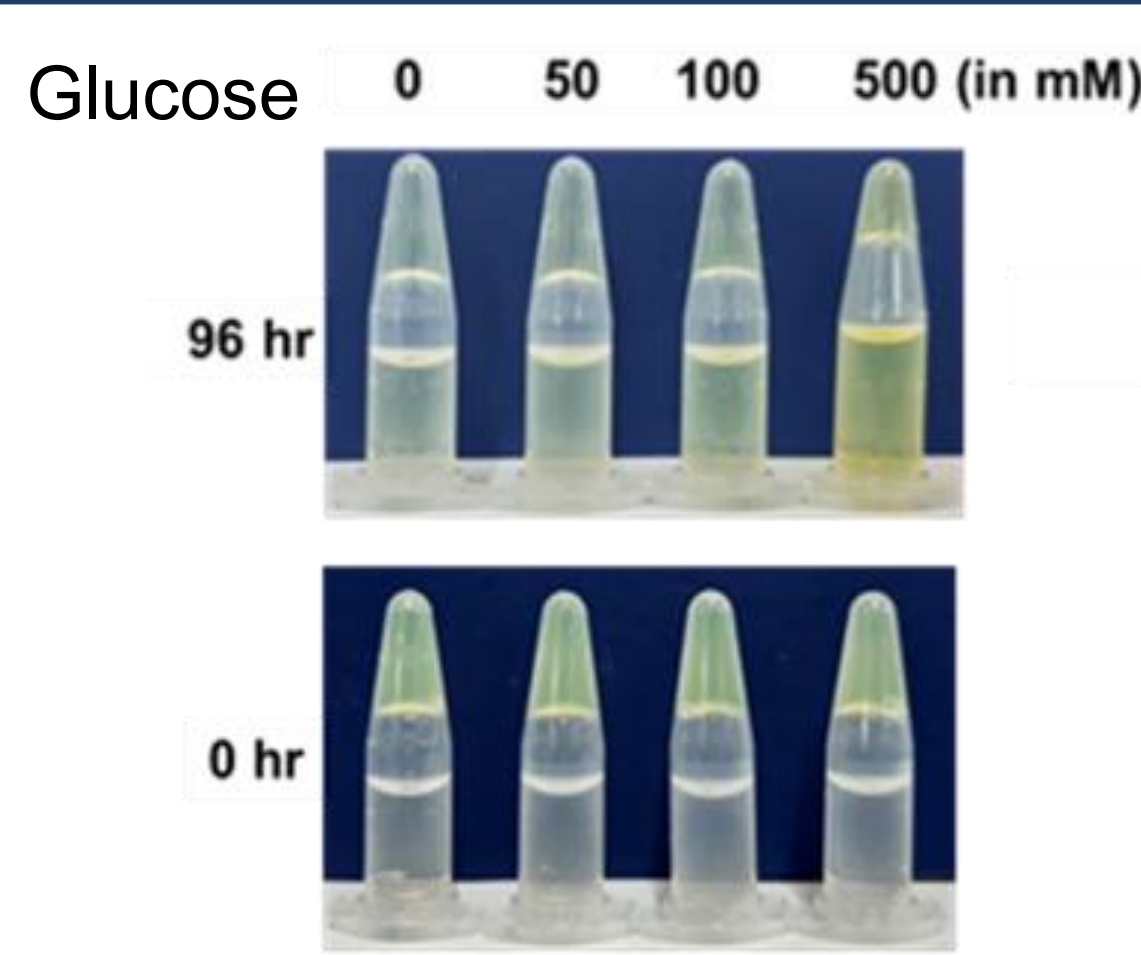
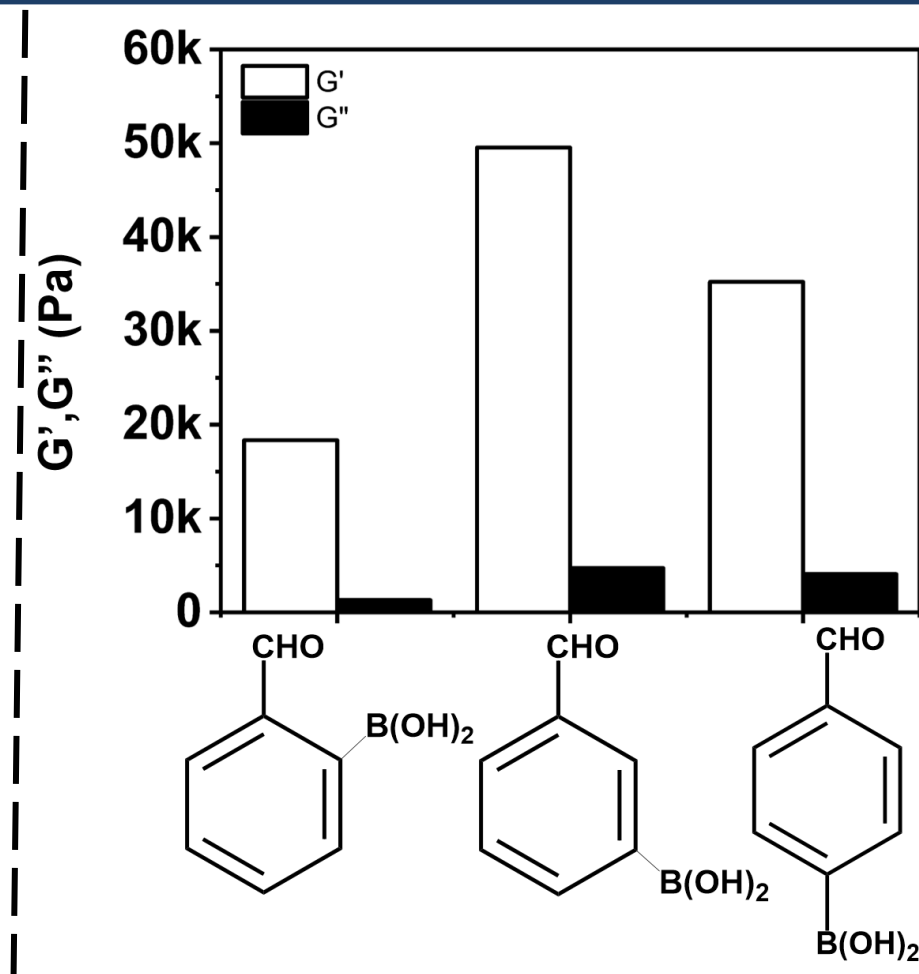
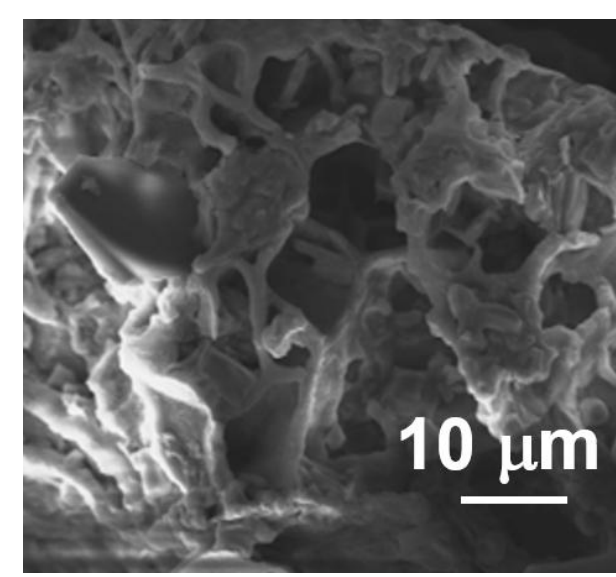


Results and Discussion

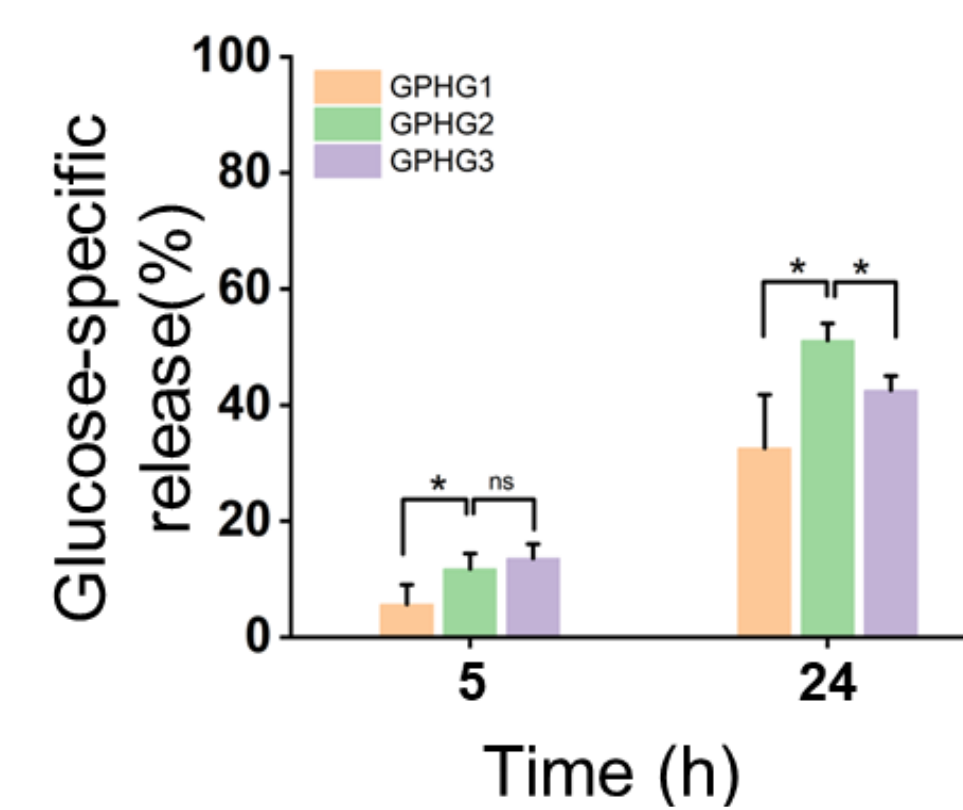
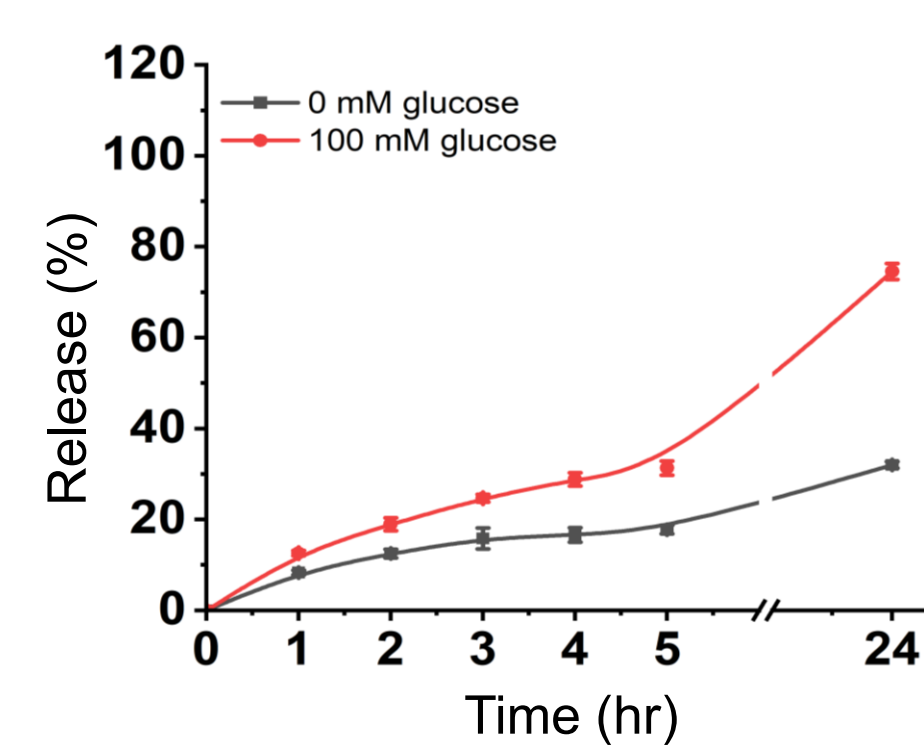
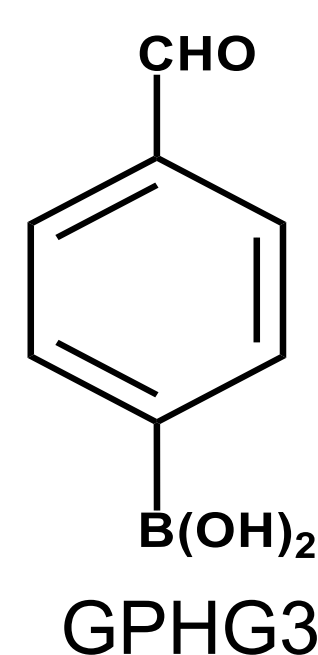
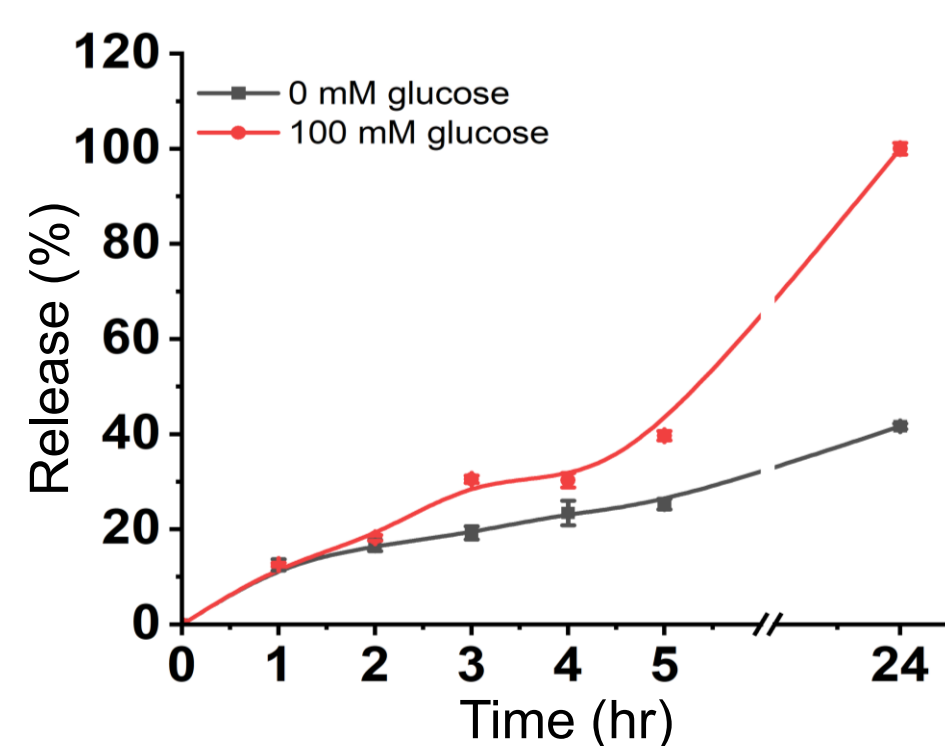
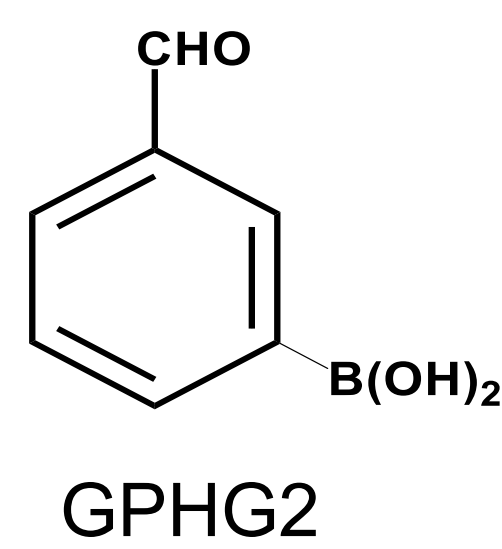
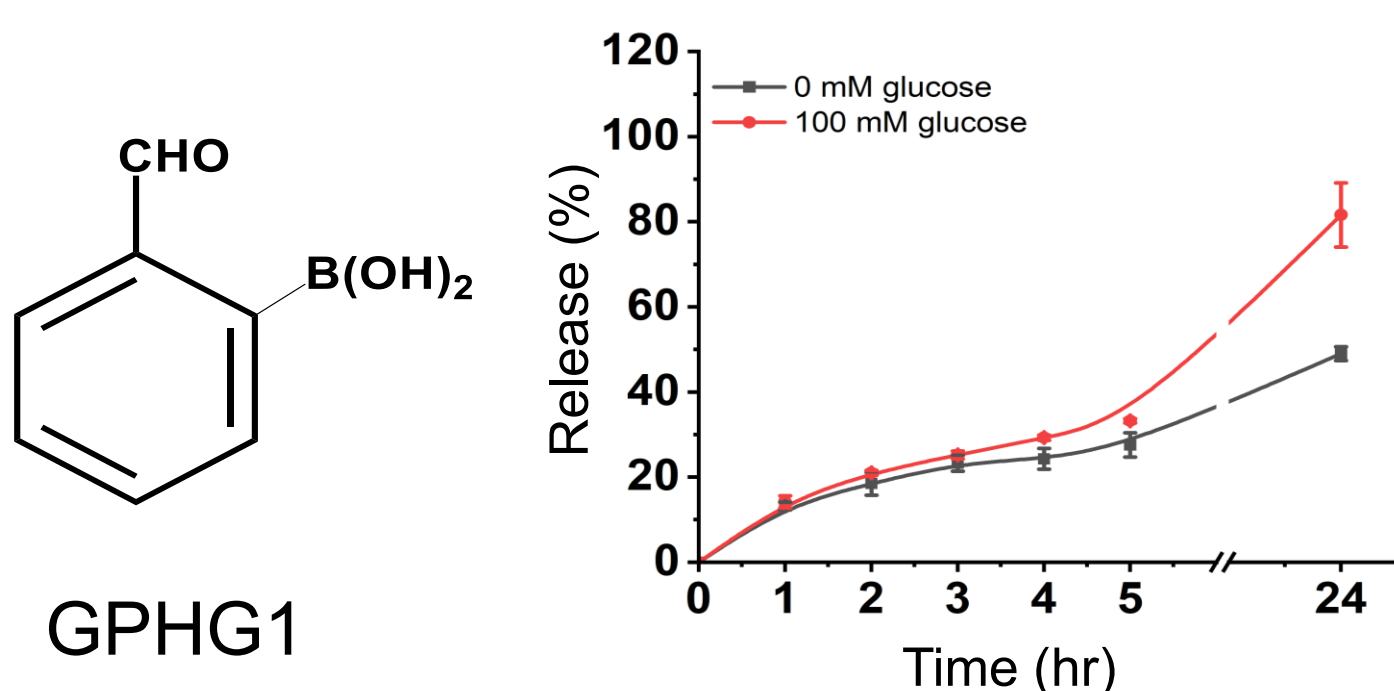
1. Hydrogel Formation



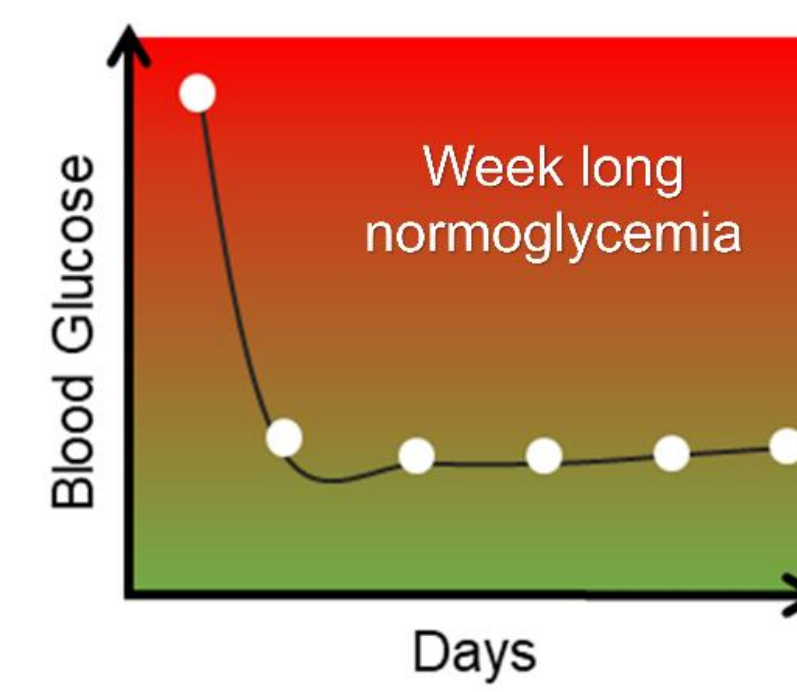
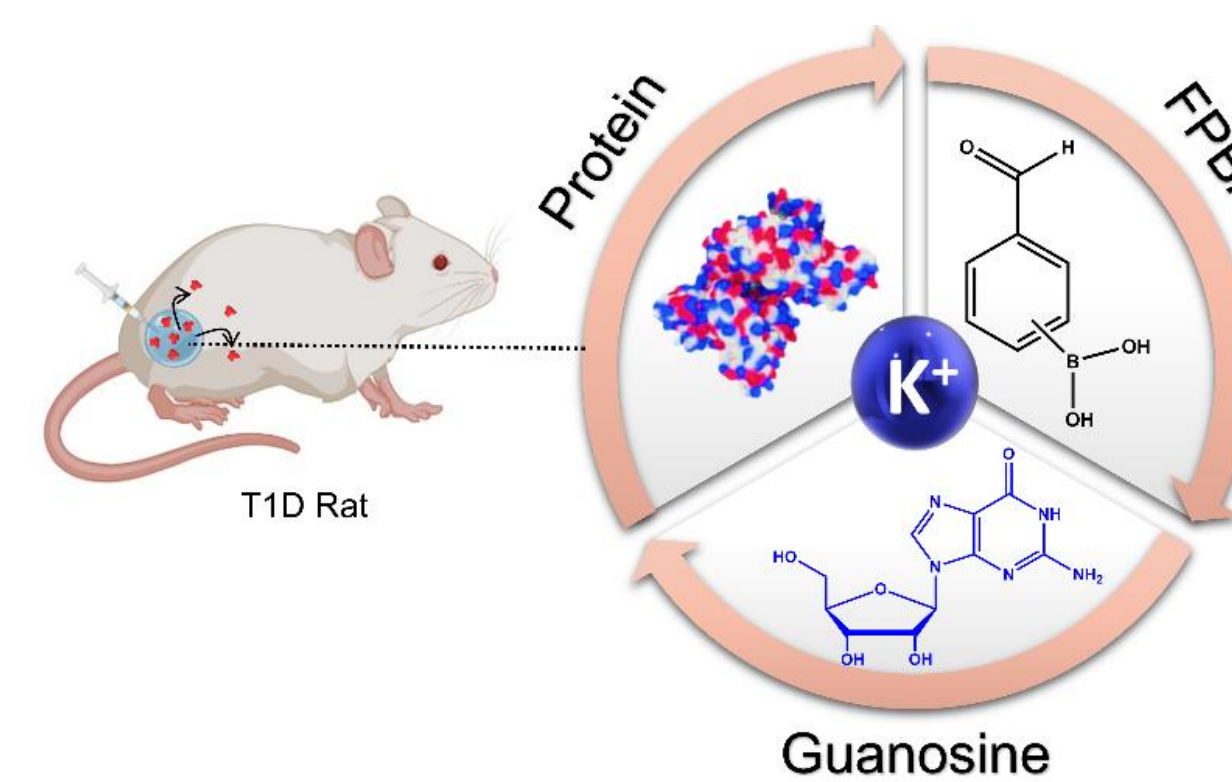
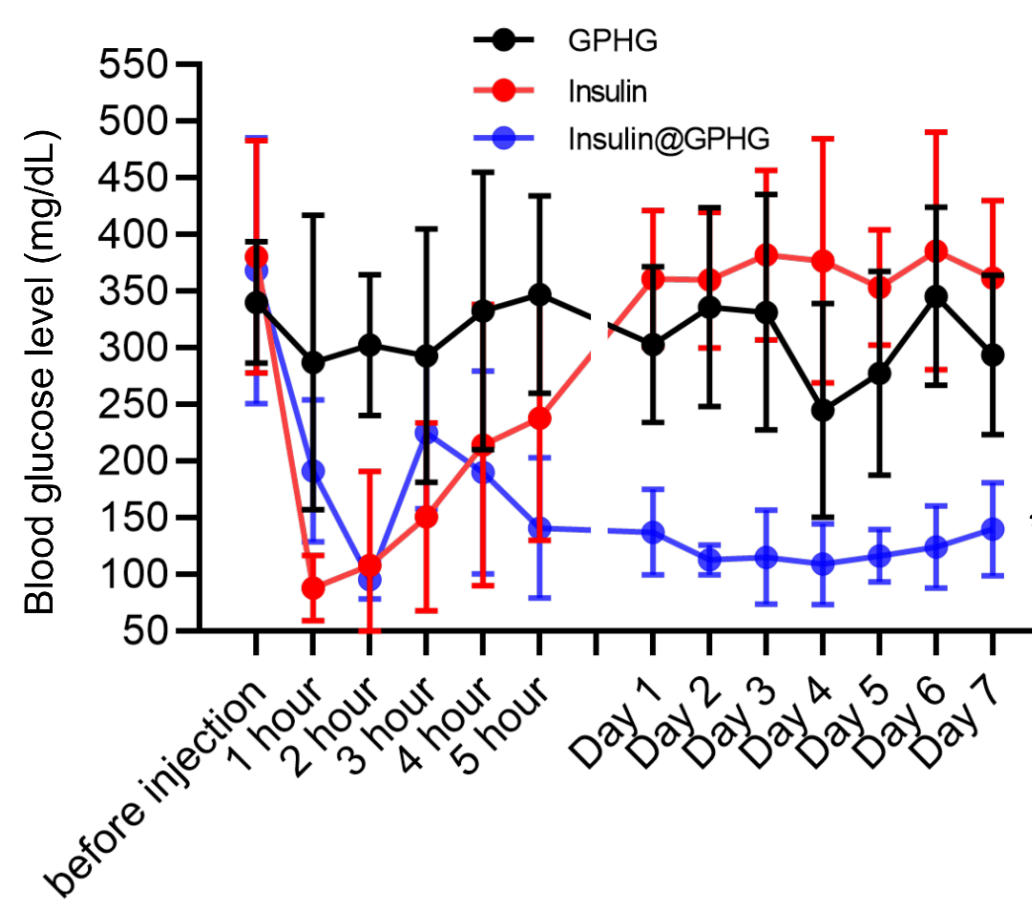
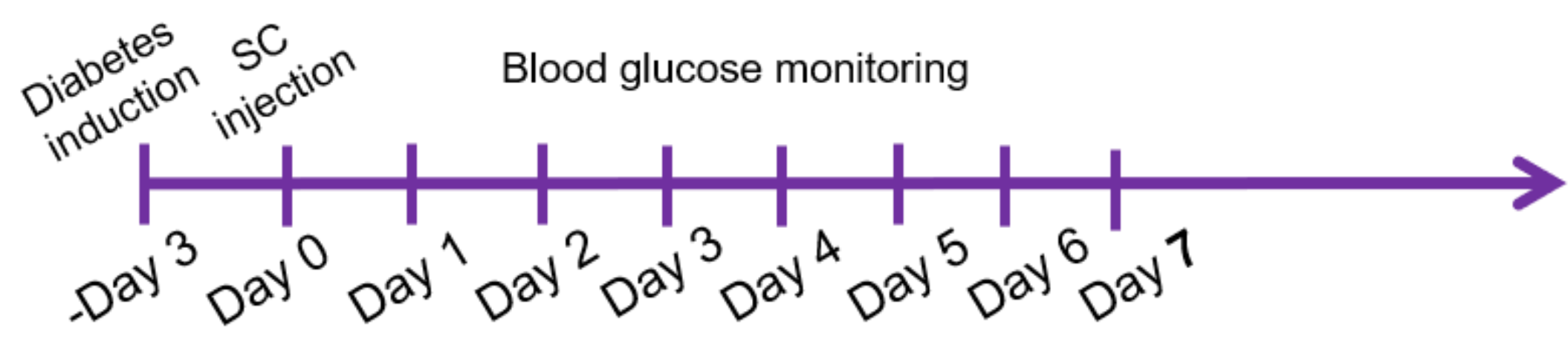
2. Morphology, Rheology, Glucose Sensitivity, Injectability



3. In Vitro Insulin Release



4. In Vivo Study



Conclusion

- ✓ A novel supramolecular G-quartet hydrogel for smart insulin delivery.
- ✓ The hydrogel exhibited glucose-responsive behavior under hyperglycemia.
- ✓ This system promotes week-long normoglycemia in T1D rats.

Future Work / Acknowledgment

- ✓ Stability and scalability evaluation.
- ✓ Clinical Translational potential.
- ✓ Long-term biocompatibility studies.



References

- Saha, S.; Jinagal, D.; Saroj, S.; Ali, A.; Paul, D.; Rakshit, T.; Pal, S., Glucose-responsive G-quartet/Protein Hydrogels Promotes Week-Long Normoglycemia in T1D Rats. *ACS Appl. Bio Mater.* 2026, 9, 9, 4013–4023.
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