

EcAMSat: A small satellite flown to explore the role a sigma factor plays in *E. coli*'s response to the antibiotic gentamicin.

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We have successfully flown the *EcAMSat* (*Escherichia coli* Antimicrobial Satellite) free-flyer mission. This was a 6U small satellite that autonomously conducted an experiment in low Earth orbit to explore the impact of the space environment on antibiotic resistance in *uropathogenic E. coli* (UPEC) and the role a particular sigma factor plays in the response. After being held in stasis during transport to orbit, two strains—a wildtype UPEC and an isogenic mutant with a deleted gene that encodes a sigma factor—were grown to stationary phase in a fluidic card inside *EcAMSat*'s payload, then incubated with three concentrations of the antibiotic gentamicin. The payload then administered alamarBlue®, a redox indicator, into all wells of the fluidic card. The cells were then incubated for 144 hours and metabolic activity was measured optically using the payloads' LED and detector system. Data were then telemetered to the ground and compared to a control experiment conducted in an identical satellite in a lab. The results of this experiment will help us better understand important therapeutic targets for treating bacterial infections on Earth

and in space. Such targets are particularly relevant to deep-space and long-duration missions where crew may be more susceptible to infection and treatments for them may work differently.