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Sex: Male | Date of birth: 17/02/2002 | Nationality: Chinese

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## RESEARCH EXPERIENCE

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### 1. Research on Macrophage Death Induced by Cytoplasm Membrane Vesicles(CMV) Separated from Streptococcus Agalactiae Cells (Finished) 2022/07--2023/04

China University Life Science Competition (ULSC)

**Role:** Project leader

**Abstract:** This research focus mechanism of host cell inflammation and cell death caused by the interaction of cytoplasm membrane vesicles(CMV) released by streptococcus agalactiae(GBS) with mouse macrophages.

**Contribution:** Design the experiment, Identification of the Streptococcus Agalactiae and its CMVs, Hoechst stain to visualize to death of Macrophage, ELISA to quantify to cytosine, Write the final thesis.

**Learned skills:** Basic molecular techniques, Scientific writing, Culturing cell, Data analysis and visualization with Excel

### 2. Recombinant Tumor Vaccine for Breast Cancer HER2 Antigen Based on Outer Membrane Vesicle (Finished) 2021/08--2023.05

National Innovation and Entrepreneurship Competition Fund

**Role:** Project leader

**Abstract:** This project uses ClyA protein as a guiding sequence to locate HER2 antigen to the outer membrane vesicles(OMV) of E. coli and elicit immune response in mouse macrophages.

**Contribution:** Writing the proposal, Construct recombinant plasmid and transfer it into recipient E.coli and identification, Identification of OMVs, Visualizing OMVs with confocal microscopy, Thesis defense, Writing and publishing review article

**Learned skills:** Literature searching and reading, Review writing, The construction of genetic recombinant bacteria, Culturing E.coli, Defense

### 3. Benchmarking Algorithms for Batch Correction in Single-cell ATAC-seq data Analysis (Finished) 2023/12--2024/04

Bachelor Thesis

**Abstract:** This project aims to assess the efficacy, accuracy, and scalability of different integration algorithms, providing insights into the performance of these software tools under varying conditions.

**Contribution:** Design the protocol, Data download and quality control, Data standardization, Annotating cell types, Processing the data with different algorithms, Calculating metrics and visualizing the result, Thesis defense(In English and Chinese)

**Learned skills:** The whole analysis steps of sc-ATAC data, Programming with Python, Defense in English, Operation on Linux, Operation on HPC

#### 4. Investigating the Role of RNA and its metabolism in Centrioles Formation (Ongoing)

2025.02-Present(will be done before 2026.02)

##### Master Thesis

**Abstract:** This project aims to investigate the functions and systematically identify the existence of RNA at centrioles, make use of fluorescent microscopy and RNA-seq technology, which will provide more insights in centriole formation.

**Contribution:** Establish protocols of using qPCR to detect RNA in Centrioles; Co-localizing Centrioles and RNAs using RNA specific dyes and FISH; Perform data mining and data analysis on the RNA-seq data;

**Learned skills:** Experiment design; Literature Reading & Scientific Thinking; Sequencing data analysis; Analysis Pipeline making; Microscopy; Molecular Biology; Image process with FIJI ; Presentation

#### RESEARCH EXPERIENCE

##### 1. Bio-Engineering 2020/09--2024/07 *Bachelor of Engineering*

Inner Mongolia University(IMU) (Project 211, National key University)

Address: No. 24, Zhaojun Road; Yuquan District, Hohhot City, Inner Mongolia 010000

Major Courses(Bold font represents a score exceeding 85): **Bioinformatics, Probability Theory and Mathematical Statistics, Professional Foreign Language (English)**, General Biology, **Instrumental Analysis, Cell Biology**, Physiology, **Microbiology, Biological Statistics**, Biochemistry, College Chemistry, **Cell Engineering**, Advanced Mathematics, **Genetic engineering**, Molecular biology, **Principle of chemical engineering**

Served as Class Rep.

##### 2. Bioinformatics 2023/12--2024/04 *Visiting Student*

Westlake University (Visiting student)

No.18 Shilongshan Road, Xihu District, Hangzhou, Zhejiang, 310024

Zhang Kai Lab ([Lab website](#))

Major job: Finishing the content of the **Bachelor Thesis** and help the RA to do **some data analysis job**. Also supplement laboratory teaching documents.

Learned Skills: Basic concepts and methods of **Computational biology**, become proficient in **data science**. Ability of **making English presentation**.

##### 3. Chemical Biology 2024/09--Present *Master of Science*

University of Geneva and École polytechnique fédérale de Lausanne(EPFL)

Geneva and Lausanne, Switzerland

Major Courses: Elements in bioinformatics, Machine Learning(Auditor), Microscopy and imaging course, Current trends in Chemical biology and Drug Development; Current Topics in Chemical Biology

#### PERSONAL SKILLS

Self assessment	Data processing	Data Mining	English Writing	Literature reading	Problem solving
	Competent	Competent	Proficient	Proficient	Competent

- ❖ Familiar with Systems such as Windows, MacOS, **Ubuntu or CentOS**, as well as some tools like “DepMap”, “UCSC genome browser” or GEO database, can manage my code with Github
- ❖ **Proficient in Python** and familiar with packages like pandas, scanpy, numpy as well as a beginner of C++
- ❖ Proficient in molecular lab skills like Westblotting, ELISA, SDS-PAGE, Genome extraction, PCR etc.

## HONORS & PUBLICATIONS

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Honors    09/2024, Merit Fellowship from SNE Chemical biology, Switzerland  
09/2023, Selected as the candidate of "JingYing Scholar" Training Program of Inner Mongolia University  
07/2023, Outstanding camper of Life science summer camp, University of Science and Technology of China  
04/2023, Third-Class Model Scholarship of Inner Mongolia University  
04/2023, Undergraduate First-class Academic Scholarship of Inner Mongolia University  
05/2022, 2021 Outstanding Youth League Cadre of Inner Mongolia University  
05/2022, University-level Merit Student of Inner Mongolia University  
04/2022, Undergraduate Second-class Academic Scholarship of Inner Mongolia University  
05/2021, 2020 Outstanding League Member of Inner Mongolia University  
04/2021, Undergraduate Third-class Academic Scholarship of Inner Mongolia University

Publications    [1]Sun Cai, Wu Yanhao, **Guo Jiayi**. Research Progress in the Application of OMV in Tumor Vaccines[J]. *Chinese Bulletin of Life Sciences*, 2022,34(11):1431-1441.DOI:10.13376/j.cbls/2022157,  
[2]Wang S, **Guo J**, Bai Y, et al. Bacterial outer membrane vesicles as a candidate tumor vaccine platform. *Front Immunol*. 2022;13:987419. doi:10.3389/fimmu.2022.987419