The Role of Cryobiology in Implementing Advanced Cell Models

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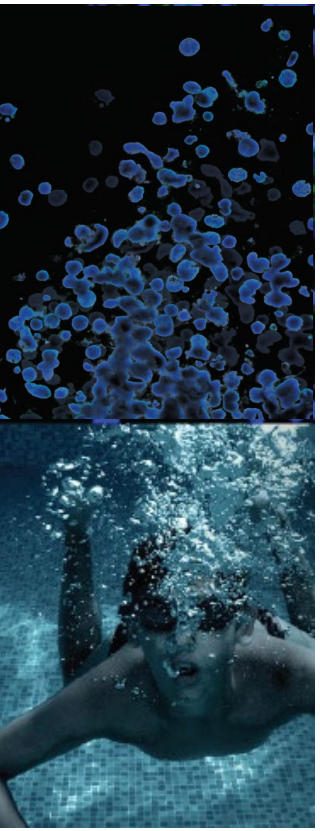
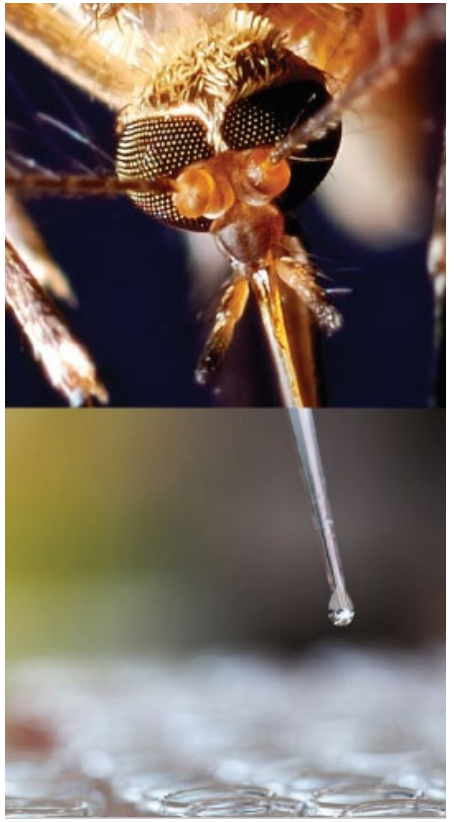
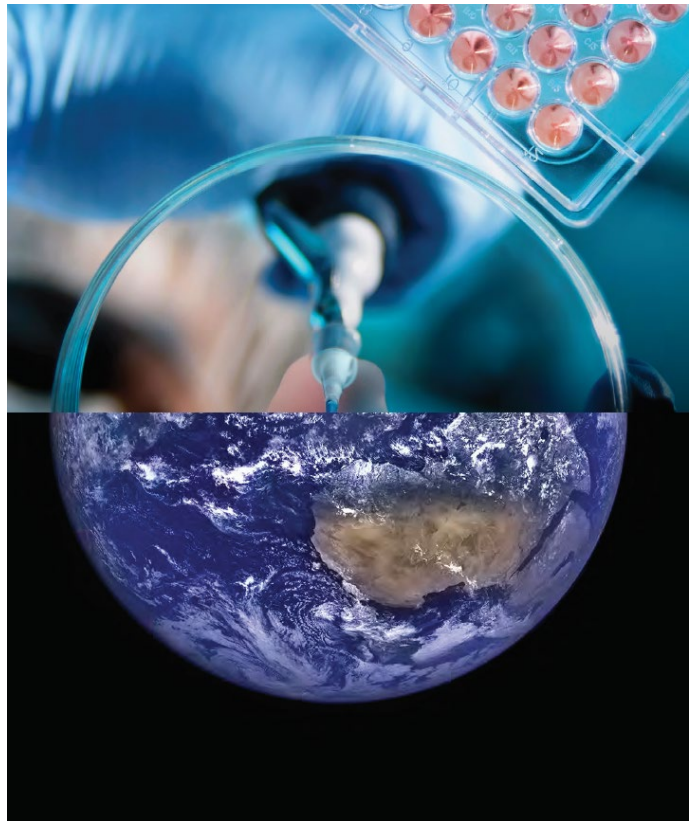
Research & Industrial Solutions







Credible Leads to Incredible™

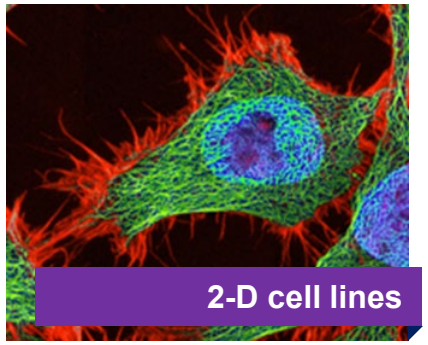
About ATCC®

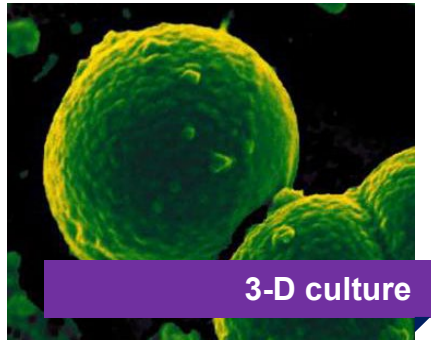
- Founded in 1925, ATCC® is a non-profit organization with HQ in Manassas, VA, and an R&D center in Gaithersburg, MD
- World's premier biological materials resource and standards development organization
  - 5,000 cell lines
  - 70,000 microorganisms
  - Genomic & synthetic nucleic acids
  - Media/reagents
  - Reference genomes
- ATCC® collaborates with and supports the scientific community with industry-standard biological materials and data

ATCC®

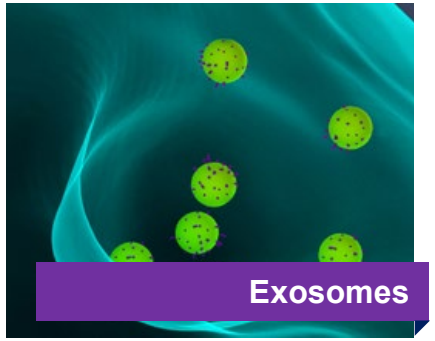
Innovative products in cell biology

Cells models and cell lines





Focused new product areas



Authenticated and quality controlled

- Over 5,000 cell biology products
- Primary cells, immortalized cell lines in 2-D and 3-D formats
- PDX cancer models that include clinical and sequencing data
- Cancer cells with molecular profiles
- DNA available from many cell lines
- Supporting culture media and reagents

Innovative products in microbiology


Bacteriology products


Fungal products


Viral products

Most comprehensive microbial collection with enhanced authentication

- Includes 70,000+ microbial strains, including bacteria, yeast, fungi, protozoa, human & animal viruses
- Over 1,000 derivatives such as nucleic acid preparations

Brand Recognition

- Organizations and regulatory agencies specify ATCC cultures in their standards and guidelines
  - USP, ISO, FDA, CLSI, USDA, ASTM, AOAC, WHO
- Over 475 reference strains recommended to be used in quality control

Expanding Scientific Advancement

For the development of new diagnostics and therapies.

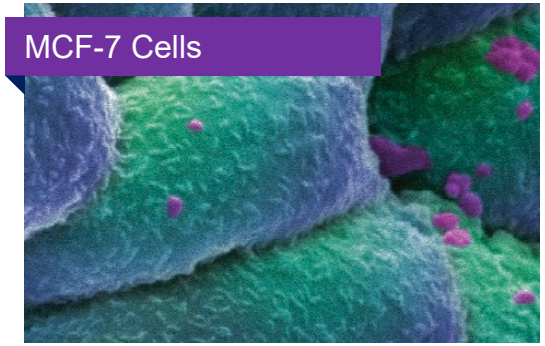
Thermus aquaticus

→ PCR

Aspergillus brasiliensis

→ Fast detection of opportunistic infections

MCF-7 Cells



→ Breast cancer therapies

ATCC®

Expanding Scientific Advancement

To protect global health and environmental safety.

DHA supplements in infant formula are created from *Crypthecodinium cohnii* microalgae.

Dunaliella bardawil is a strain used for biofuel production and a source of nutrients for animal feed.

Deinococcus radiodurans is an extremophile that plays an invaluable role in bioremediation.

Experts in Global Management of Biological Materials

Long-standing network of international collaborators, suppliers, and distributors worldwide.

Deep and broad experience with all applicable export and import requirements, permits and licenses.

Worldwide cold chain reach in >150 countries, and 100,000+ shipments annually.

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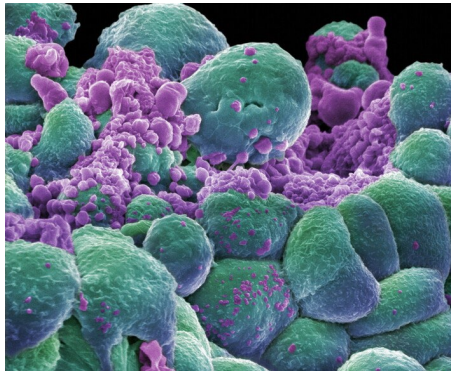
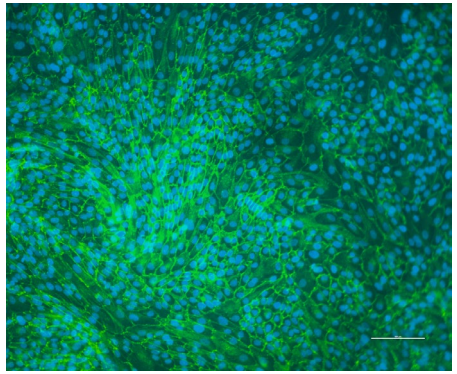
Creating products for the future – Advanced models



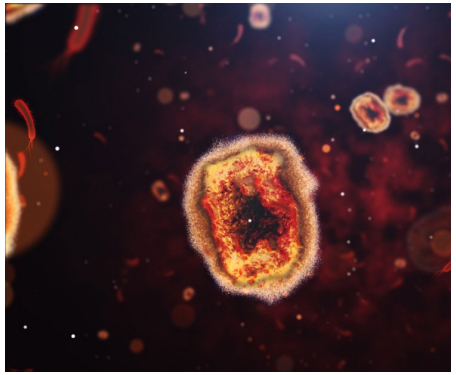
Oncology

A growing portfolio that includes materials and standards for drug screening, tumor mechanisms, cancer immunology, and cancer diagnostics.



Toxicology

Credible cell lines and models for performing standardized, reliable, and reproducible toxicology studies.

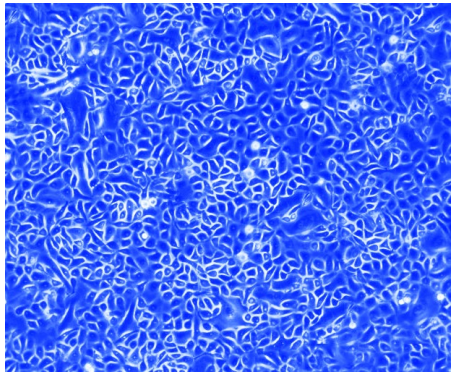


Molecular Diagnostics & Virology

Ready-to-use, fully authenticated standards that can be used from assay development to control.

Bioproduction

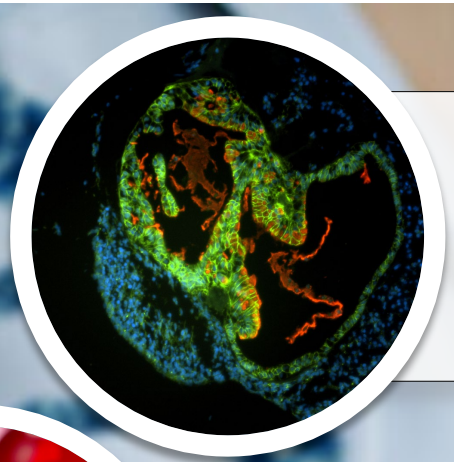
Resources for industrial bioprocessing and cell-based assays; resources for production of clinically valuable metabolites.



Research Applications

A comprehensive collection of biomaterials and specialized products to support innovative research and scientific discovery.

Advanced models – Our focus for now and the future



Disease Modeling
Close the gap between “bench to bedside”

Drug Discovery
De-risk to ensure clinical success

Cell & Gene Therapy Development
Accelerate progress out of R&D

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Innovation in models, formats, and bioinformatics

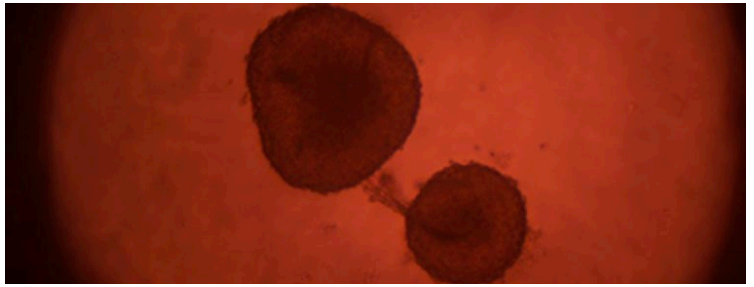
Disease modeling

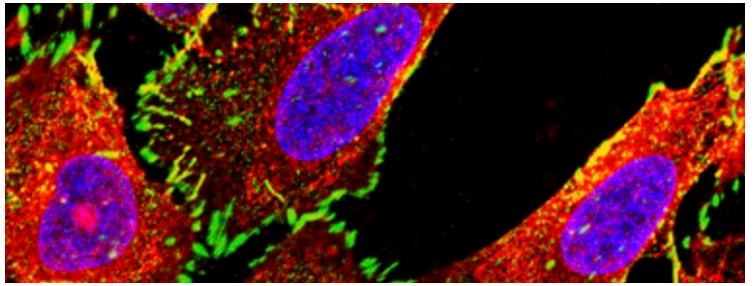
Isogenic cell models – advanced models to model cancer patients

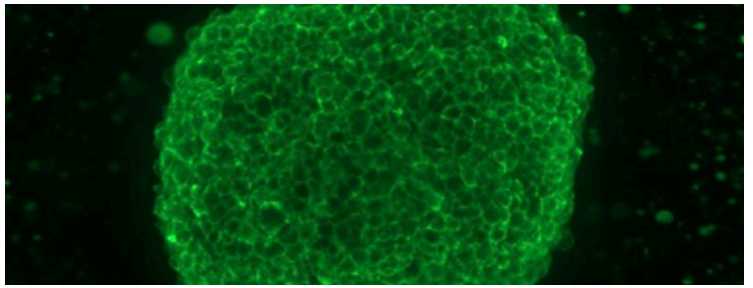
Advanced cell models created using gene-editing

- Precisely gene-edited using cutting-edge technologies
- Engineered on relevant tumor cell lines
- Highly relevant to diseases and drug targets
- Validated at genomic, transcript, and protein levels

Speed, precision, and reliability in drug discovery





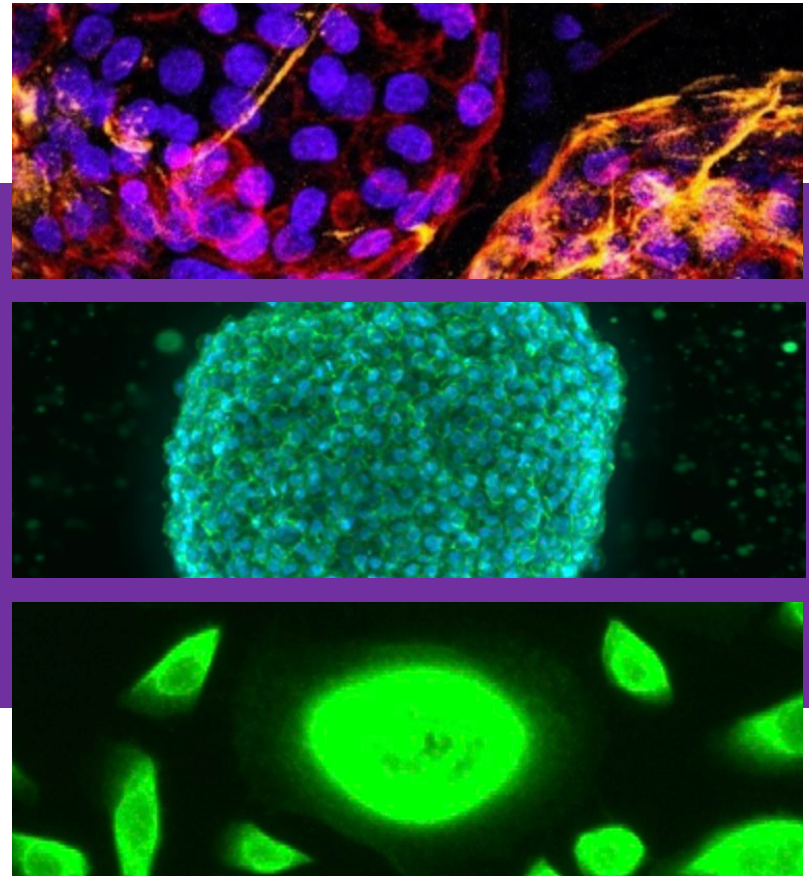


Drug discovery

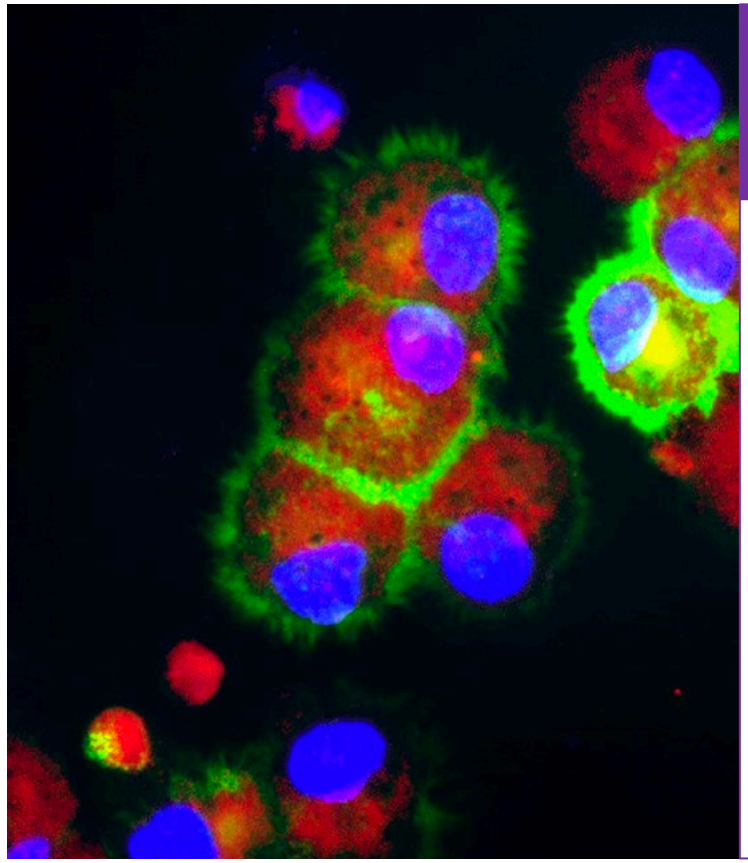
Reporter cells for a variety of screening assays.

Harnessing power of bioluminescence to spearhead drug discovery and disease modeling

Reporter labeled cells are instrumental in accelerating drug screening



Cell & gene therapy development



Dedicated cell models to support and accelerate cell & gene therapy applications:

- **Viral reference materials** – determine the dose and potency of gene therapy products.
- **Enhanced AAV production** – 293.STAT BAX double knockout cell model for producing high-titer stocks of Adeno-associated virus.
- **CAR-T target luciferase reporter cells** – immuno-oncology models that enable the real-time monitoring of potency and efficacy of candidate CART-T effector cells.
- **Quality control strains** – reference materials that support compendial testing.

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What is missing?

We need better preservation techniques and formats

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Need for innovation in preservation

Need	Traditional Cryopreservation
No impact to cell physiology	X
Complex cell systems	X
3-D systems	X
Easy to use	X
Scale up	X

Current preservation techniques are self-limiting and only consider singular cells, not 3-D models or advanced cell models.

Current challenges – the way we see it

Cryogenic processing at scale

Long-term storage

ATCC®

Cryogenic processing at scale

Difficult scale up: The process designed for single cell and small volume operation. Scaling up requires extensive use of human and material intervention.

Format limitations: Technological limitations prevent 3-D cell structures from being preserved in a scaled-up environment.

Differential response: Different cell types have different levels of cellular outcome.

ATCC

Long-term storage

Unreliable outcome

- Periodic sampling is needed – leads to destruction of samples

Difficult storage and retrieval

- There are significant risk of loss of viability and reliability of culture during sample storage and retrieval. The risk is multiplied when multiple samples are stored in a heterogenous storage model

Risk of contamination

- The samples are prone to contamination

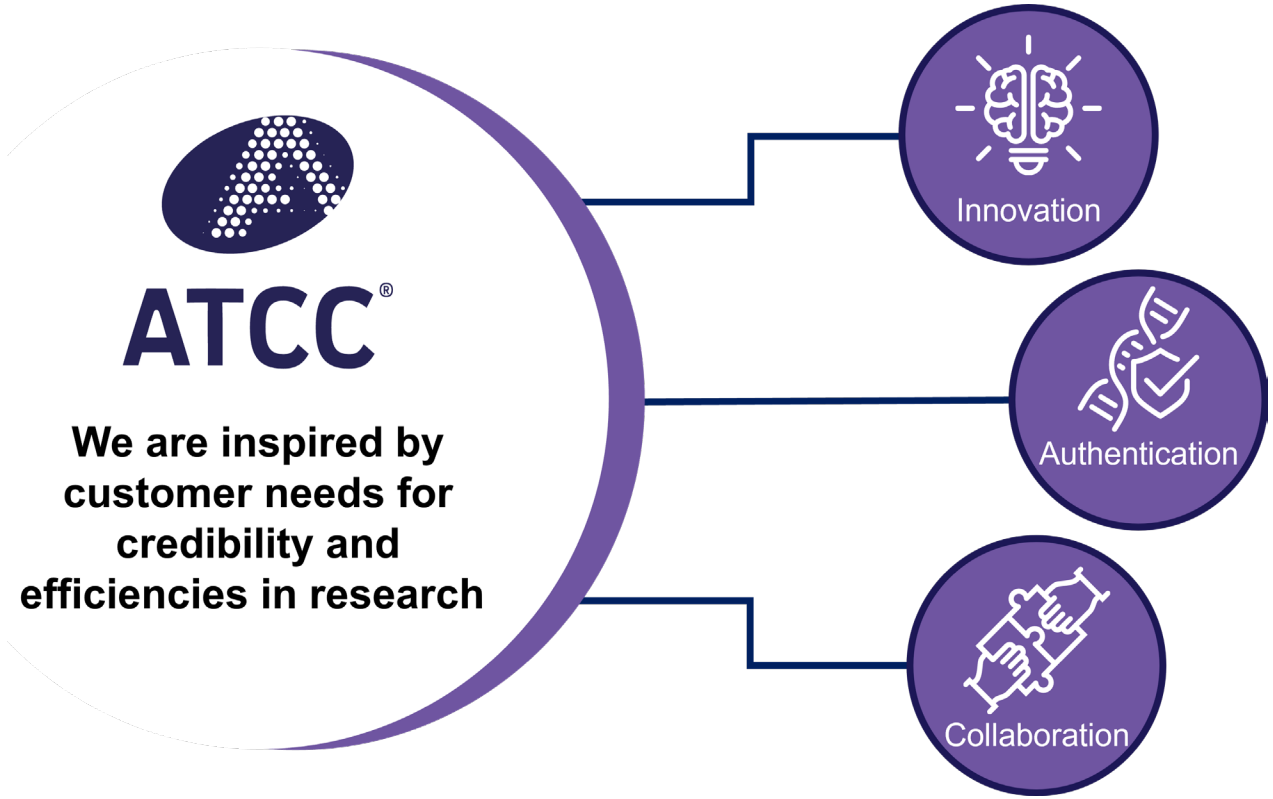
Infrastructure need

- Continuous supply of cryogenic materials are needed to maintain storage

ATCC is at the forefront of cryopreservation solutions

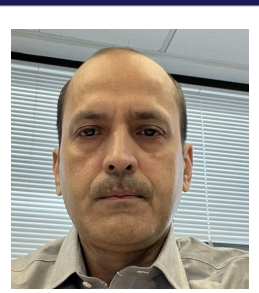
- ATCC is investing toward a future where our advanced cell models are supported by **novel preservation technologies** that enable you to:
  - Start your assays faster
  - Reduce your costs
  - Shorten your time to market

- ATCC is open to collaborating with the scientific community.



Learn more about our innovations in cryopreservation

Advancements in Human Cell Line Cryopreservation for Assay-ready Efficiency
Speaker: Lukas Underwood, PhD, Scientist, Cryobiology R&D, ATCC
Location: Bethesdan Ballroom
Time: July 23, 2024, at 3:50 – 4:10 PM



Molecular Studies as a Guide for Designing an Optimal Lyophilization Process for Microbial Preservation
Speaker: Jyoti Jha, PhD, Senior Scientist, Cryobiology R&D, ATCC
Location: Bethesdan Ballroom
Time: July 24, 2024, at 3:00 – 3:15 PM

Formulation-based Comparative Proteomic Analysis of Fungal Strains Before and After Preservation
Speaker: Thiruganesh Ramasamy, PhD, Senior Scientist, Cryobiology R&D, ATCC
Location: Rosedale Room
Time: July 25, 2024, at 12:40 – 1:00 PM

Thank You

CREDIBLE
MODELS

INCREDIBLE
OUTCOMES

ATCC® | CREDIBLE LEADS TO INCREDIBLE