UA ASCEND Life Sciences

Using the Ames test to measure the viability and mutagenicity of spacefaring *Salmonella enterica* and establish the efficacy of a flight platform

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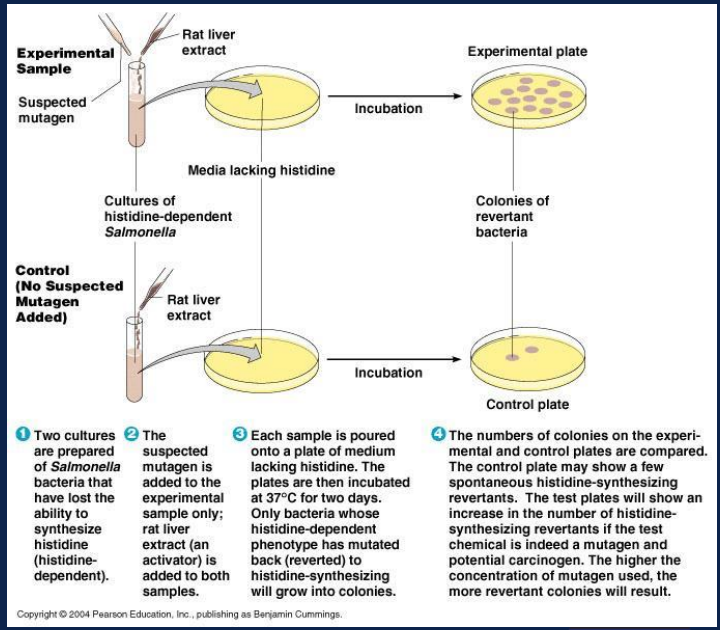
Experiment Objectives

- Measuring effects of ionizing radiation on *Salmonella enterica* via the Ames mutagenicity assay.
- Providing proof of concept and conducting a test flight in preparation for the AZSGC RockSat-C mission launching in June 2018.



Sample Containment

- Locking-Cap Microcentrifuge Tubes
  - Rated to 10,000*g*
- Parafilm

Sample Containment

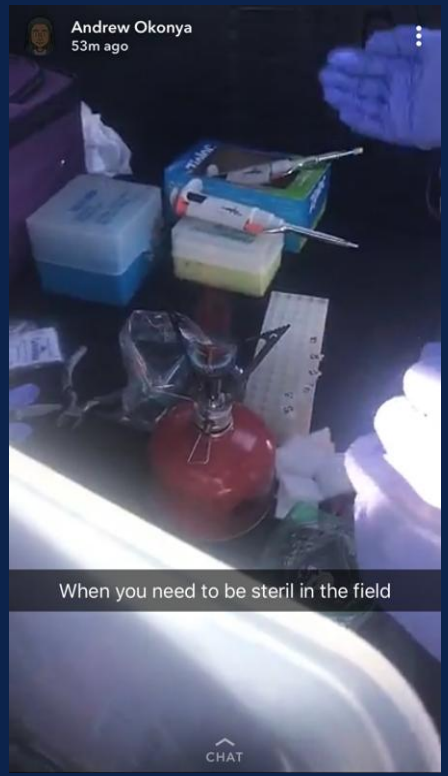
- Absorbent Aerogel Insulation
- Isolated 3D-printed (PLA) Container

Methodology

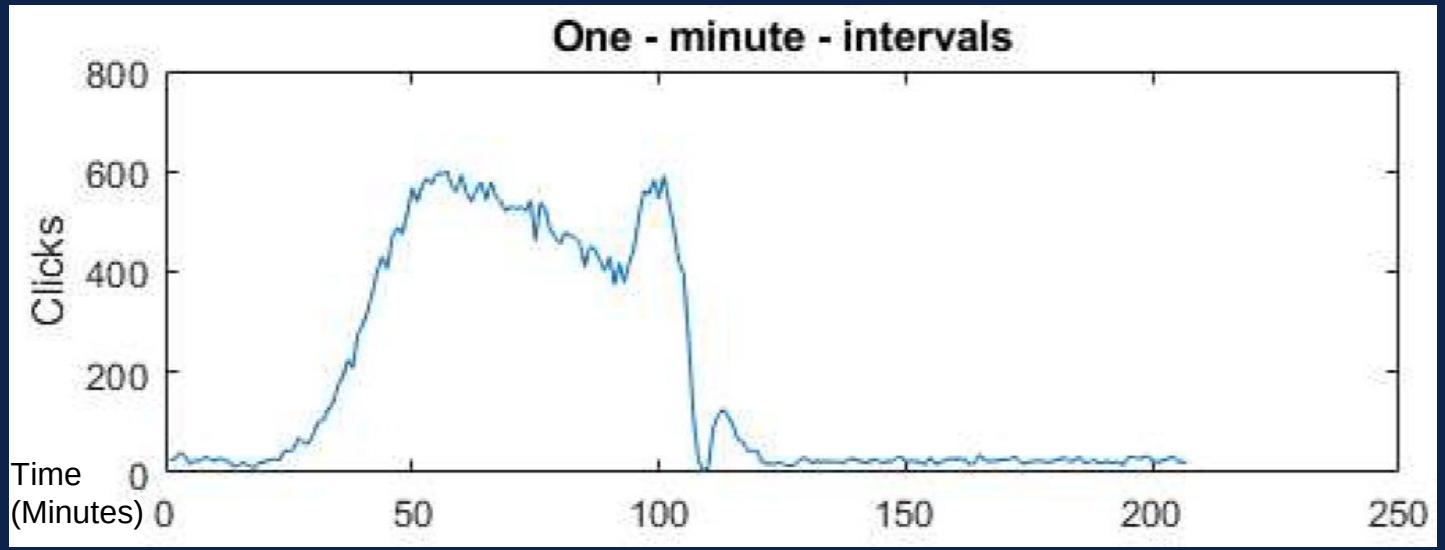
1. Experimental Flight Samples
2. Ground Control
3. Identical Incubation
4. Dilution series and colony counting

Methodology

- Incubation
  (Pre- and Post-flight)
- Maintaining sterile technique in the field



Results and Data



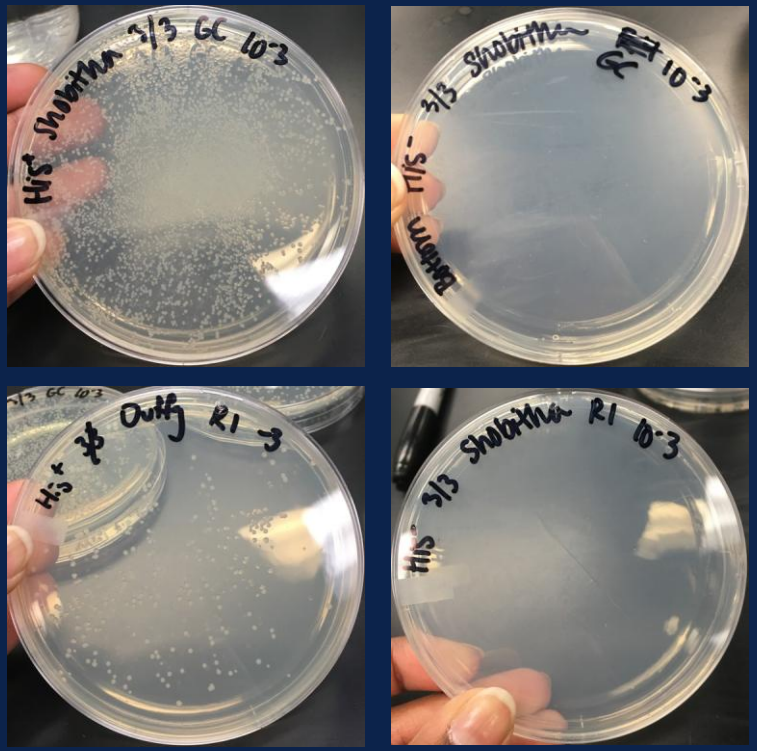
Measurement of radiation levels over time shows the samples experienced beta and gamma radiation during the flight

Results and Data

Colony counts on nutrient-rich media show proof of in-flight sample viability

Results and Data

Mutated colonies observed, but not statistically significant



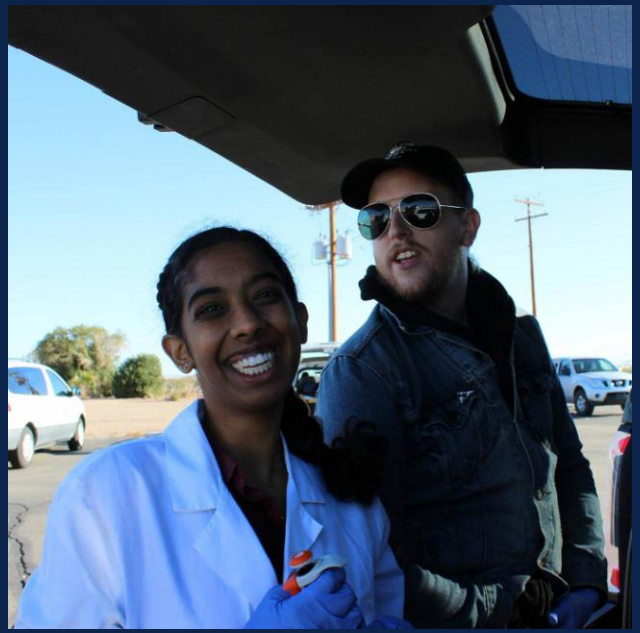
Conclusions

- Flight negatively affects cell viability
  - 10-fold decrease in survival
- Our apparatus allows for live cell recovery

Future Directions

- Testing with on-flight radiation shielding
  - Radiation-specific control
- Sounding rocket flight to Thermosphere
  - Gel Fixation
  - Increased Container Durability
- Other Cell types
  - TA98 *Salmonella*
  - Human Immune Cells

Acknowledgements



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