

Mateus Vidigal de Castro: Cellular and genetic determinants of healthy aging and disease resilience

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Dr. Mateus Vidigal de Castro is a postdoctoral researcher at the University of São Paulo, Brazil. His research focuses on the cellular and molecular mechanisms underlying healthy aging, disease resilience, and extreme longevity. He leads studies involving induced pluripotent stem cells (iPSCs) derived from centenarians, aiming to better understand the biology of aging and its intersection with infectious diseases such as COVID-19. Dr. de Castro is also a member of Sigma Xi, the Scientific Research Honor Society. He is particularly passionate about exploring how genetic diversity in underrepresented populations can reveal novel insights into longevity and human health. In this Genomic Press Interview, Dr. de Castro shares with our readers his reflections on his life, career, and the scientific journey that continues to inspire him.

Part 1: Mateus Vidigal de Castro – Life and Career

Where were you born, and where do you live now?

I was born in Campinas, a city about one hour's drive from São Paulo. Because of my work, I currently live in São Paulo, the largest city by population in the Americas, the Western Hemisphere, and the Southern Hemisphere.

Could you give us a glimpse into your personal history, emphasizing the pivotal moments that first kindled your passion for science?

I grew up surrounded by science. Both of my parents were researchers, and from an early age, I was fascinated by the invisible world—the world beyond what the eyes can see. Watching my parents' dedication to research shaped my values and sparked my curiosity about biology and how life works at the cellular level. My real passion for science was ignited when I first looked through a microscope during college. Seeing living cells for the first time was a life-changing experience—I knew I wanted to dedicate my life to understanding the mechanisms of life that are hidden from the naked eye. My academic journey was not always easy. I faced many rejections when applying for my first research opportunity. However, persistence paid off. I eventually joined a neuroscience lab, where I learned advanced microscopy techniques and published my first papers. That experience solidified my passion for research. Later, I had the opportunity to join one of Brazil's leading genetics research centers under the supervision of Professor Mayana Zatz, which opened the door for me to work in the fields of human genetics, aging, and longevity. Since then, my mission has been to use science to understand better why some people live exceptionally long and healthy lives and how we can translate that knowledge to improve human health.



Figure 1. Mateus Vidigal de Castro, PhD, University of São Paulo, Brazil.

Please share with us what initially piqued your interest in your favorite research or professional focus area.

I have always been fascinated by Brazilian supercentenarians—those individuals who have lived to be over 110 years old—and this has fueled my interest in studying the genetics behind exceptional longevity.

We would like to know more about your career trajectory leading up to your current role. What defining moments channeled you toward this opportunity?

The pandemic forced me to completely revise my research project, as social distancing made it impossible to collect blood samples from volunteers in their homes. At that moment, we decided to study centenarians who recovered from COVID-19 as a model of resilience. That was the turning point that sparked my focus on longevity research.





What is a decision or choice that seemed like a mistake at the time but ended up being valuable or transformative for your career or life?

I did not undertake any research internships abroad during my PhD or postdoctoral studies, and I sometimes regret not having had that international experience. However, staying ended up being a transformative decision. I had many unique opportunities and played a leading role in significant research projects at my center, which significantly shaped my career.

What habits and values did you develop during your academic studies or subsequent postdoctoral experiences that you uphold within your research environment?

Although I consider myself a competitive person, I take my ethical principles very seriously. For me, my efforts are always in service of science, not personal ambition. I firmly believe that scientific progress must be built on integrity, respect, and collaboration. I highly value the opinions and perspectives of my current supervisor and colleagues, and I strive to create an environment where open dialogue and mutual respect are prioritized.

Please tell us more about your current scholarly focal points within your chosen field of science.

My current research focuses on understanding the biological mechanisms that drive healthy aging, disease resilience, and extreme longevity. My goal is to investigate how genetics, cellular mechanisms, and immune responses contribute to exceptional longevity and resistance to infectious diseases such as COVID-19. I also have a strong personal interest in rare progeroid syndromes and in studying rare populations in general.

What impact do you hope to achieve in your field by focusing on specific research topics?

I hope to discover something that contributes to promoting human health—whether through the development of new treatments, improved diagnostics, or strategies to prevent age-related diseases.

What do you most enjoy in your capacity as an academic or research rising star?

I love the creative side of science—designing experiments, solving problems, and thinking about how to connect molecular mechanisms to real-world health outcomes. I also deeply enjoy mentoring students, collaborating with colleagues, and being part of a global scientific community that shares the same passion for advancing knowledge.

At Genomic Press, we prioritize fostering research endeavors based solely on their inherent merit, uninfluenced by geography or the researchers' personal or demographic traits. Are there particular cultural facets within the scientific community that warrant transformative scrutiny, or is there a cause within science that you feel strongly devoted to?

Brazil is a country of huge inequalities, and this inevitably impacts science. Research is often undervalued, underfunded, and underprioritized. There are very few resources, few women in leadership positions, and a limited number of Black scientists represented in academia. The lack of diversity and representation across multiple layers of society truly frustrates me. As an openly homosexual scientist, I feel a strong personal responsibility to help bring more visibility to underrepresented groups in science. I believe that diversity—whether it is cultural, racial, gender, or sexual orientation—is not just a matter of fairness but a driver of better, more innovative science.

Outside professional confines, how do you prefer to allocate your leisure moments, or conversely, in what manner would you envision spending these moments given a choice?

Outside of work, I enjoy spending time with my family and close friends. I love traveling and exploring new places. I also enjoy quiet moments. Spirituality is an important part of my life as well; I often find peace in



Figure 2. Mateus and his nephew Nicholas visiting the iconic statue of Christ the Redeemer in Rio de Janeiro, Brazil. They enjoy spending time together and traveling whenever they can, preferably to beach destinations.

prayer and moments of reflection. I want to spend more time close to nature.

Part 2: Mateus Vidigal de Castro – Selected questions from the Proust Questionnaire¹

What is your most marked characteristic?

Kindness and generosity are my most defining traits.

Among your talents, which one(s) give(s) you a competitive edge?

Creativity is one of my biggest strengths. I also tend to perform very well under pressure — sometimes too well, I think. (laughs).

If you could change one thing about yourself, what would it be?

Sometimes, I make things more complicated for myself by taking on too many commitments, even when I know I probably will not have enough

¹In the late nineteenth century, various questionnaires were a popular diversion designed to discover new things about old friends. What is now known as the 35-question Proust Questionnaire became famous after Marcel Proust's answers to these questions were found and published posthumously. Proust answered the questions twice, at ages 14 and 20. In 2003, Proust's handwritten answers were auctioned off for \$130,000. Multiple other historical and contemporary figures have answered the Proust Questionnaire, including among others Karl Marx, Oscar Wilde, Arthur Conan Doyle, Fernando Pessoa, Stéphane Mallarmé, Paul Cézanne, Vladimir Nabokov, Kazuo Ishiguro, Catherine Deneuve, Sophia Loren, Gina Lollobrigida, Gloria Steinem, Pelé, Valentino, Yoko Ono, Elton John, Martin Scorsese, Pedro Almodóvar, Richard Branson, Jimmy Carter, David Chang, Spike Lee, Hugh Jackman, and Zendaya. The Proust Questionnaire is often used to interview celebrities: the idea is that by answering these questions, an individual will reveal his or her true nature. We have condensed the Proust Questionnaire by reducing the number of questions and slightly rewording some. These curated questions provide insights into the individual's inner world, ranging from notions of happiness and fear to aspirations and inspirations.



time for everything. I am still learning to set healthier boundaries and say no when necessary.

What is your current state of mind?

My current state of mind is a mix of gratitude, determination, and reflection. I am grateful for everything I have accomplished so far, and I am determined to continue pushing forward with my research and projects while also being reflective on how to balance work, life, and my well-being.

What is your idea of perfect happiness?

For me, perfect happiness is feeling at peace with myself and knowing that my life and work have meaning and a positive impact on others."

When and where were you happiest? And why were you so happy then?

I was probably happiest when I was accepted for my postdoctoral position at the University of São Paulo. But beyond professional milestones, I am also thrilled in the simple moments — being with my family and close friends or in moments of spiritual connection.

What is your greatest fear?

I have many fears, but my greatest ones are related to violence.

What is your greatest regret?

My greatest regret is not having completed an international research internship during my PhD or postdoctoral studies. Sometimes, I feel that I missed the opportunity to experience a different academic culture and expand my network further. However, at the same time, staying allowed me to take the lead on important projects and grow significantly as a scientist.

What are you most proud of?

I am most proud of the personal and professional efforts I have made over the past few years.

What do you consider your greatest achievement?

To date, my most notable achievement has been consistently delivering meaningful and solid work throughout the COVID-19 pandemic. It was a tough time — I lost some people very close to me, and it was emotionally devastating. Still, despite the personal pain and all the uncertainties, I managed to conduct my postdoctoral research with dedication.

What or who is your greatest passion?

My greatest passion is science. Moreover, as a person, it is my father (in memoriam) who was my biggest inspiration and taught me the values I carry today.

What is your favorite occupation (or activity)?

I enjoy reading about the history of the Catholic Church and related topics. Catholicism fascinates me — not only from a spiritual perspective but also from a historical and cultural one.

What is your greatest extravagance?

Shopping. If I could, I would go to the mall all the time! (laughs).

What is your most treasured possession?

I could say my house or my car, but honestly, my most treasured possessions are my Catholic relics!

Where would you most like to live?

I loved living in São Paulo, Brazil, before I moved here, but I have to admit that I miss my hometown, Campinas.

What is the quality you most admire in people?

Kindness. I admire people who are kind, empathetic, and respectful to others.

What is the trait you most dislike in people?

I dislike when people are rude, disrespectful, or impolite. It is something I cannot stand.

What do you consider the most overrated virtue?

Perhaps blind obedience. It is essential to respect rules but also to question them when they do not make sense or when they harm individuals.

What do you most value in your friends?

I value their support, their presence, and the time they choose to share with me.

Which living person do you most admire?

My sister. She is an incredible woman. She always gets whatever she wants! (laughs).

Who are your heroes in real life?

My father. He was my father, mother, and friend — all in one. He is my greatest hero in life.

If you could have dinner with any historical figure, who would it be and why?

It would be Rosalind Franklin. I would love to hear her version of the DNA discovery — a story that history did not tell fairly. She is one of my greatest inspirations in science, along with Marie Curie. Honestly, having dinner with both of them together would be an absolute dream.

Who are your favorite writers?

Clarice Lispector, a Brazilian writer. I admire her depth, sensitivity, and reflections on life and identity.

Who are your heroes of fiction?

Batman.

What aphorism or motto best encapsulates your life philosophy?

"If you believe, you can achieve."

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