BEDFORD
RESEARCH FOUNDATION
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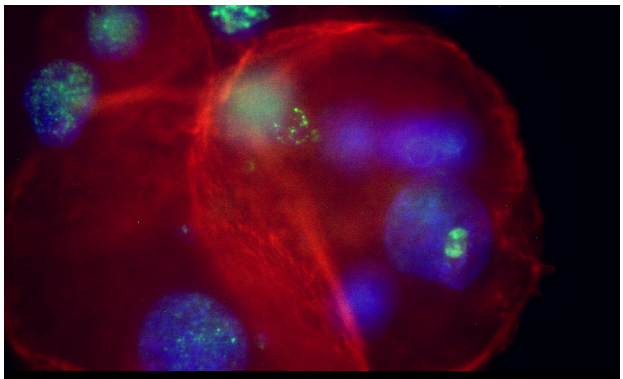
Stem Cells For *Every*Body

Twenty-Five Years of Progress

Bedford Research Foundation is TWENTY FIVE

Founded in 1996 to conduct research that the NIH cannot fund because of the Dickey-Wicker amendment, Bedford Research scientists have achieved ground-breaking milestones:

- **1998** Special Program of Assisted Reproduction (SPAR) designed to protect wives and babies of HIV-infected men from infection during conception
- **2000** World's first program of human egg donation for stem cell research
- **2001** Report on artificially activated human eggs (parthenotes)
- **2002** First Activated Egg Symposium
- **2006** Research program with The University of Athens to understand human egg parthenogenesis



Fluroescence staining of human parthenote on Day 3 after activation. Blue circles are cell nuclei, green spots are DNA synthesis, red background is cell membranes

- **2008** First detection of prostate cancer genes in semen specimens
- **2009** Discovery that circadian rhythms may be necessary to human egg activation and fertilization
- **2009** First Spinal Cord Workshop "What are the Barriers to Cure?"
- **2010** First International Meeting on Spinal Cord and Neurodegenerative Diseases in Taiwan
- **2012** First circadian microscope system to observe activated mouse egg development for five days.
- **2014** First observations of active circadian rhythm genes in early mouse embryos
- **2017** Discovery of method in a mouse model system to deriving "universal" stem cells.
- **2018** Development of ethical guidelines for women to donate frozen eggs for research.
- **2019** First Symposium on Circadian Rhythms and Development
- **2020** Development of PCR test to assist health care facilities with the COVID19 pandemic
- **2021** Development of unique transport medium for unfertilized human eggs

Important note: This work cannot be federally funded because of the 1996 Dickey-Wicker Amendment to the National Institutes of Health budget. BRF scientists rely on private donations for research to develop "universal" stem cells for *Every* BODY.

FALL 2021- WINTER 2022

Donate to the Foundation **Your donations could help everyone you know**

Donations accepted by mail at: Bedford Research Foundation, PO Box 1028 Bedford MA 01730

New Staff at BRF

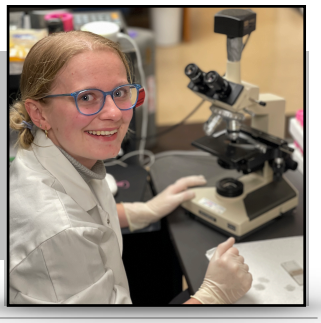
The Foundation is ready for 2022 with these exciting new staff members

Dr. David Albertini joins the foundation as Professor of Reproductive Cell Biology. He is a leading Embryologist, Editor-in-Chief of the Journal of Assisted Reproduction and Genetics, and visiting scientist at The Rockefeller University and Center for Human Reproduction. Dr. Albertini's most recent research at the Bedford Research Foundation aims to develop clinically useful stem cells from activated human eggs and understand the mechanisms underlying ovarian and oocyte aging in women.

Dr. María Gracia Gervasi joins the Bedford Research Foundation as Assistant Professor of Reproductive Cell Biology. Her scientific career has been dedicated to studying the molecular pathways regulating sperm acquisition of fertilization competence. She is now pursuing research regarding the parthenogenetic activation of human oocytes to develop human stem cells.

In addition to her research, Maria is passionate about working towards a more inclusive and diverse environment in science. Since 2020, she has organized a series of bi-weekly international seminars online (Reproseminars) specifically designed to bring together the Hispanic/Latin community working in reproductive biology around the globe.

Dr. Lynae Brayboy joins us as Associate Professor of Reproductive Cell Biology. Dr. Brayboy is board certified in Reproductive Endocrinology with a passion for understanding egg biology: "Life begins with an egg, and we don't know very much about them." Dr. Brayboy is currently on sabbatical in Germany, pursuing her research into egg mitochondrial function. She graduated from Florida A&M University followed by medical degree from Temple University and residency in obstetrics and gynecology. Women and Infants Hospital was the location for her clinical fellowship in reproductive endocrinology. Dr. Brayboy's passion for egg research is a welcome addition to our parthenote stem cell derivation program.



Katherine Bertolini, B.S. graduated from Boston University with a bachelor's degree in biology. She started at Bedford Research in September 2021 as a PVSA intern. She is excited to expand her role at the Bedford Research Foundation as a lab technician. Originally from York, Maine, Katherine grew up sailing competitively and eventually went on to end her senior year at Boston University as a captain of the BU sailing team. When she is not at the lab, she spends much of her time outside enjoying nature.

From the Director

February 29, 2020, I called the CDC to ask if we could help with SARS-CoV-2 testing because BRF holds a federal license to do PCR tests for infectious diseases like HIV. The CDC scientist reminded me we could not help because we were not in the CDC "network" of State Departments of Public Health laboratories. That same morning, the FDA circulated an email with guidance for Emergency Use Authorization of SARS-CoV-2 tests because hospitals and nursing homes country-wide were desperate to triage sick people appropriately. Having been at the forefront of the HIV pandemic three decades ago, it was straightforward that widespread testing was an immediate and essential public health need. Three weeks later, we had satisfied the FDA EUA criteria, developed a non-infectious specimen transport solution, and began testing for area hospitals and long-term care facilities — and a group of farmworkers. The testing burden would consume most laboratory energies for 2020. By February 2021, SARS-CoV-2 testing was turned over to high throughput labs, and BRF scientists returned to research projects; the lab had performed more than 30,000 SARS-CoV-2 tests.

BRF scientists could rapidly respond to the testing needs of the pandemic because it is a unique, independent, not-for-profit research institution with responsive oversight boards that help guide our research activities. The goal of our research is broadly applicable "universal" human stem cells from artificially activated, unfertilized human eggs. The decades-old Dickey-Wicker Amendment prohibits federally funded research on human eggs and the stem cells derived from them. Thanks to the guidance of the meritorious individuals serving on our Ethics Advisory Board, our Human Subjects Committee, and our Stem Cell Research Oversight Committee, we are moving our work forward with the cooperation of human egg banks.

Our goals for 2022 include applying the mouse research findings we discovered in 2021 to unfertilized human eggs for stem cell derivation. The single copy of each chromosome in unfertilized eggs can be edited to eliminate the major protein on the surface of cells that causes tissues to be rejected following transplantation. Such "universal donor" stem cells could then be used as "off-the-shelf" treatments for acute conditions, such as heart attack, spinal cord injury, and stroke, as well as chronic conditions, such as Parkinson's Disease, diabetes, Lou Gehrig's disease (ALS), Alzheimer's Disease, and Huntington's Disease. We won't know the full therapeutic potential of human parthenote stem cells until the cells are actually genetically modified and derived.

Human egg research MUST be privately funded. We appreciate your contribution to our critical work and are most grateful for your support!

Sincerely,

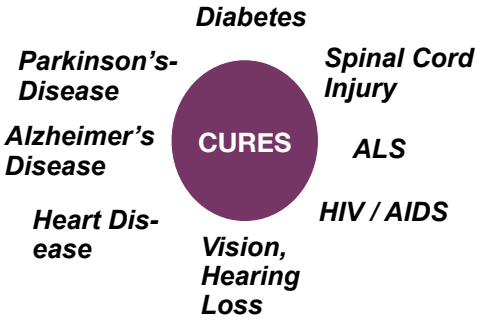
Ann A Kiessling, PhD ***Director, Bedford Research Foundation***

Donate Today

"Bedford Research scientists are developing stem cells from eggs, not from embryos, thus bypassing many of the ethical dilemmas associated with stem cell research."

-Sen. Michael J. Barrett

Philanthropy Is The Key To Continued Progress



The average cost of each experiment is $90,000. Because much of our building overhead is covered by fee-for-service laboratory tests, ***92% of every dollar donated*** goes directly toward research, both stem cells for every body and prostate screening tests. This innovative funding model allows Bedford Research scientists greater flexibility to move quickly in promising new research directions.

Continued progress in all research areas requires meeting our annual funding goal of $500,000 in 2022.

This will help fund another senior scientist to keep our momentum going — donate today!

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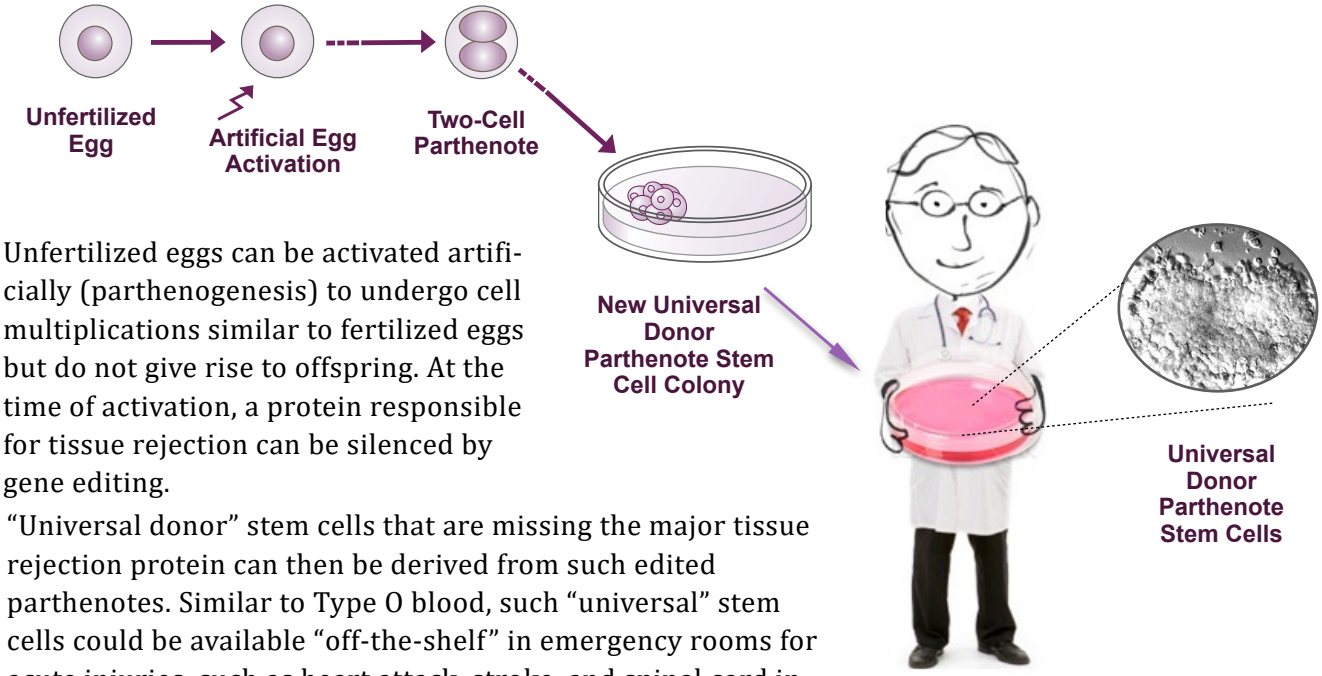
Stem Cells for *Every*Body



Unfertilized eggs can be activated artificially (parthenogenesis) to undergo cell multiplications similar to fertilized eggs but do not give rise to offspring. At the time of activation, a protein responsible for tissue rejection can be silenced by gene editing.

"Universal donor" stem cells that are missing the major tissue rejection protein can then be derived from such edited parthenotes. Similar to Type O blood, such "universal" stem cells could be available "off-the-shelf" in emergency rooms for acute injuries, such as heart attack, stroke, and spinal cord injury. This would be a significant step forward in stem cell therapies for critical and chronic conditions.