WEI Shengnan

The University of Macau
Faculty of Health Sciences

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Education

Aug. 2022 – present **The University of Macau** **Macau SAR, China**

- Ph.D. student in Biomedical Sciences

Aug. 2020 – Feb. 2022 **The University of Sydney** **Sydney, NSW, Australia**

- M. Eng. in Biomedical Engineering

Aug. 2016 – Jul. 2020 **Beijing University of Chemical Technology** **Beijing, China**

- B. Eng. in Biomedical Engineering

Research (Supervised by Prof. Guokai CHEN at the University of Macau)

Aug. 2022 – present **Potential Impact of Early Fate Decision of hPSCs on the Tendency and Function of Offspring Cells.**

- Maintained hPSC lines (H1, H9) to support pluripotency-to-germ-layers transition studies.
- Elucidated signalling pathways driving hESC differentiation into definitive endoderm.
- Characterized primitive streak subpopulations, revealing distinct phenotypic tendencies.

Dec. 2022 – present **Research on Key Pathways of *In Vitro* Induction and *In Vivo* Genesis of MSCs.**

- Established MSC derivation protocols from PSCs using serum-based and chemically defined methods.
- Investigated the key components in traditional serum culture medium that contribute to the *in vitro* induction of MSCs.
- Explored the potential improvements in MSC derivation by modifying the components of the traditional serum culture medium.

Apr. 2023 – present **Effect of Culture Conditions on Therapeutic Immunomodulation Ability of MSCs.** National Key Research and Development Program of China 2022YFA1105000

- Established and maintained diverse human MSC lines (T-MSCs, BM-MSCs, UC-MSCs, AD-MSCs, Liver-MSCs, Colon-MSCs) to support comparative functional studies.
- Optimized MSC culture media by testing supplements and components, enhancing immune regulatory function.
- Mapped signalling pathways influencing MSC immunomodulation, identifying strategies to boost therapeutic efficacy.
- Implemented priming of MSCs with key cytokines such as interferon-gamma (IFN-γ) to modulate their immune regulatory properties.
- Pioneered chemically defined MSC culture systems, reducing reliance on serum-based methods.

Aug. 2022 – present **FEA Insights into the Mechanics of hPSC Colonies**

- Developed numerical models for human Pluripotent Stem Cell (hPSC) colonies.
- Implemented qualitative Finite Element Analysis (FEA) methods for assessing the mechanics of hPSC colonies.

Research (Supervised by Dr Ali ENTEZARI at the University of Sydney)

Feb. 2021 – Dec. 2021 **FEA study on porous total knee arthroplasty (TKA) prostheses**

- Developed numerical models for porous TKA prostheses.
- Conducted FEA on TKA prostheses with varying porosity.
- Optimized the design of porous components in TKA prostheses.

Research (Supervised by Prof. Xing WANG at Beijing University of Chemical Technology)

Dec. 2020 – Feb. 2021 **3D cell culture of mesenchymal stem cells (MSCs) with hydrogels**

- Cultivated mouse Mesenchymal Stem Cells (MSCs).
- Investigated 3D culture conditions for mouse MSCs using Chitosan/di-terminal functionalized polyethylene glycol (DF-PEG) (CP) hydrogels.

Jun. 2019 – Jun. 2020 **Adaptability study of CP hydrogels as 3D cell culture matrices**

- Synthesized DF-PEG from PEG.
- Prepared CP hydrogels.
- Adjusted the mechanical strength of the hydrogels to the desired levels.
- Studied the impact of the mechanical strength of hydrogels on cell proliferation.
- Optimized 3D culture conditions for L929 fibroblast cells and RSC96 Schwann cells.

Research (Supervised by Prof. Zheng-Jun LI at Beijing University of Chemical Technology)

Jun. 2018 – Sept. 2018 **Construction of genetically engineered bacteria**

- Cultivated genetically engineered bacterial strains.
- Collected samples and characterized products using gas chromatography.

Work Experience

2024 – present **MacOrigen Technology Limited (Macau)** **Macau SAR, China**

Co-founder

- Designed, conducted, and interpreted experiments, leading the development of a defined MSC medium as part of strategic R&D initiatives.
- Facilitated collaboration with the university.
- Participated in preparation and presentation at various exhibitions, including Macao International Trade and Investment Fair (MIF), enhancing brand visibility and impact.

Academic Experience

Teaching Assistant, University of Macau

- GEST1002 Quantitative Reasoning for Social Science (2022)
- HSCI8005 Critical Scientific Reading-Writing and Analysis (2024)

Publications

Patent Z. Li, W. Li, **S. Wei**, Q. Zhu, "Genetic engineering bacterium for simultaneously producing glycolic acid and lactic acid as well as construction method and application of genetic engineering bacterium", China Patent CN109337848A, Feb. 2019

Journal Article Y. Meng, C. Deng, X. Xiao, **S. Wei**, C. Song, J. Wang, CL Lei, W. Liu, G. Chen, The modulation of calcium and chloride channels induces cardiomyocytes from human pluripotent stem cells. *Int. J. Biol. Sci.* 2025; 21(1): 95-108

Conference Presentations

S. Wei, Z. Zhang, Y. Chen, T. Sun, L. Li, G. Chen, Chemically Defined Platform for Standardised Culture and Immunomodulatory Evaluation of Human MSCs, **Poster**, 5th International Conference of the Guangdong-Hong Kong-Macau Greater Bay on Regenerative Medicine, Apr. 2026

S. Wei, Designing Fully Defined Platforms that Enable MSC Expansion and Functional Characterization, **Oral Presentation**, 10th Symposium on Biomedical Sciences for Students, Postdoctoral Fellows and Research Assistants, Apr. 2026

S. Wei, Z. Zhang, Y. Chen, T. Sun, L. Li, G. Chen, Chemically Defined Platform for Standardised Culture and Immunomodulatory Evaluation of Human MSCs, **Poster**, Singapore Cell and Gene Therapy (SCGT) Pan Asia Summit 2025, Jul. 2025

S. Wei, Z. Zhang, G. Chen, Finite Element Analysis of hPSC Colony Mechanics: From Single Cells to Colonies, **Poster**, 11th Macau Symposium on Biomedical Sciences (MSBS), Jun. 2025

S. Wei, Z. Zhang, G. Chen, Finite Element Analysis of hPSC Colony Mechanics: From Single Cells to Colonies, **Poster**, 4th International Guangdong-Hong Kong-Macau Greater Bay Area Conference in Regenerative Medicine (GBRM), May 2025

S. Wei, Z. Zhang, G. Chen, Finite Element Analysis of hPSC Colony Mechanics: From Single Cells to Colonies, **Poster**, 9th Symposium on Biomedical Sciences for Students, Postdoctoral Fellows and Research Assistants, Mar. 2025

S. Wei, Chen, "Signalling Pathways During the Journey Towards Definitive Endoderm: Those Who Can and Those Who Cannot", **Poster**, 10th Macau Symposium on Biomedical Sciences (MSBS), Jun. 2024

S. Wei, Chen, "Signalling Pathways During the Journey Towards Definitive Endoderm: Those Who Can and Those Who Cannot", **Poster**, 8th Symposium on Biomedical Sciences for Students, Postdoctoral Fellows and Research Assistants, Mar. 2024

S. Wei, Z. Zhang, G. Chen, "Qualitative analysis of hPSC colony mechanics with finite element method", **Poster**, 9th Macau Symposium on Biomedical Sciences (MSBS), Jun. 2023

S. Wei, A. Entezari, "Design optimization of total knee arthroplasty prostheses: an FEA study", **Poster**, 7th Symposium on Biomedical Sciences for Students, Postdoctoral Fellows and Research Assistants, Apr. 2023

S. Wei, Z. Zhang, G. Chen, "Qualitative analysis of hPSC colony mechanics with finite element analysis", **Poster**, 2nd International Guangdong-Hong Kong-Macau Greater Bay Area Conference in Regenerative Medicine (GBRM), Apr. 2023

S. Wei, A. Entezari, "Design optimization of total knee arthroplasty prostheses: an FEA study", **Poster**, 8th Macau Symposium on Biomedical Sciences (MSBS), Oct. 2022

Award

Apr. 2026	First Prize for Oral Presentation, 10th Symposium on Biomedical Sciences for Students, Postdoctoral Fellows and Research Assistants
Aug. 2025	Second Place of 2025 University of Macau & Bank of China Trophy UltiMater Entrepreneurship Competition
May 2025	Third Prize for Excellent Poster at the 4th International Guangdong-Hong Kong-Macau Greater Bay

	Area Conference in Regenerative Medicine (GBRM)
Mar. 2025	Outstanding Poster (First Prize) at the 9th Symposium on Biomedical Sciences for Students, Postdoctoral Fellows and Research Assistants
Sept. 2019	Best Student in the Advanced Practicum at China-Japan Friendship Hospital

Skills

Experiments

- P1 and P2 Lab Work
- Cell Culture
- Flow Cytometry
- Molecular Cloning
- RT-qPCR
- Western Blotting
- 3D Modelling
- Finite Element Analysis

Language

- Chinese: Native Speaker
- English: IELTS 7.0

Software

- SolidWorks
- Rhinoceros
- ANSYS Workbench
- Python
- Imaris
- MS Office

Extracurricular activities

Aug. 2020 – Dec. 2021	**Subcommittee member of the Sydney University Association of Biomedical Engineers**, in charge of the WeChat Chinese student connection program and helping the organization of biweekly journal clubs.
Oct. 2016 – Oct. 2019	**Member of the operation team for the official WeChat account of the College of Life Science and Technology**, Beijing University of Chemical Technology, working on the design and editing of multimedia content and training of new members.