

# 膳食甘草促进小鼠镉解毒 并调节小鼠肠道菌群代谢

郑鑫<sup>1</sup>, 王丽琨<sup>1</sup>, 尤琳浩<sup>2</sup>, 刘永鑫<sup>3</sup>, Michael Cohen<sup>4</sup>,  
田丝雨<sup>2</sup>, 李文君<sup>1,5</sup>, 李小方<sup>1</sup>

<sup>1</sup>中国科学院遗传与发育生物学研究所农业资源研究中心, 石家庄, 中国

<sup>2</sup>河北师范大学生命科学学院, 石家庄, 中国

<sup>3</sup>中国科学院遗传与发育生物学研究所, 北京, 中国

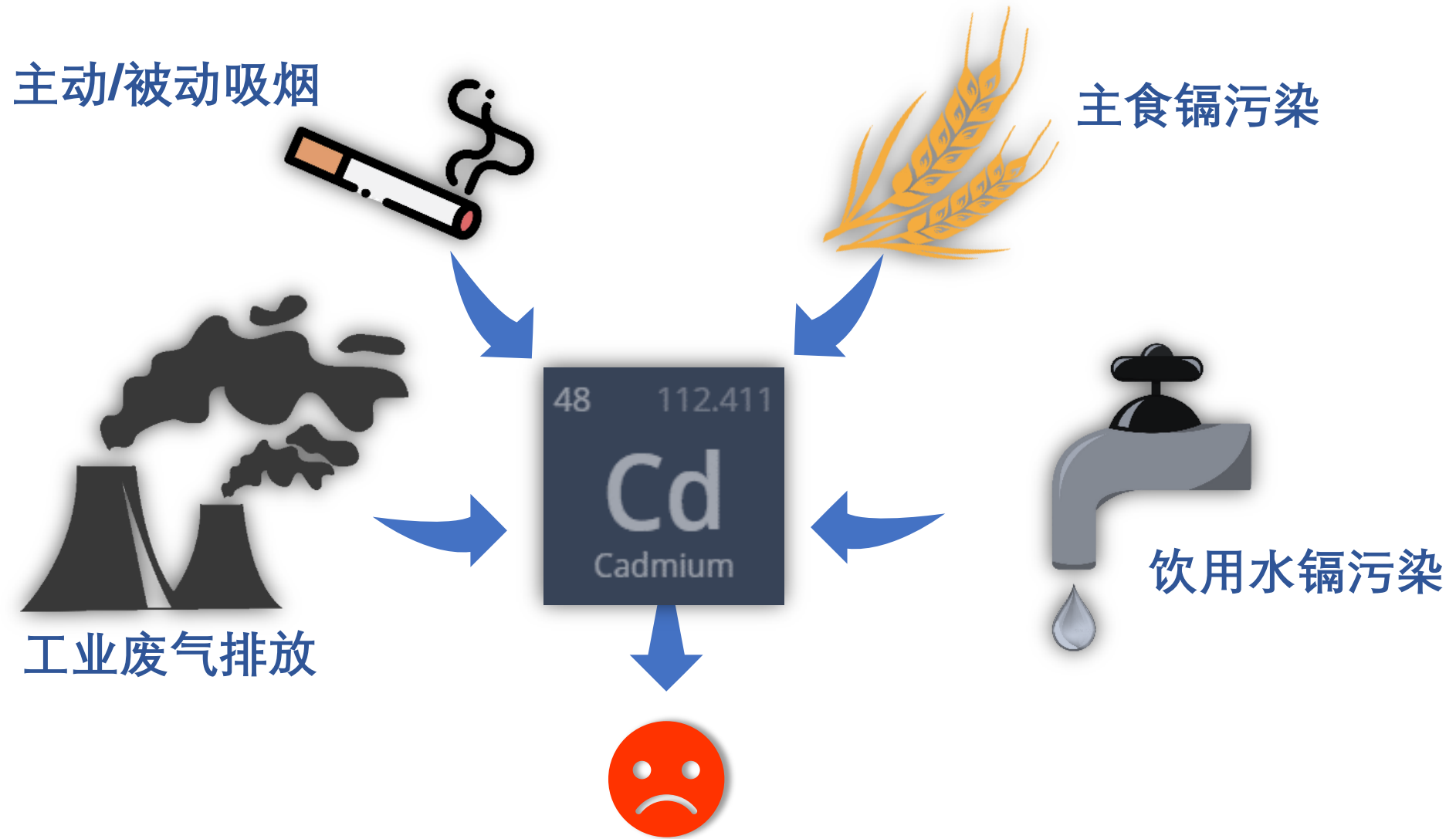
<sup>4</sup>索诺马州立大学生物系, 加利福尼亚, 美国

<sup>5</sup>中国科学院大学, 北京, 中国



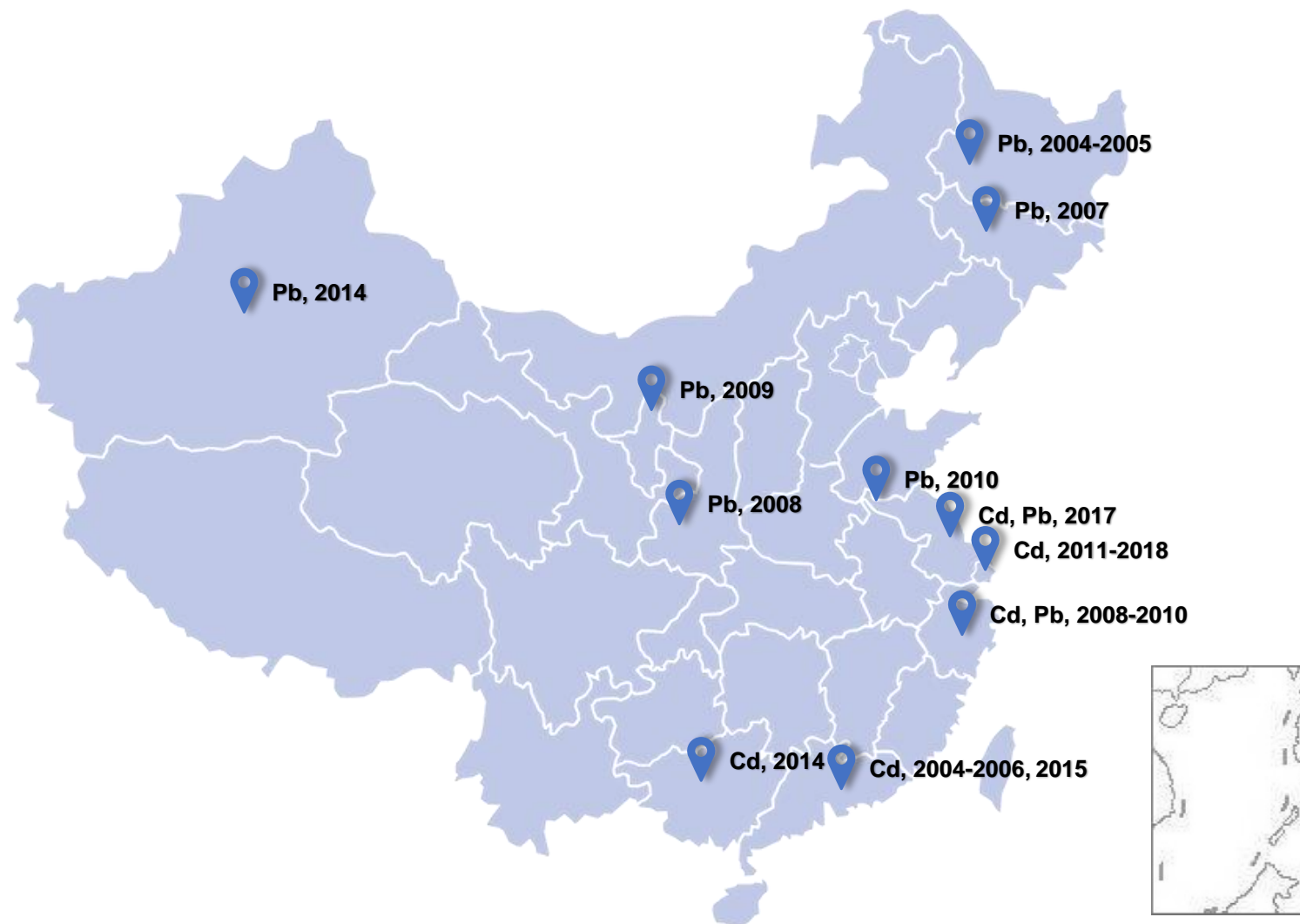
Zheng, Xin, Likun Wang, Linhao You, Yong-Xin Liu, Michael Cohen, Siyu Tian, Wenjun Li, and Xiaofang Li. 2022. “Dietary Licorice Enhances In Vivo Cadmium Detoxification and Modulates Gut Microbial Metabolism in Mice.” *iMeta* e7. <https://doi.org/10.1002/imt2.7>

# 当今社会人体可通过多种途径接触过量镉



Zheng, Xin, Likun Wang, Linhao You, Yong-Xin Liu, Michael Cohen, Siyu Tian, Wenjun Li, and Xiaofang Li. 2022. "Dietary Licorice Enhances In Vivo Cadmium Detoxification and Modulates Gut Microbial Metabolism in Mice." *iMeta* e7. <https://doi.org/10.1002/imt2.7>

# 近年中国血镉或铅超标事件频发令人担忧



Zheng, Xin, Likun Wang, Linhao You, Yong-Xin Liu, Michael Cohen, Siyu Tian, Wenjun Li, and Xiaofang Li. 2022. “Dietary Licorice Enhances In Vivo Cadmium Detoxification and Modulates Gut Microbial Metabolism in Mice.” *iMeta* e7. <https://doi.org/10.1002/imt2.7>

# 重金属超标的治疗干预问题难以解决



污染源难以精确识别；



责任追溯难以界定；



作为一种慢性中毒，医疗干预难以实施；



针对性治疗药物难以获得。

# 饮食干预有助于解决大规模人口层面的健康问题

阿尔茨海默病

子宫内膜异位症

儿童肥胖

急性淋巴细胞白血病

心血管疾病

抑郁症

II型糖尿病

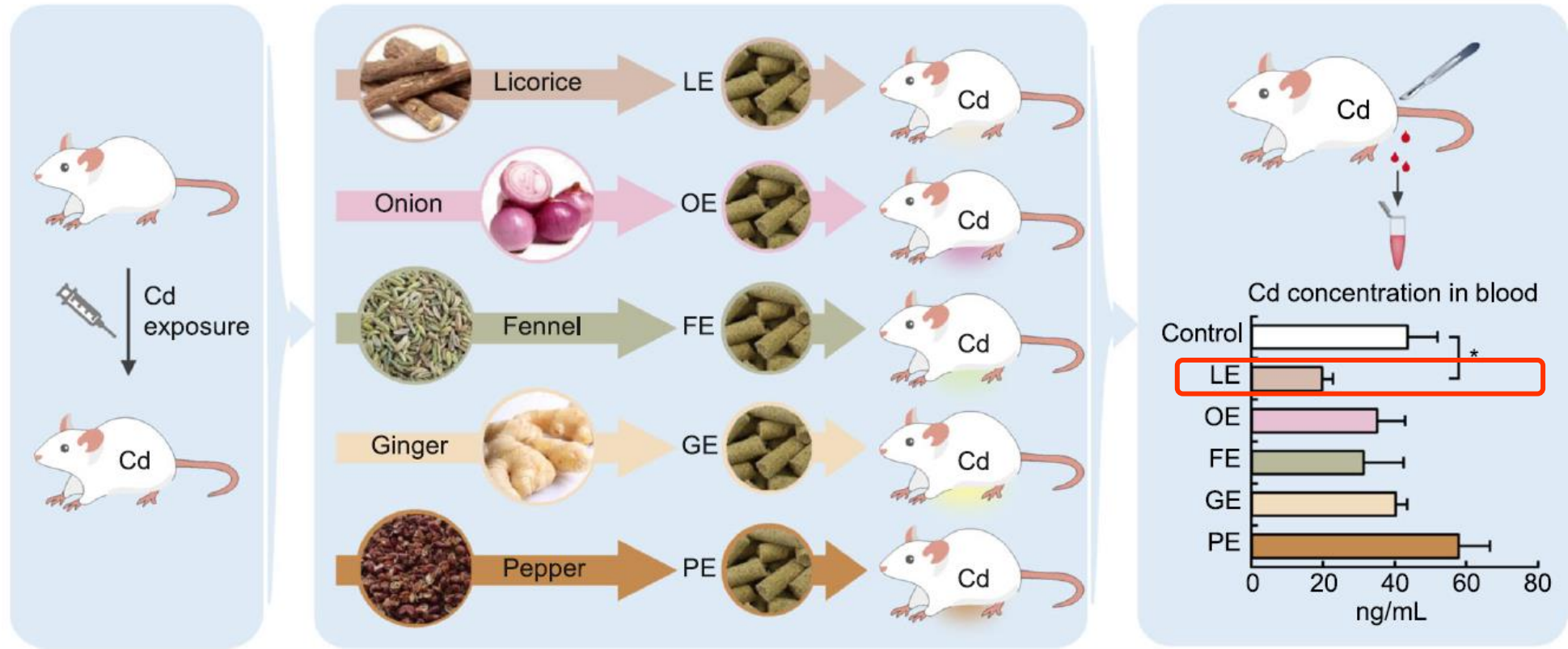
膳食中草药毒性和副作用低，价格低廉，易于获取



中草药能否用于血镉超标的膳食干预？

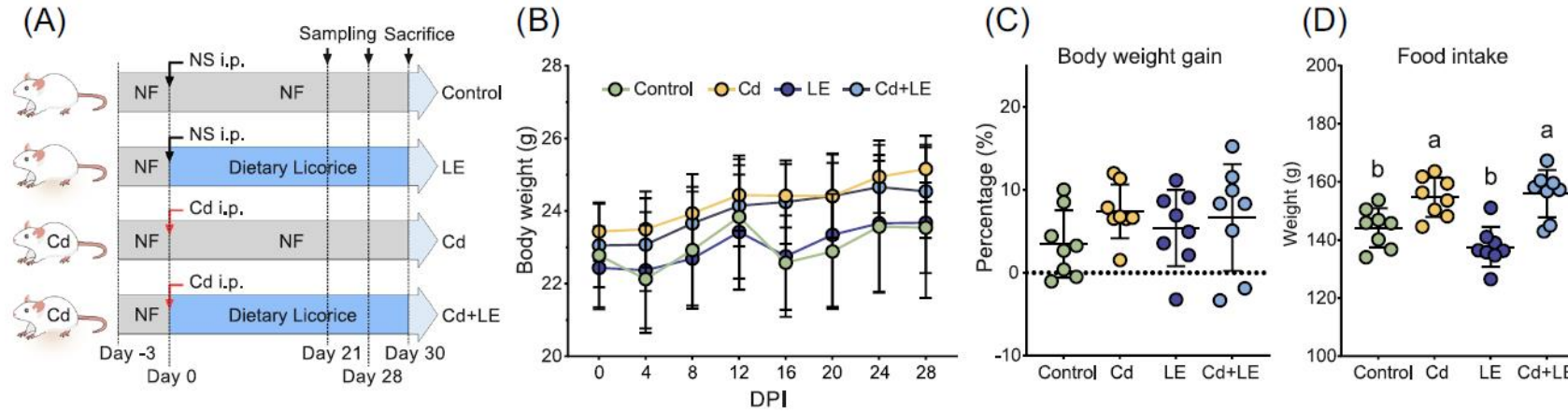
Zheng, Xin, Likun Wang, Linhao You, Yong-Xin Liu, Michael Cohen, Siyu Tian, Wenjun Li, and Xiaofang Li. 2022. "Dietary Licorice Enhances In Vivo Cadmium Detoxification and Modulates Gut Microbial Metabolism in Mice." iMeta e7. <https://doi.org/10.1002/imt2.7>

# 镉解毒功能性膳食草药的筛选



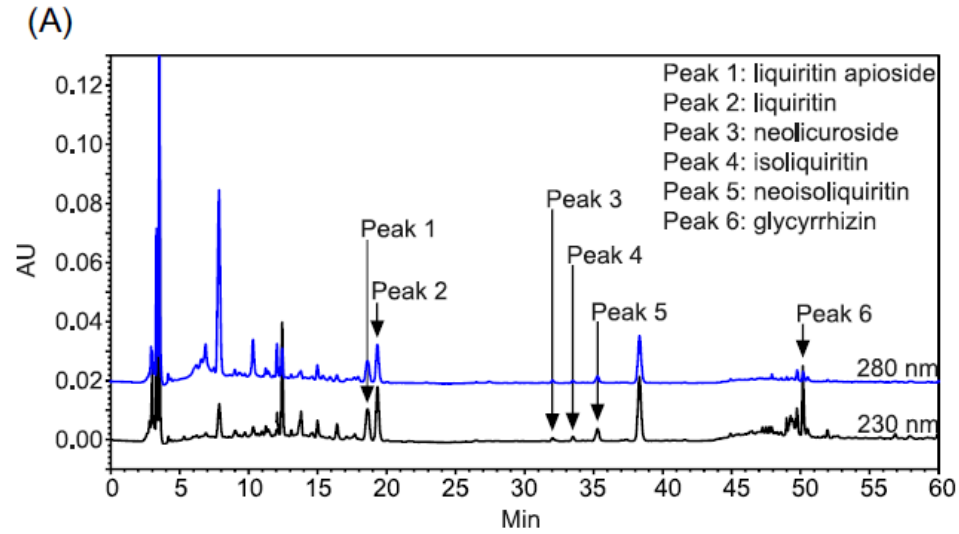
Zheng, Xin, Likun Wang, Linhao You, Yong-Xin Liu, Michael Cohen, Siyu Tian, Wenjun Li, and Xiaofang Li. 2022. "Dietary Licorice Enhances In Vivo Cadmium Detoxification and Modulates Gut Microbial Metabolism in Mice." *iMeta* e7. <https://doi.org/10.1002/imt2.7>

# 膳食甘草的体内镉解毒作用



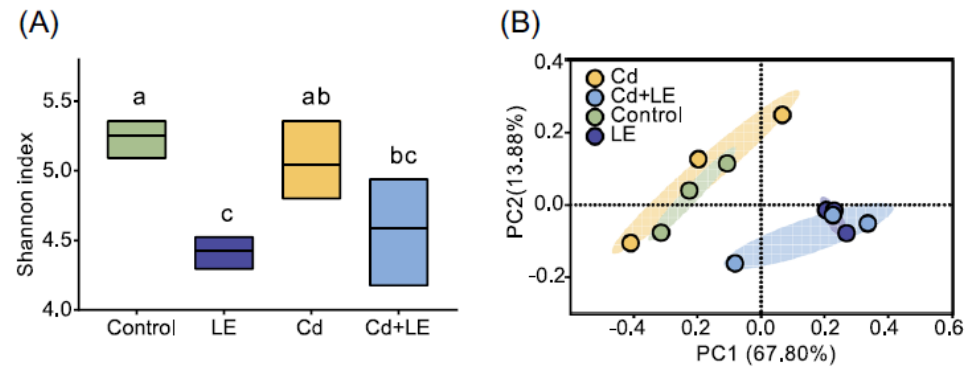
Zheng, Xin, Likun Wang, Linhao You, Yong-Xin Liu, Michael Cohen, Siyu Tian, Wenjun Li, and Xiaofang Li. 2022. "Dietary Licorice Enhances In Vivo Cadmium Detoxification and Modulates Gut Microbial Metabolism in Mice." *iMeta* e7. <https://doi.org/10.1002/imt2.7>

# 甘草水提取物的指纹图谱及肝细胞毒理分析



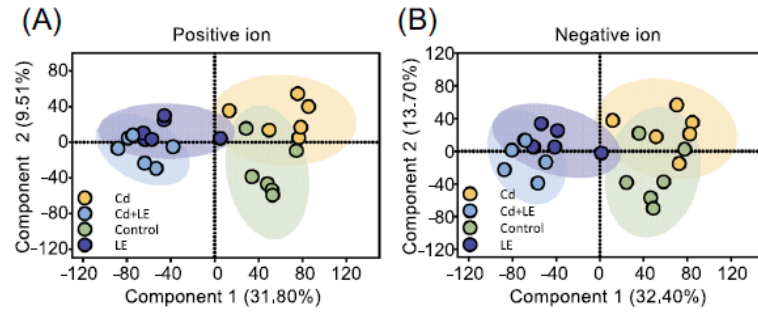
Zheng, Xin, Likun Wang, Linhao You, Yong-Xin Liu, Michael Cohen, Siyu Tian, Wenjun Li, and Xiaofang Li. 2022. "Dietary Licorice Enhances In Vivo Cadmium Detoxification and Modulates Gut Microbial Metabolism in Mice." *iMeta* e7. <https://doi.org/10.1002/imt2.7>

# 膳食甘草改变镉中毒小鼠的肠道菌群组成和功能



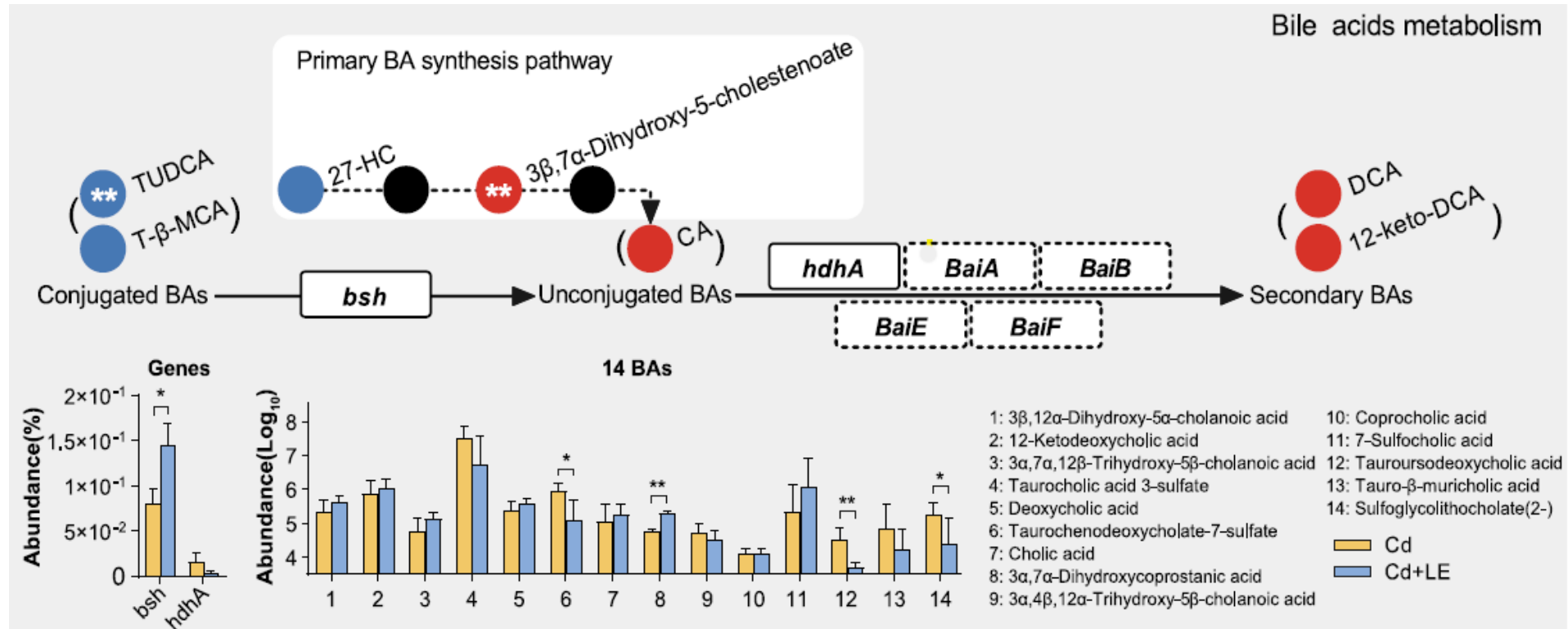
Zheng, Xin, Likun Wang, Linhao You, Yong-Xin Liu, Michael Cohen, Siyu Tian, Wenjun Li, and Xiaofang Li. 2022. “Dietary Licorice Enhances In Vivo Cadmium Detoxification and Modulates Gut Microbial Metabolism in Mice.” *iMeta* e7. <https://doi.org/10.1002/imt2.7>

# 膳食甘草干预后的典型肠道代谢物与典型微生物相关性分析



Zheng, Xin, Likun Wang, Linhao You, Yong-Xin Liu, Michael Cohen, Siyu Tian, Wenjun Li, and Xiaofang Li. 2022. “Dietary Licorice Enhances In Vivo Cadmium Detoxification and Modulates Gut Microbial Metabolism in Mice.” *iMeta* e7. <https://doi.org/10.1002/imt2.7>

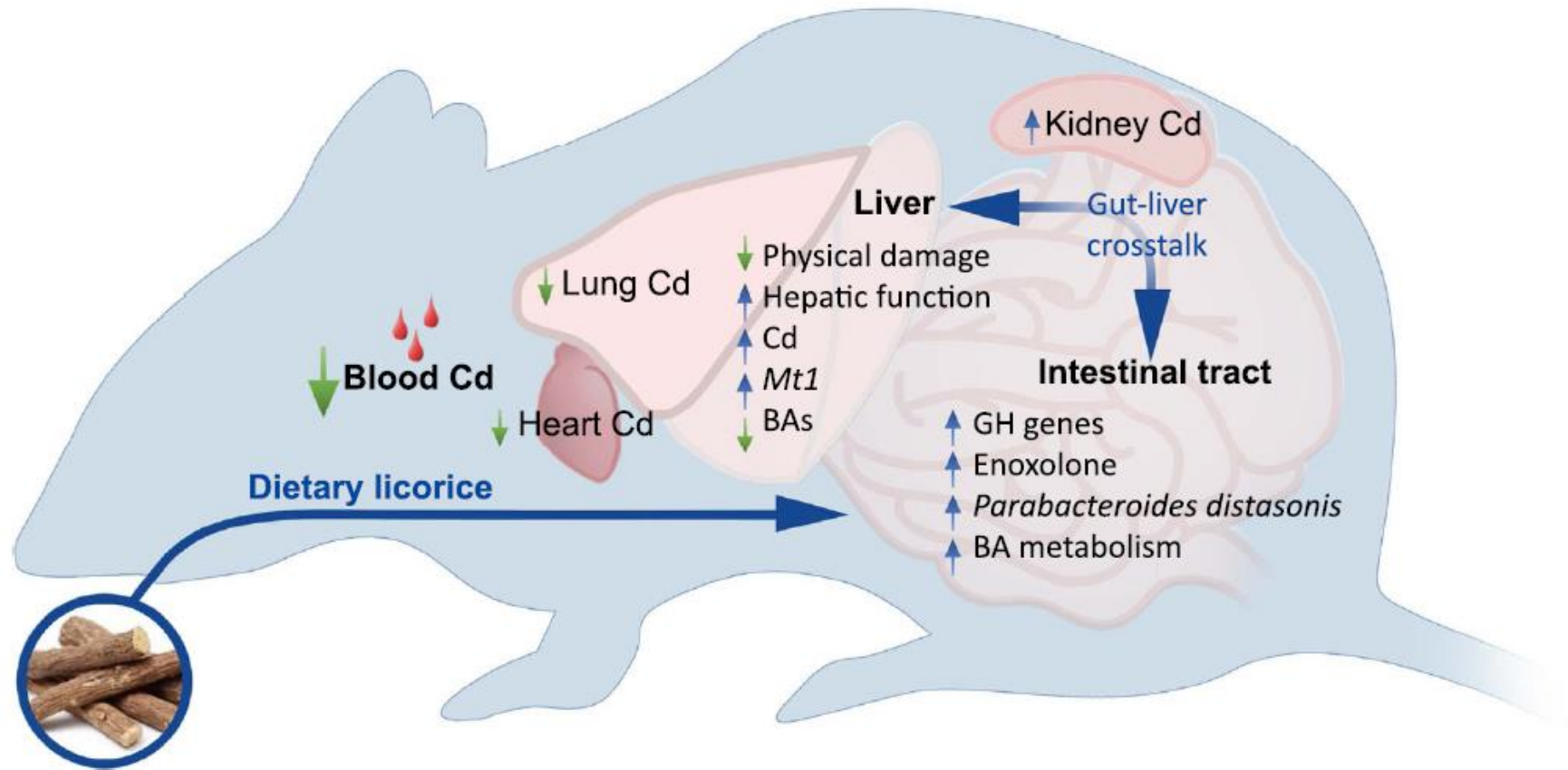
# 膳食甘草调节了肠道微生物潜在代谢过程



Zheng, Xin, Likun Wang, Linhao You, Yong-Xin Liu, Michael Cohen, Siyu Tian, Wenjun Li, and Xiaofang Li. 2022. "Dietary Licorice Enhances In Vivo Cadmium Detoxification and Modulates Gut Microbial Metabolism in Mice." *iMeta* e7. <https://doi.org/10.1002/imt2.7>

# 总结

## 镉中毒状态下膳食甘草干预健康的潜在机制



Zheng, Xin, Likun Wang, Linhao You, Yong-Xin Liu, Michael Cohen, Siyu Tian, Wenjun Li, and Xiaofang Li. 2022. "Dietary Licorice Enhances In Vivo Cadmium Detoxification and Modulates Gut Microbial Metabolism in Mice." *iMeta* e7. <https://doi.org/10.1002/imt2.7>

# 致 谢



郑 鑫



王丽琨



尤琳浩



刘永鑫



Michael Cohen



田丝雨



李文君



李小方



河北省杰出青年科学基金 ( D2018503005)

国家重点研发计划 (2018YFD0800306)




国家自然科学基金 (31700228, 41877414)

Zheng, Xin, Likun Wang, Linhao You, Yong-Xin Liu, Michael Cohen, Siyu Tian, Wenjun Li, and Xiaofang Li. 2022. “Dietary Licorice Enhances In Vivo Cadmium Detoxification and Modulates Gut Microbial Metabolism in Mice.” *iMeta* e7. <https://doi.org/10.1002/imt2.7>

**iMeta:** Integrated meta-omics to change the understanding of the biology and environment



**“iMeta”** is an open-access Wiley partner journal and launched by scientists of the Chinese Academy of Sciences. iMeta aims to promote metagenomics, microbiome and bioinformatics development by publishing original researches, methods or protocols, and reviews. The goal is to publish highly quality papers (Top 10%, IF > 15) targeting broad audience. Unique features including video submission, reproducible analysis, figure polishing, APC waiver, and promotion by social media with 500,000 followers. The first issue will be released in March 2022.

 Society: <http://www.imeta.science>  
 Publisher: <https://onlinelibrary.wiley.com/journal/2770596x>  
 Submission: <https://mc.manuscriptcentral.com/imeta>

 [office@imeta.science](mailto:office@imeta.science)

 [iMetaScience](#)

 [iMeta](#)

 [iMetaScience](#)  
[iMetaJournal](#)