Zhenzhen He

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Education

- Ph.D. of Civil Engineering, The George Washington University, USA

Supervisor: Prof. Danmeng Shuai *09/2022 – present*

- Master of Environmental Science, Sun Yat-sen University, China

Supervisor: Prof. Longfei Shu *09/2019 – 06/2022*

- Bachelor of Environmental Science, Anhui Agricultural University, China

09/2015 – 06/2019

Research Experience

- **Microbial interactions affect drinking water safety**

  We find that both viable and inactivated amoeba spores protect their intracellular bacteria from drinking water disinfection. And a novel strategy, FeP/persulfate system, can effectively inactivate intracellular bacteria within amoeba spores.

  Related experimental skills:

  Microbiology: microbial cultivation; DNA and RNA extraction; molecular clone.

  Physical chemistry: sampling; determination of physicochemical indexes.

  Microscopy: video microscopy; confocal laser microscopy; electron microscopy.

  Quantitative analyses of microbes: qPCR; CFU counting.

- **Selective interactions between amoebae and bacteria**

  We find that the interactions between amoebae and bacteria are selective and amoebae can change the biogeochemical cycles of heavy metals through selective predation.

  Related experimental skills:

  Quantitative analyses of microbes: chemotaxis assay; population dynamics; high-throughput sequencing.

  Microbial interactions: time-lapse video microscopy; microbial co-culture; aggregation of bacterial and amoeba.

Publications

1. Huang Yu[#], **Zhenzhen He**[#], Zhili He, Qingyun Yan*, Longfei Shu*. Soil amoebae affect iron and chromium reduction through preferential predation between two metal-reducing bacteria. ***Environmental Science & Technology***, 2022 (DOI: 10.1021/acs.est.1c08069).

2. **Zhenzhen He**[#], Ningchao Zhen[#], Lin Zhang, Yuehui Tian, Zhuofeng Hu*, Longfei Shu*. Efficient inactivation of intracellular bacteria in amoeba spores by FeP. ***Journal of Hazardous Materials***, 2022. 425: p. 127996 (DOI: 10.1016/j.jhazmat.2021.127996).

3. Siyi Zhang, **Zhenzhen He**, Chenyuan Wu, Zihe Wang, Yingwen Mai, Ruiwen Hu, Xiaojie Zhang, Wei Huang, Yuehui Tian, Dehua Xia, Cheng Wang, Qingyun Yan, Zhili He*, Longfei Shu*. Complex bilateral interactions determine the fate of polystyrene micro and nano plastics and soil protists: implications from a soil amoeba. ***Environmental Science & Technology***, 2022 (DOI: 10.1021/acs.est.1c06178).

4. Yuehui Tian, Tao Peng, **Zhenzhen He**, Luting Wang, Xurui Zhang, Zhili He, Longfei Shu*. Symbiont-induced phagosome changes rather than extracellular discrimination contribute to the formation of social amoeba farming symbiosis. ***Microbiology Spectrum***, 2022 (DOI: 10.1128/spectrum.01727-21).

5. **Zhenzhen He**, Luting Wang, Yuexian Ge, Siyi Zhang, Yuehui Tian, Xin Yang*, Longfei Shu*. Both viable and inactivated amoeba spores protect their intracellular bacteria from drinking water disinfection. ***Journal of Hazardous Materials***, 2021. 417: p. 126006 (DOI: 10.1016/j.jhazmat.2021.126006).

6. Longfei Shu, **Zhenzhen He**, Xiaotong Guan, Xueqin Yang, Yuehui Tian, Siyi Zhang, Chenyuan Wu, Zhili He, Qingyun Yan, Cheng Wang*, Yijing Shi*. A dormant amoeba species can selectively sense and predate on different soil bacteria. ***Functional Ecology***, 2021.00:p. 1-14 (DOI: 10.1111/1365-2435.13824). (Cover Story)

7. Yijing Shi, David C. Queller, Yuehui Tian, Siyi Zhang, Qingyun Yan, Zhili He, **Zhenzhen He**, Chenyuan Wu, Cheng Wang*, Longfei Shu*. The ecology and evolution of amoeba-bacterium interactions. ***Applied and Environmental Microbiology***, 2021, 87 (DOI: 10.1128/AEM.01860-20). (Cover Story)

Academic Awards & Scholarship

Outstanding Graduate Award, Sun Yat-sen University (06/2022)

National Scholarship for Graduate Students, China (2021)

Academic Scholarship, Sun Yat-sen University (2021, 2020, 2019)

Outstanding Graduate Award, Anhui Agricultural University (06/2019)

Academic Scholarship, Anhui Agricultural University (2018, 2017, 2016)

Other skills

Language:

English: TOEFL iBT: 97 (2021, R: 24, L: 28, S: 23, W: 22); Chinese: Native

Coding: R

Software: Graphpad, Adobe Illustrator, Gephi, Cytoscape