**Introduction**

Serratia marcescens cells may die in the harsh conditions they are exposed to in the upper atmosphere, such as low temperatures and increased radiation. S. marcescens is more likely to change color, colonize other environments, and produce colonies in enclosed spaces. Viability testing of this organism is imperative to future space exploration because it provides vital data for research on the radiological protection of planetary ecology.

**Methods**

**A Case Study on the Radiological Exposure of Serratia marcescens**

**The Big Idea:** To compare the radiation exposure of a high altitude environment and the effects of changing radiation and colony colors in a microencapsulated environment.

**The Theory:** Microorganisms exhibit enhanced metabolic processes and variations in atmospheric environments, therefore studying the effects on them is imperative to our understanding of how these organisms adapt to changing environments. It is important to study the effects of these changes on the organism’s behavior and viability.

**The Overarching Concept:** The study of organism behavior in space and atmospheric environments is imperative to future space exploration because it provides data for health sciences in automation and protection of planetary systems.

**Results**

**Flight Plan Summary**

- **Cargo:** Bioencapsulated microorganisms
- **Launch:** 5/10/2020
- **Mission Duration:** 90 minutes
- **Temperature Maintenance and Launch Day:** 1°C to 37°C
- **Payload:** Bioencapsulated microorganisms
- **External Sample Housing:** Temperature maintenance and launch day
- **Final Plate Culture:** Biological growth detection
- **Data Collection:** UV radiation exposure and growth rate

**Conclusion**

As you can see, the mission was successful! Testing the viability of simple microorganisms that can tolerate high altitudes and a low temperature environment is imperative to future space exploration. The summary of data on this payload is crucial for future research on space environment tolerance.

**Acknowledgements**

COSSG Associate Director: Bernadette Garcia, M.S.

RockSat-X Mentor: Barbra Albert, COSGC Adviser: Jennifer Jones, M.S.

RockSat-X Sponsor: NASA Goddard Space Flight Center

COSGC Sponsor: NASA Wallops Flight Facility