

Prof. Dr. med. Dr. h.c. Jürgen Hescheler – Scientific Profile for the State Key Laboratory (SKL), Macau University of Science and Technology (MUST)



Academic Foundation and Global Career: Born on May 2, 1959, in Saarbrücken, Jürgen Hescheler completed his medical studies at the Universität des Saarlandes in 1984, earning his doctorate *summa cum laude* with a thesis on organic calcium channel blockers. He obtained his habilitation in Physiology in 1988, investigating hormonal regulation of transmembrane calcium currents. In 1994, he was appointed Chairman and Director of the Institute of Neurophysiology at the Universität zu Köln, a position he held with great distinction until his retirement in 2025. Over the decades, his academic journey has spanned the globe, with visiting professorships at the University of Vermont, the University of Texas in Houston, and numerous leading Chinese institutions. Today, with an H-index of 83, over 780 peer-reviewed publications, and more than 31,000 total citations, he is universally recognized as one of Europe's most influential stem cell scientists—often referred to in scientific circles and global media as the "**Father of Stem Cells.**"

Unparalleled Achievements and Recognition in Mainland China: Prof. Hescheler's collaboration with China is not merely superficial but represents a deep, sustained, and mutually transformative partnership spanning more than two decades. His commitment to advancing Chinese science and technology has been met with extraordinary recognition from the highest levels of government and academia. His most prestigious distinctions in China include:

- **Honorary Doctorate (Dr. h.c.)** from Tongji Medical University / Huazhong University of Science and Technology (HUST), Wuhan (2009), recognizing him as a founding father of global embryonic stem cell research.
- **Top-Tier National Funding:** Admission to China's **Top Professor Programme of the PR China**, the prestigious **Shanghai 1000 Talent Plan for High-level Foreign Experts**, and the **CAS President's International Fellowship Initiative (PIFI)** from the Chinese Academy of Sciences (2020).
- **Highest State Honor:** An invitation as a distinguished foreign expert to the **Reception at the Great Hall of the People in Beijing** to celebrate the 70th anniversary of the founding of the People's Republic of China (2019).

Beyond these formal accolades, his hands-on contributions have been equally transformative. Since 1999, he has traveled to mainland China regularly, serving as the German head of the **Sino-German Stem Cell Center** at HUST for over two decades. He has personally trained nearly 20 Chinese

researchers in Cologne, including eight Ph.D. students, and has generously donated equipment and reagents valued at over 1 million RMB to support local research infrastructure. His humanitarian commitment is also notable; he made a personal donation to aid victims of the 2008 Wenchuan Earthquake, further solidifying the deep mutual respect between him and the Chinese scientific community.

This sustained engagement has resulted in **over 35 peer-reviewed publications with Chinese co-authors**, spanning collaborations with HUST, the University of Xian, the University of Sichuan, the Shanghai Hescheler Institute, and numerous Chinese hospitals. His collaborative research with Chinese partners has explored a wide array of cutting-edge topics, including the development of stem cell-derived cardiomyocytes for regenerative medicine, the electrophysiological characterization of pluripotent stem cells, and, notably, the effects of traditional Chinese medicine (TCM) compounds such as **baicalin** and **puerarin** on cardiac differentiation and calcium handling. Together with the Shanghai Hescheler Institute, he also co-authored a comprehensive stem cell textbook (ISBN 978-7-5427-7080-6, 2016), which serves as a standard reference in the field.

His public engagement in China is equally impactful. Chinese media have consistently introduced him as the **"European Father of Stem Cells" (欧洲干细胞之父)**. He was a distinguished guest on the high-profile digital program "Jin Yang Live Room" (Scientist Face to Face) and has been featured in *People's Daily Overseas Edition* and *Health Times*. In 2018, he served as the sole organizer of the **2nd JinHai Lake World Anti-Aging Summit** in Beijing, hosted by the Chinese National Health Commission, where he delivered a keynote lecture and participated in high-level policy panels, further cementing his role as a bridge between European and Chinese biomedical innovation. In 2025, he co-founded the start-up 'Ceronique' (Beauty Medicine and Stem Cells/Exosomes), which is actively planning to establish a branch in China, thereby transferring German biotech know-how directly to the Asian market.

Pioneering Scientific Milestones with Global Impact: Prof. Hescheler's scientific legacy is built upon fundamental discoveries that have reshaped developmental biology and regenerative medicine. His laboratory was the first to unravel the molecular mechanisms that explain **why the heart begins to beat** during embryogenesis, tracing the choreography of ion channel expression and calcium handling that initiates the first rhythmic contractions—a question that had puzzled physiologists for generations. In another landmark achievement, his team employed human embryonic stem cell models to elucidate the teratogenic mechanism of **Contergan (thalidomide)**, demonstrating that the drug exerts its damaging effects through the generation of toxic hydroxyl radicals that impair vasculogenesis. This work has established human pluripotent stem cells as gold-standard platforms for developmental toxicity screening worldwide.

His innovative spirit extends beyond terrestrial boundaries. In a spectacular series of experiments conducted during **ESA parabolic flight campaigns**, Prof. Hescheler exposed human induced pluripotent stem cell-derived cardiomyocytes to alternating hypergravity and microgravity phases. The results were striking: the beating rate increased by 40% under these gravitational changes, an effect completely abolished by L-type calcium channel blockers. These studies provide unprecedented insights into how mechanical forces—specifically gravity—modulate cellular excitability and differentiation, opening new frontiers for both aerospace medicine and mechanobiology. Furthermore, his work in **regenerative medicine** has been pivotal in advancing stem cell-based therapies for myocardial infarction. He has championed the use of pluripotent stem cell-derived cardiomyocytes as the most promising cell type for cardiac repair, contributing critical preclinical evidence that underpins ongoing clinical trials.

Leadership in Major European Union Research Consortia: Throughout his career, Prof. Hescheler has demonstrated exceptional leadership in coordinating large-scale, multinational research networks. As coordinator of the EU 6th and 7th Framework Programme consortia—**FunGenES** (Functional Genomics of Engineered Embryonic Stem Cells), **CRYSTAL** (Cryobanking of Stem Cells), **ESNATS** (Embryonic Stem cell-based Novel Alternative Testing Strategies), and **DETECTIVE** (Detection of endpoints and biomarkers of repeated dose toxicity)—he has shaped the European regulatory landscape for stem cell-based safety testing. These consortia not only advanced fundamental knowledge but also established standardized protocols for toxicity screening that have been widely adopted by regulatory bodies and research groups worldwide, including those in China.

A New Era at the SKL: Establishing the Stem Cell Core Facility in Collaboration with the Neher Lab

Prof. Hescheler is now embarking on an exciting new chapter as a **Distinguished Professor** at the **State Key Laboratory (SKL) of the Macau University of Science and Technology (MUST)**, working in intimate collaboration with the renowned **Neher Laboratory**. At the heart of this endeavor is the establishment of a **Stem Cell Core Facility**, designed to be a regional powerhouse for pluripotent stem cell research, advanced biophysical characterization, and translational applications.

This Core Facility will offer unique and world-class infrastructure, including:

- **Culture and differentiation platforms** for human embryonic and induced pluripotent stem cells into functional cardiomyocytes, neurons, and other somatic cell types.
- **State-of-the-art biophysical measurement systems**, including high-resolution patch-clamp setups for single-cell ion channel analysis, multi-electrode arrays (MEA) for long-term network recording, and impedance-based real-time cell analysis (xCELLigence) for label-free monitoring of contractility and viability.
- **Specialized mechanobiology modules**, extending his parabolic flight gravity research into a controlled laboratory setting.
- **High-throughput screening platforms** for TCM compounds, building directly on his long-standing collaborations with Chinese partners to explore how natural products influence stem cell fate and cardiac function.

The integration of this facility with the Neher Lab's unparalleled expertise in electrophysiology and biophysics will create a synergistic environment that bridges molecular stem cell biology with quantitative, high-precision physiological readouts. This will not only support fundamental research into developmental mechanisms but also drive translational projects in drug discovery, cardiotoxicity testing, and personalized regenerative medicine.

Invitation to Young Scientists – Join a World-Class Research Environment: To bring this ambitious vision to life, Prof. Hescheler is actively seeking highly motivated and talented **doctoral candidates and postdoctoral fellows** to join his team at the SKL in Macau. This is a rare and exceptional opportunity for early-career researchers to work at the absolute forefront of stem cell science. Successful candidates will benefit from:

- Direct mentorship from a globally recognized pioneer in stem cell research.
- Access to cutting-edge core facilities and exclusive biophysical instrumentation.
- The chance to contribute to high-impact projects in cardiovascular regeneration, developmental toxicology, aerospace medicine, and TCM-based drug screening.

- A vibrant international research culture that spans European and Asian excellence, with strong links to the Shanghai Hescheler Institute and Chinese Academy of Sciences.

This is an invitation not merely to join a laboratory, but to become a founding member of a new research ecosystem that will place Macau firmly at the heart of international stem cell innovation. Prof. Hescheler looks forward to welcoming ambitious researchers who are eager to push the boundaries of what is possible in stem cell biology and regenerative medicine.