
NASA
National Aeronautics and
Space Administration
2025
NASA
SCIENCE
Introducing NASA's Space Microbial
Culture Collection
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Space Science Week

NBISC – 30 years of biospecimen sharing

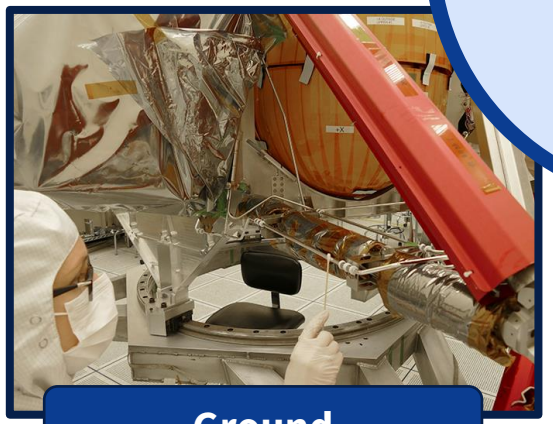
- NASA Biological Institutional Scientific Collection at NASA Ames
- Centralized repository of biological samples collected from NASA-funded spaceflight investigations and correlative ground studies.
- Officially launched in 1995
- **100,000 Non-human biospecimens and growing!**
  - Mouse, Rat, Quail, Minipig, Microbes
  - Spaceflight, simulated microgravity, space radiation ground analog
  - Samples from 1974
  - Funded by NASA BPS and HRP

Launched Space Microbial Culture Collection in 2023

Overview

Space

Ground



Metadata

Specimen

SMCC

Scientific Community

- Centralizes collection and access to space relevant microbes
- Maximizes the scientific return of spaceflight experiments
- Enables new discoveries and broadens access to space experiments
- Safeguards the priceless samples from NASA funded experiments

Why SMCC?

- No formal and guaranteed long term archiving of microbial culture collection where NASA funded research could be submitted across directorates
- No access to the greater scientific community
- Isolates are not checked for viability and contamination
- Metadata associated with these isolates is not standardized
- Existing external culture collections are either agency specific/limited infrastructure or commercially relevant.

➢ **Adhere to NASA directive NPD 7100.10F**

➢ **Adhere to NASA SPD 41A**

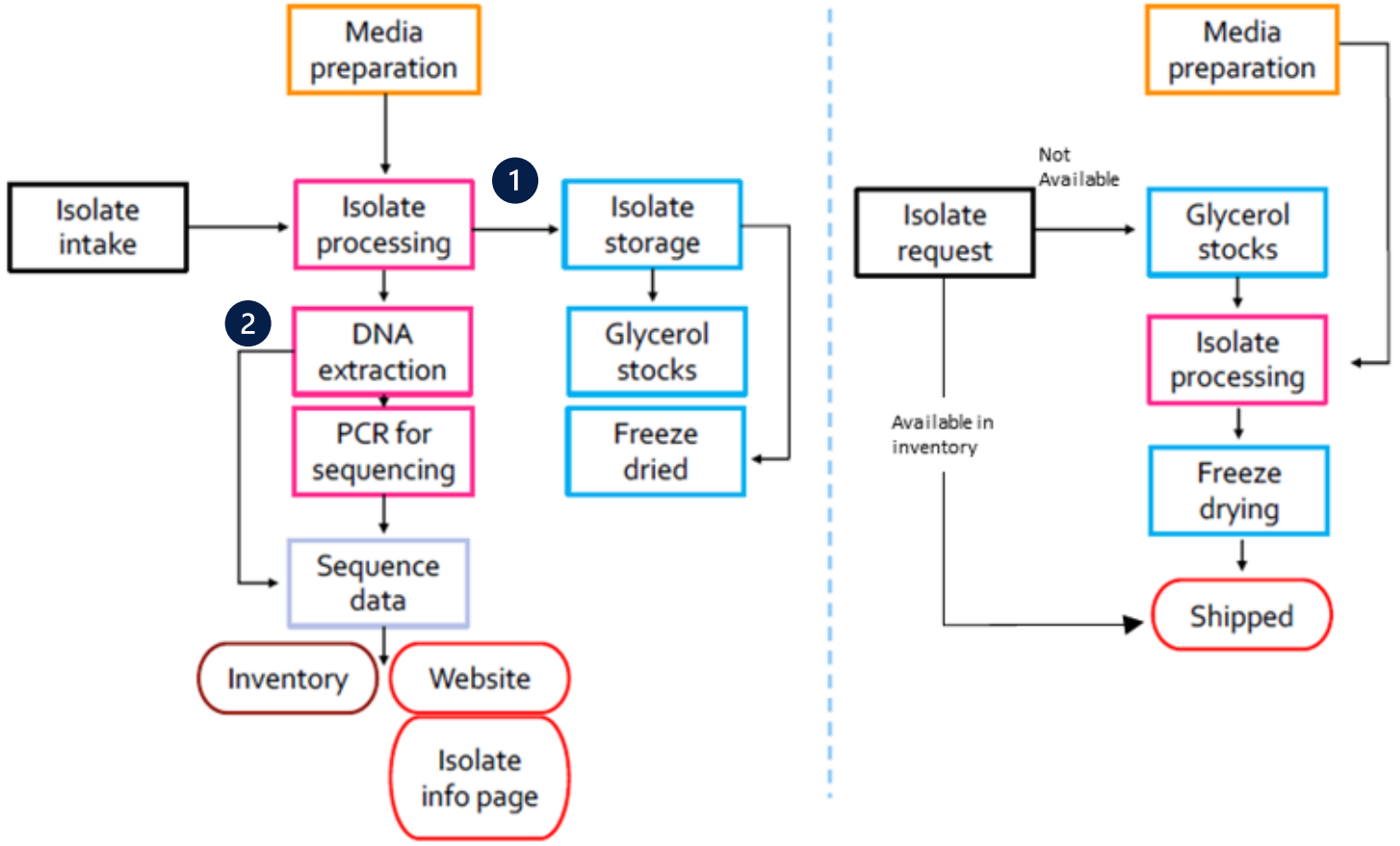
➢ **Scientific reproducibility, future research and application, and historical significance.**

SMCC Scope

- Intake of space-associated / NASA-funded microbial research collections
- Generate pure isolate cultures
- Process microorganismal isolates for short-term (1-5 years) and long-term storage
- Identify each isolate with confirmatory genetic sequencing
- Create database of physical and digital isolate data
- Accept requests for isolates and provide lyophilized samples
- Routine quality checks and audits to ensure viability & revivability
- Local and external redundancy of entire collection

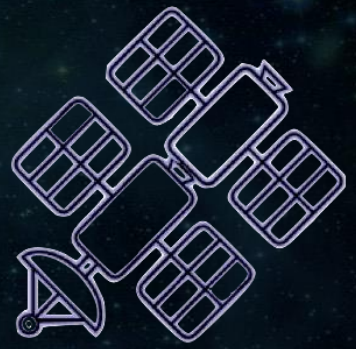
SMCC General Workflow

1. All isolates will be processed and stored
2. Sequencing will depend on budget and priority or isolate request



Unique & Rare Isolates

Currently Processing >2000 isolates



International Space Station

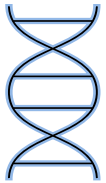
Low Earth orbits & atmospheric sampling

Gravity & radiation experiments

Clean rooms & manufacturing processes

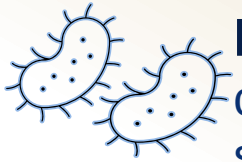
SMCC Offers

Strict contamination control
Safe, secure storage of collections
Isolate processing & QC

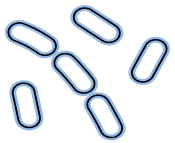


Confirmatory sequencing
Isolate & metagenomic sequencing

Safe & Secure
Short-term & long-term isolate storage



Redundancy
copy of all the isolates in a second, secure location.



Physically accessible
Isolate distribution to scientific community
Robust isolate & collection metadata

Digitally accessible
Accessible genomic data

SMCC for Planetary Protection

- **Microbial Isolate Submission:** Researchers from past and current Planetary Protection Research (PPR) projects can submit microbial isolates to SMCC.
- **Official Repository:** SMCC will be designated as the official repository for microbial isolates generated through PPR awards in future solicitations.
- **JPL Collection:** ~10,000 microbial isolates collected by JPL's Biotechnology and Planetary Protection group during Mars mission spacecraft assembly will be transferred to SMCC for long-term storage and dissemination.

Currently

Soliciting collections
Accepting collection intake
Processing isolates for storage
Confirmatory sequencing
Isolate requests

Coming soon!

Database launches online
Searchable genomic data

Contact

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