



复兴中学宣讲 浅谈大学生生活

生命科学学院

董哲

2025.06.12

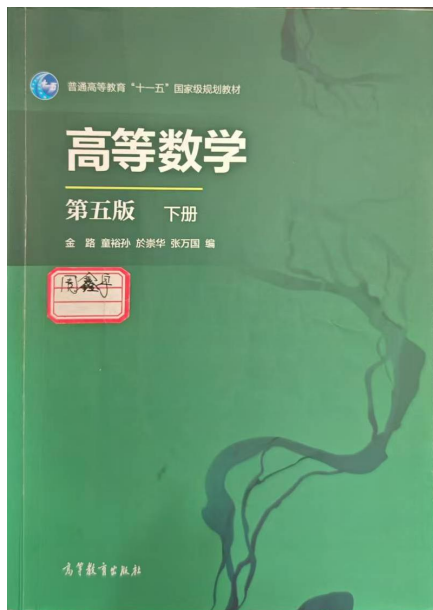
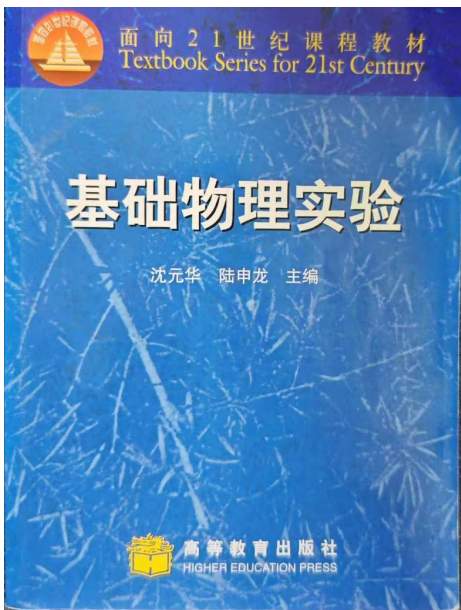


大学生活，从.....开始？



“等到了大学，你们就轻松啦！”

大学生活，从.....开始？



你的绩点

总学分数

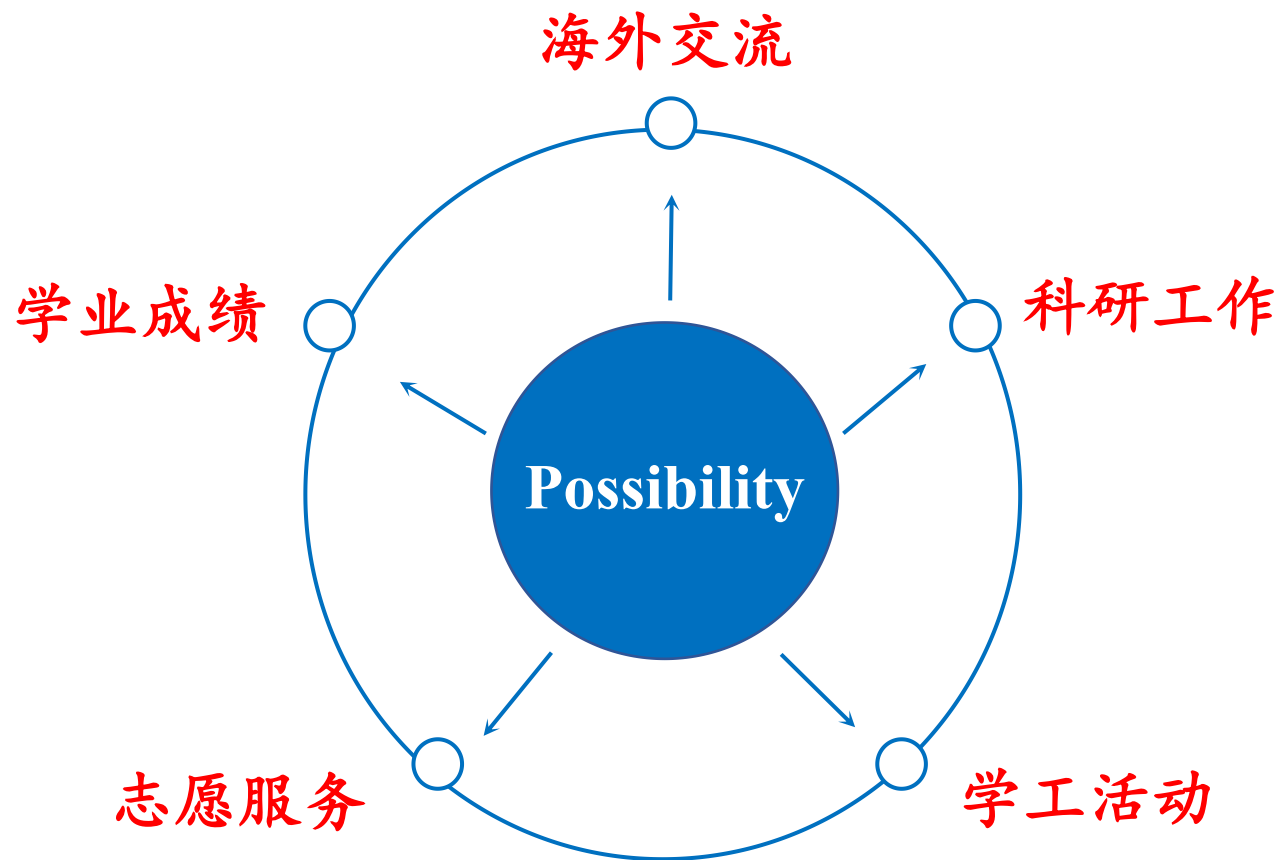
，绩点排名

，点击查

看详情

困境1：繁重的学业压力

大学生活，从....开始？



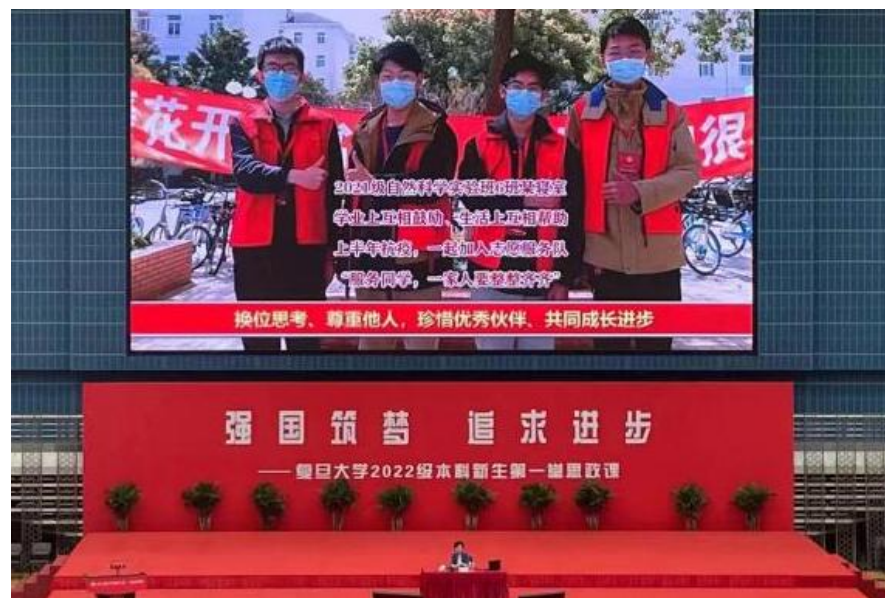
困境2：选择太多，怎么选？

所以，我开始想...

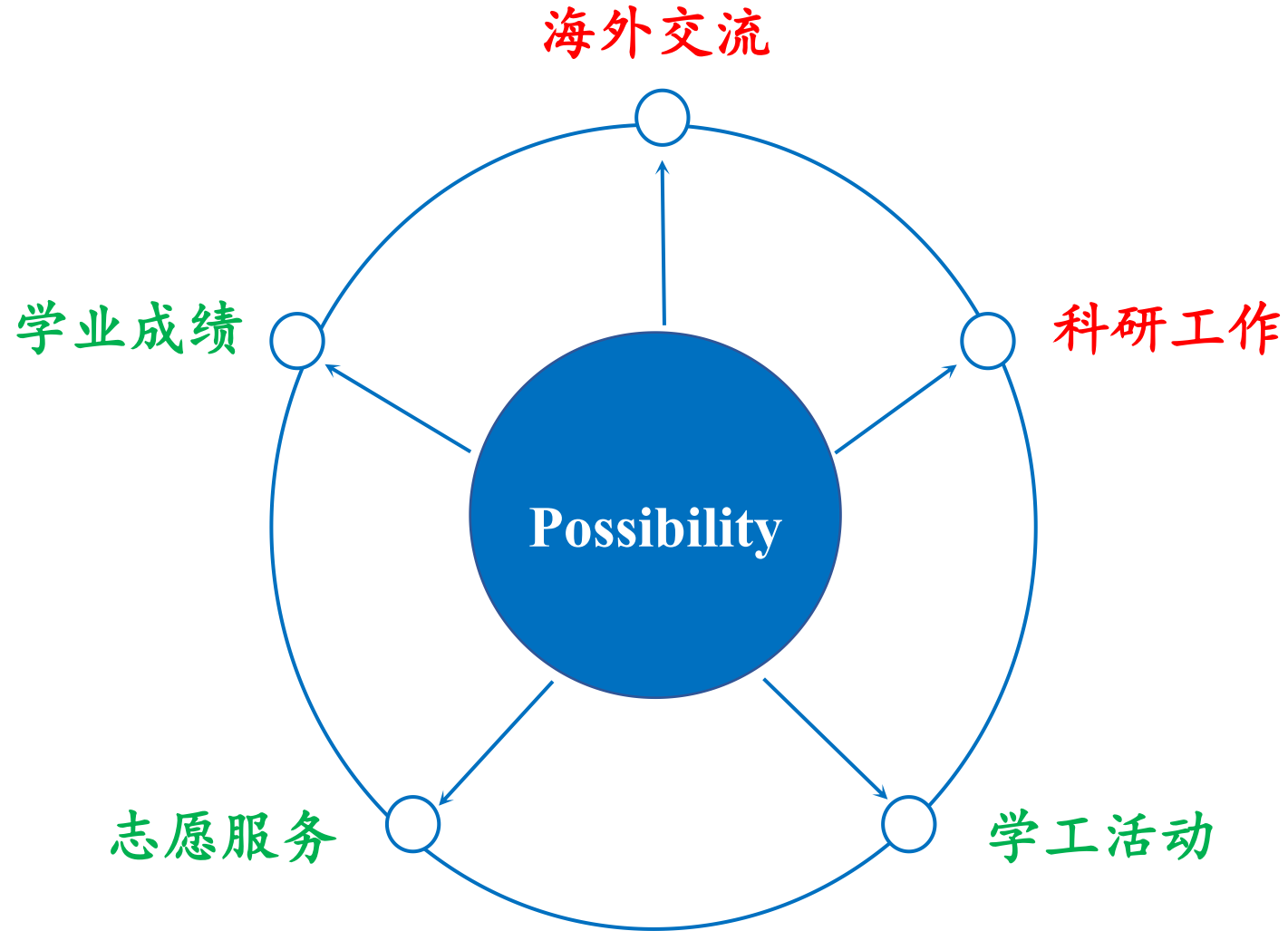
压力大、落差大、茫然无措

- 学业压力 (高中-大学 gap)
- Peer Pressure (一寝室的卷王)
- 时间压力 (课余时间少，想做的事情多)
- 疫情的未知性
- 对未来的迷茫
-

认清自己，把握机会

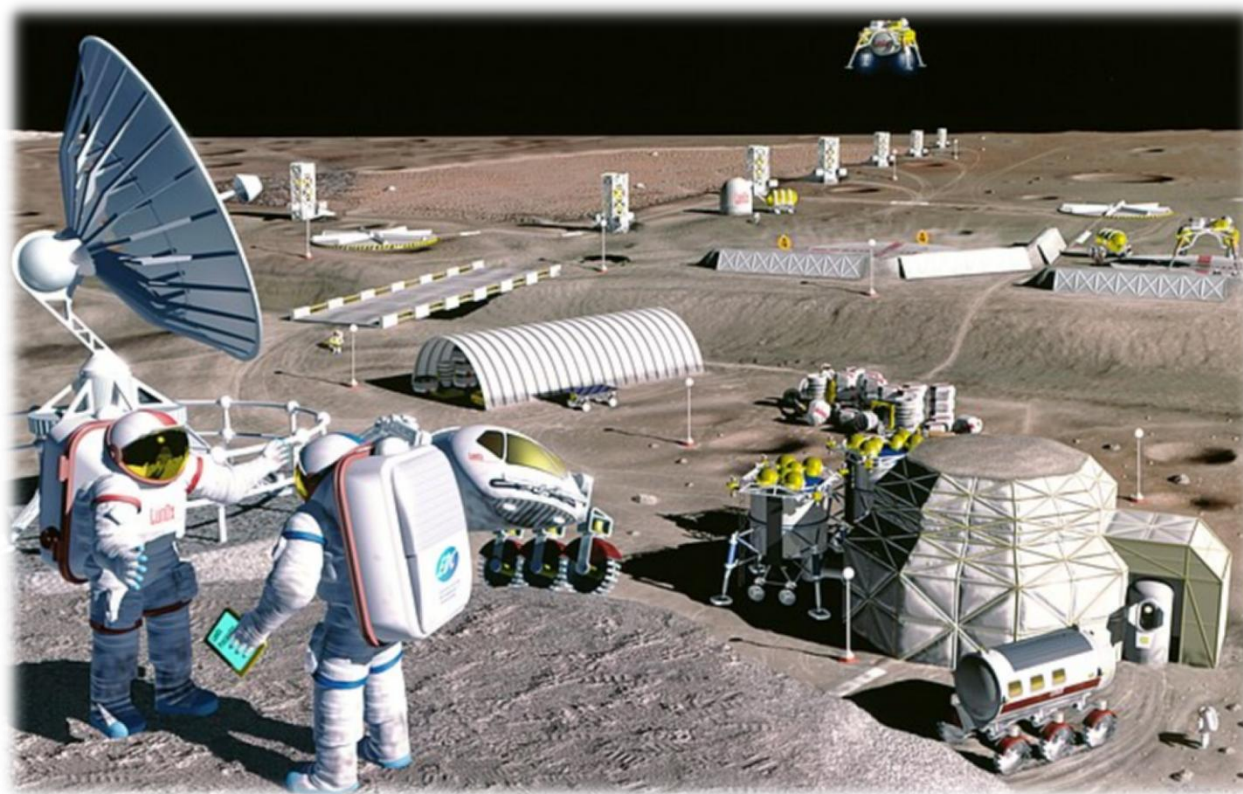


Then, where to go?





当地球不在宜居?



未来的某一天，人类可能会移民到新的类地行星，重新点燃生命的曙光



火星，新的家园？



重力



水



大气层



生命元素





火星，新的家园？



Introduction

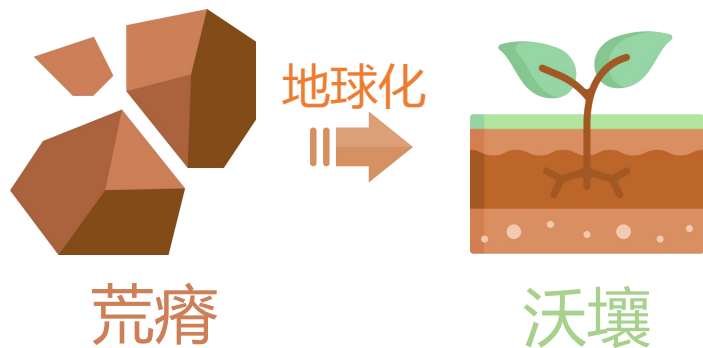
Background

Project

Awards



地球化与初生演替?



地衣 (lichens)

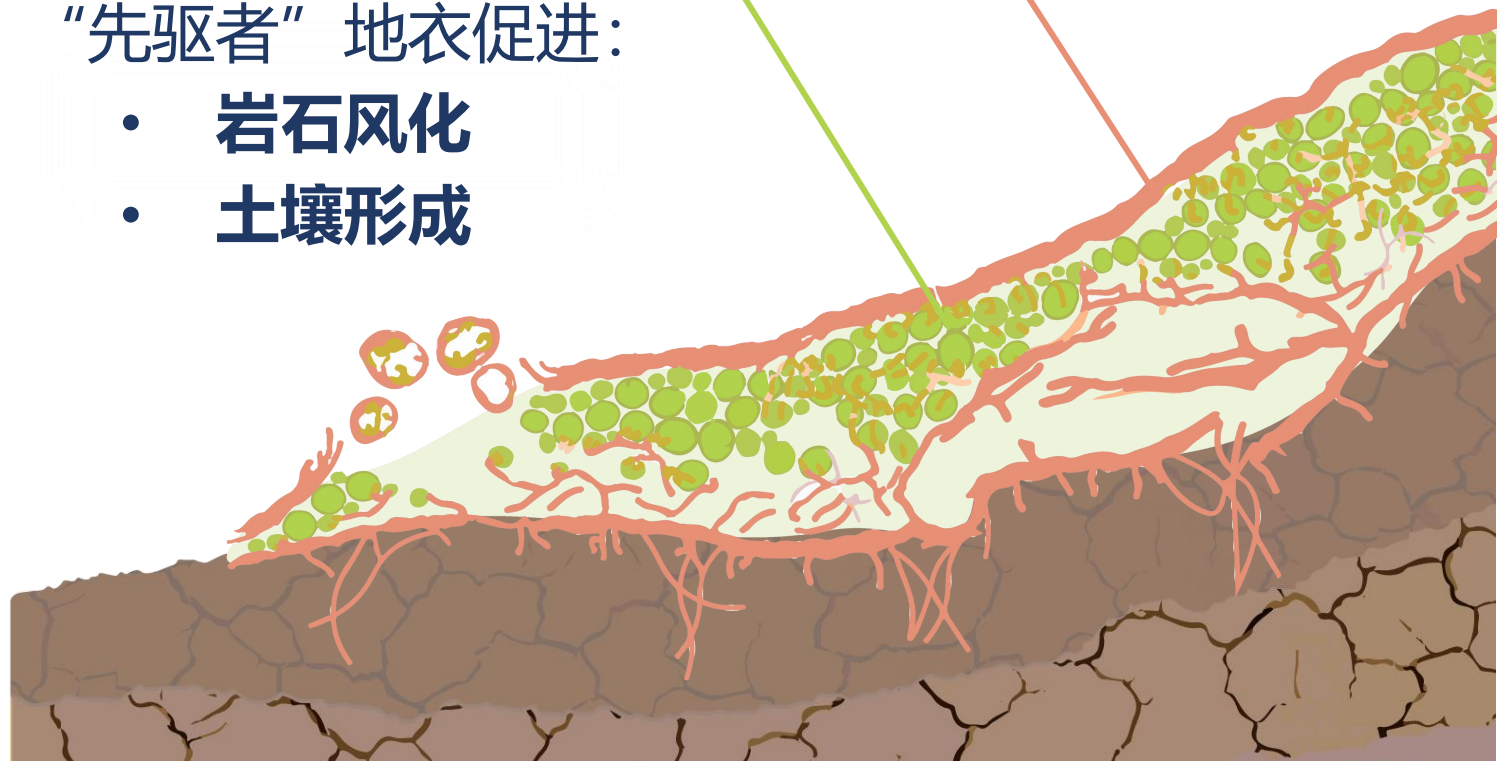
地衣 = 蓝细菌 + 真菌

光合作用固碳

形成菌丝吸收土壤中的矿物质和水分

“先驱者”地衣促进:

- 岩石风化
- 土壤形成



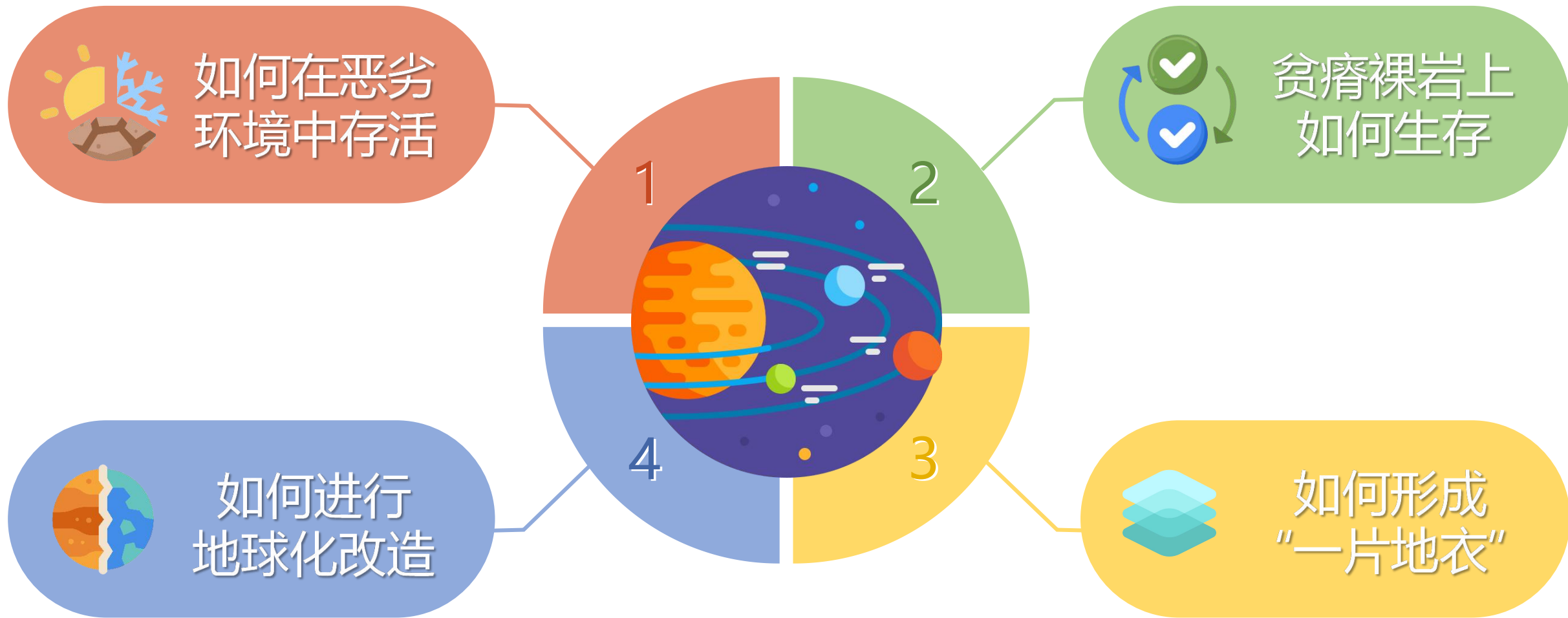


idea! 模拟地衣生态功能的自养菌膜



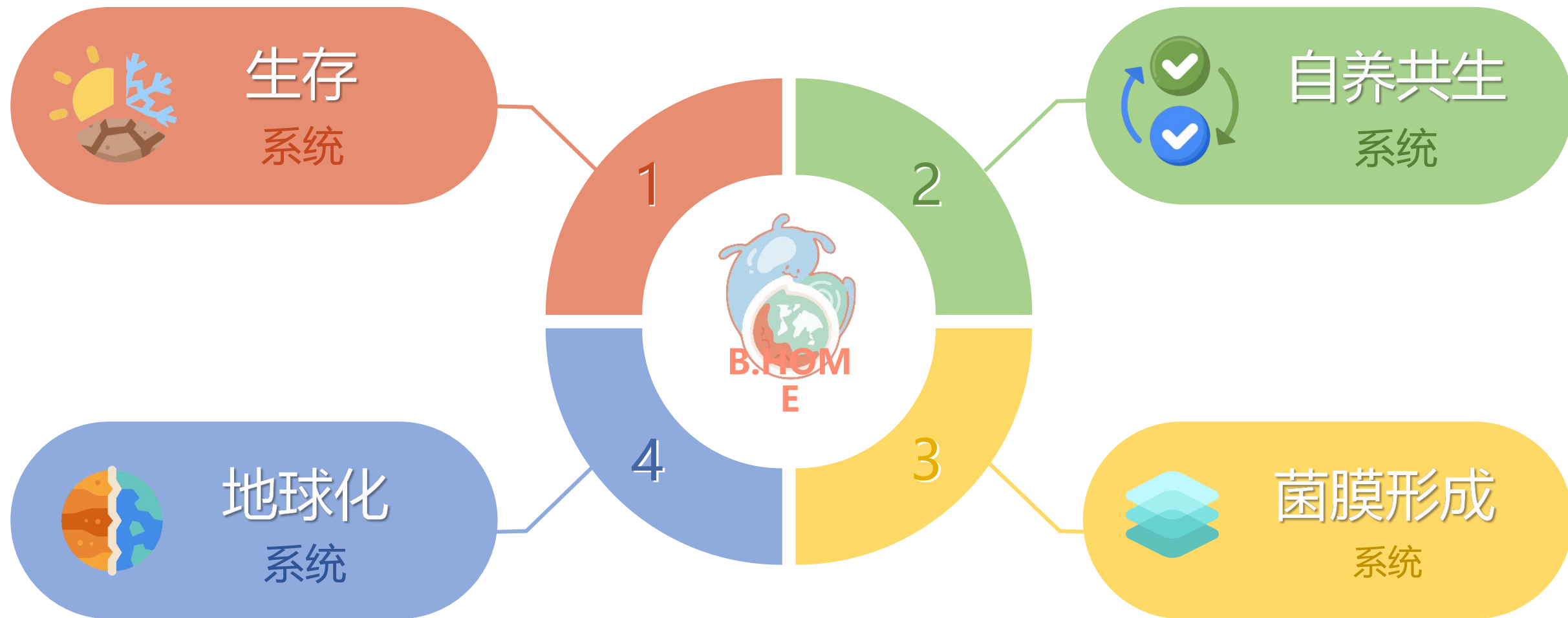


challenge! 需要考虑的因素

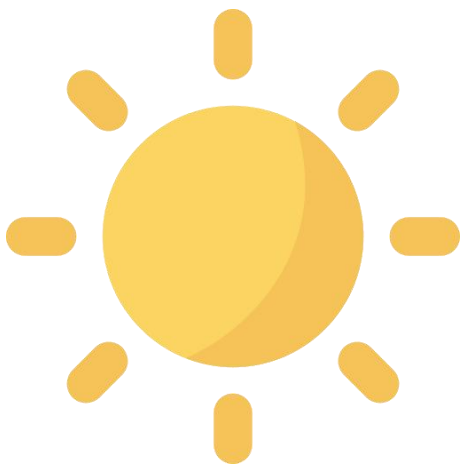




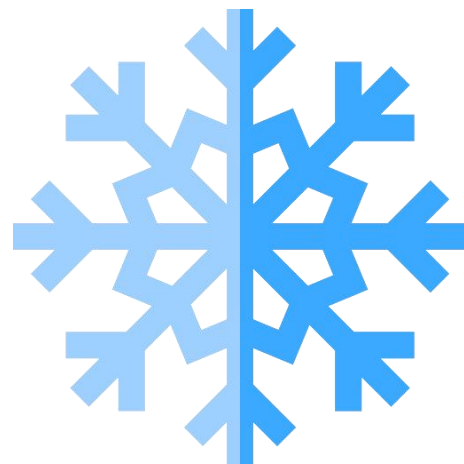
solution! 模块化系统设计



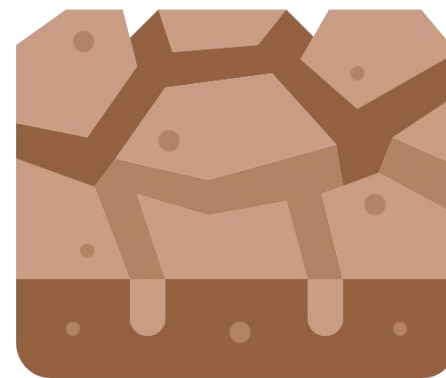
生存系统



抗紫外

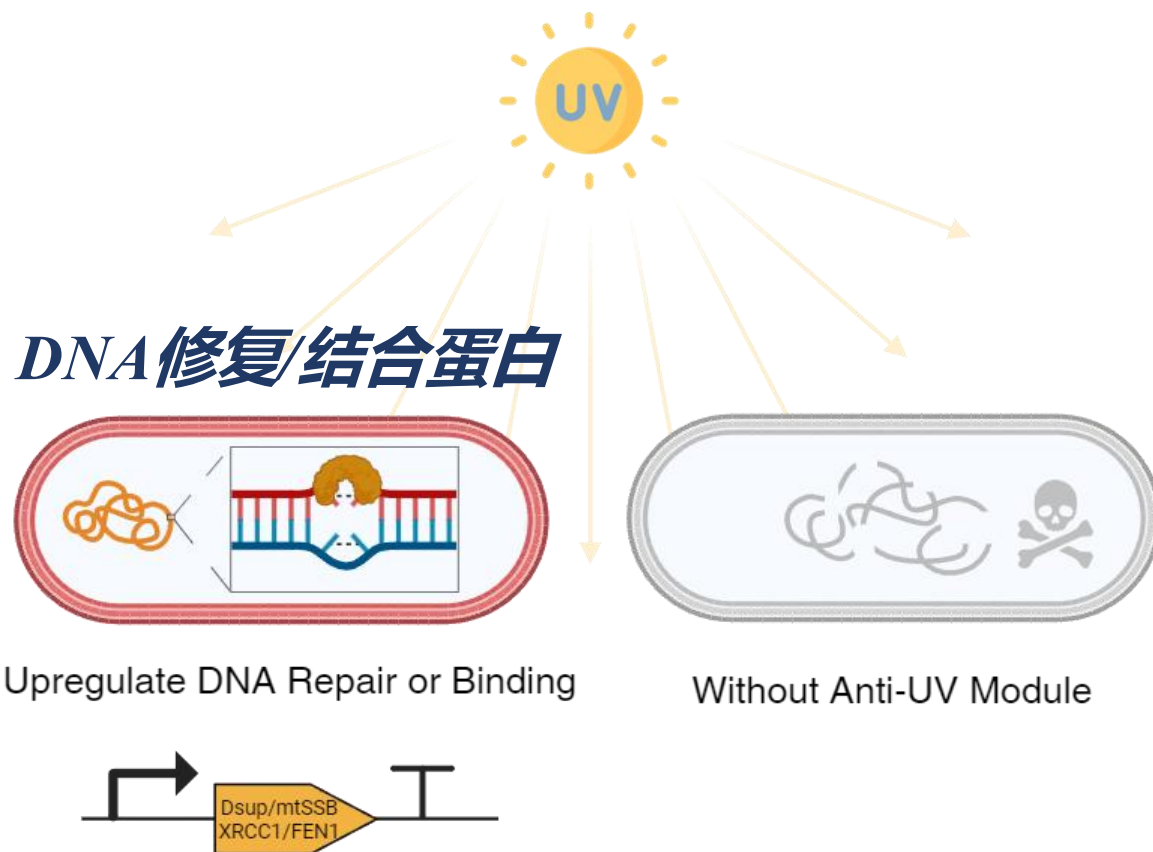


抗冻



抗干燥

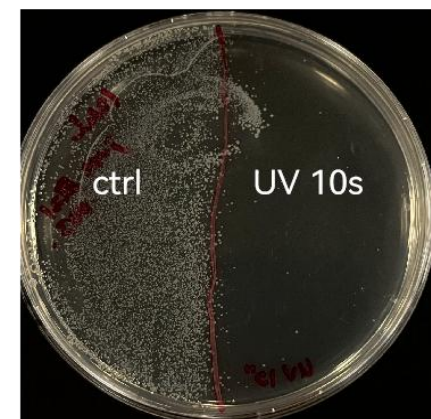
生存系统 —— 抗紫外模块



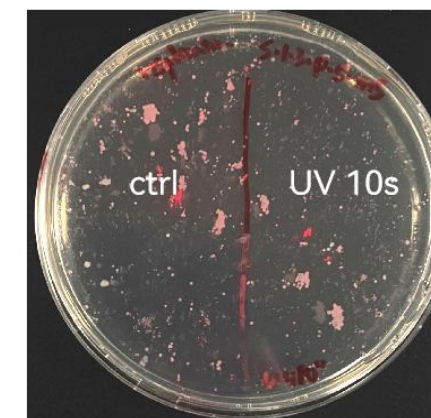
Coutney et al. *bioRxiv*, 2023

Chen et al. *Org Chem.*, 2021

Plain *E. coli*

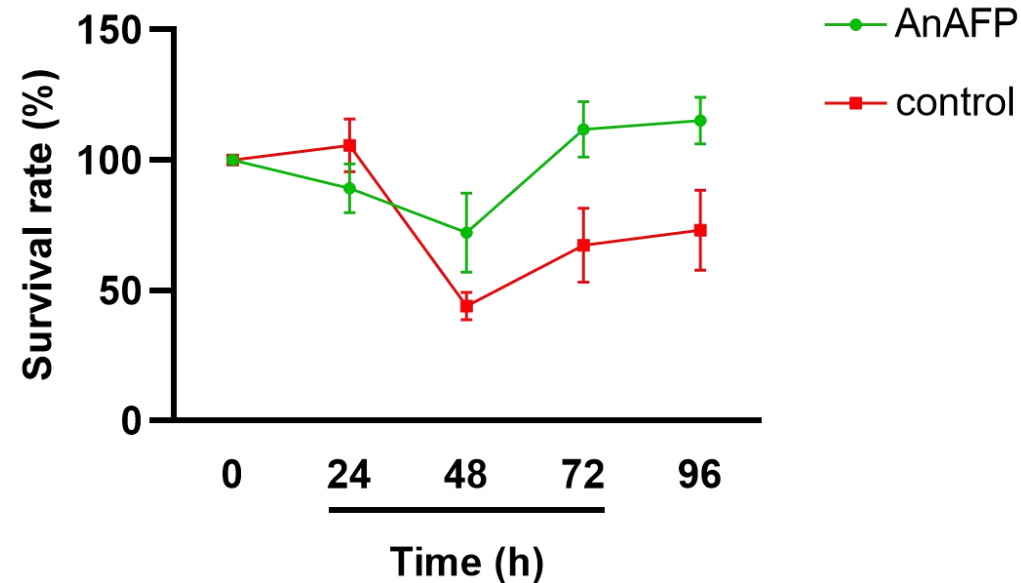
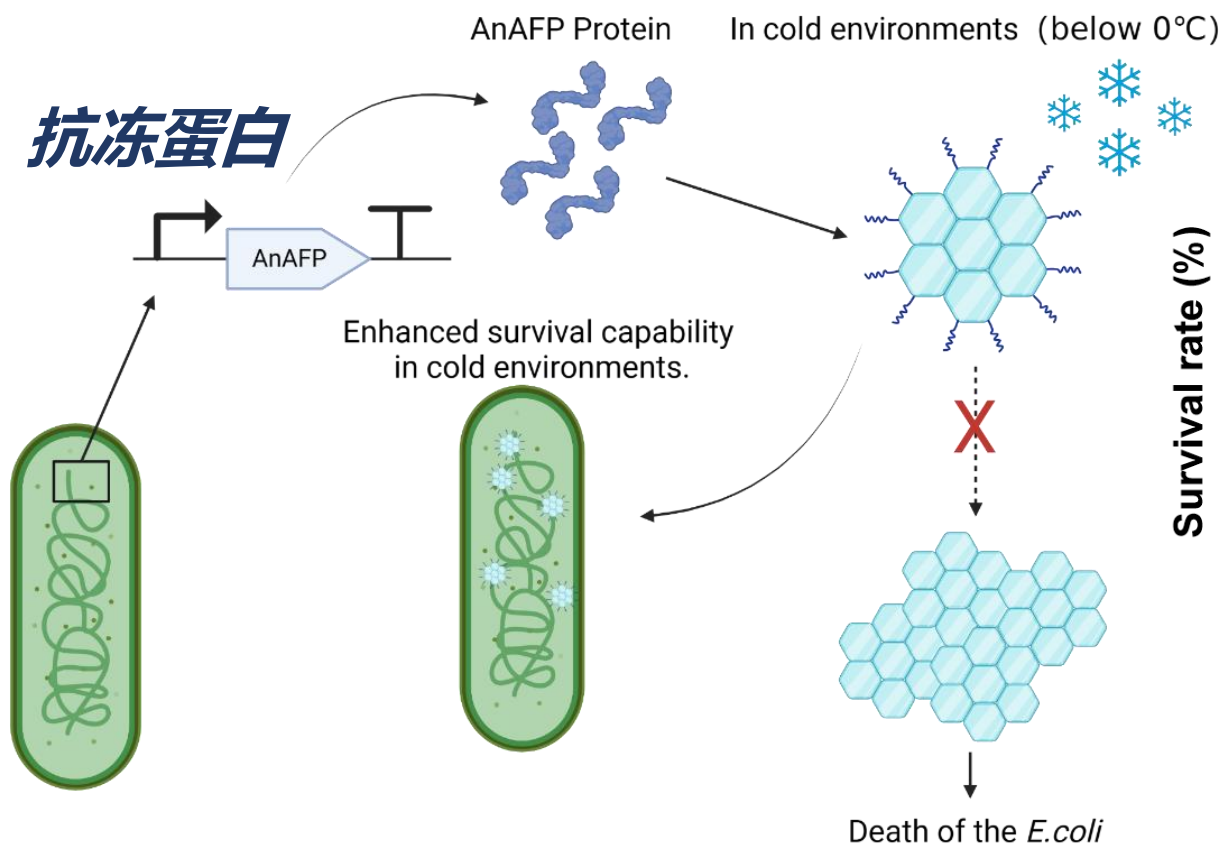


Engineered *E. coli*



紫外照射后的细菌生存率

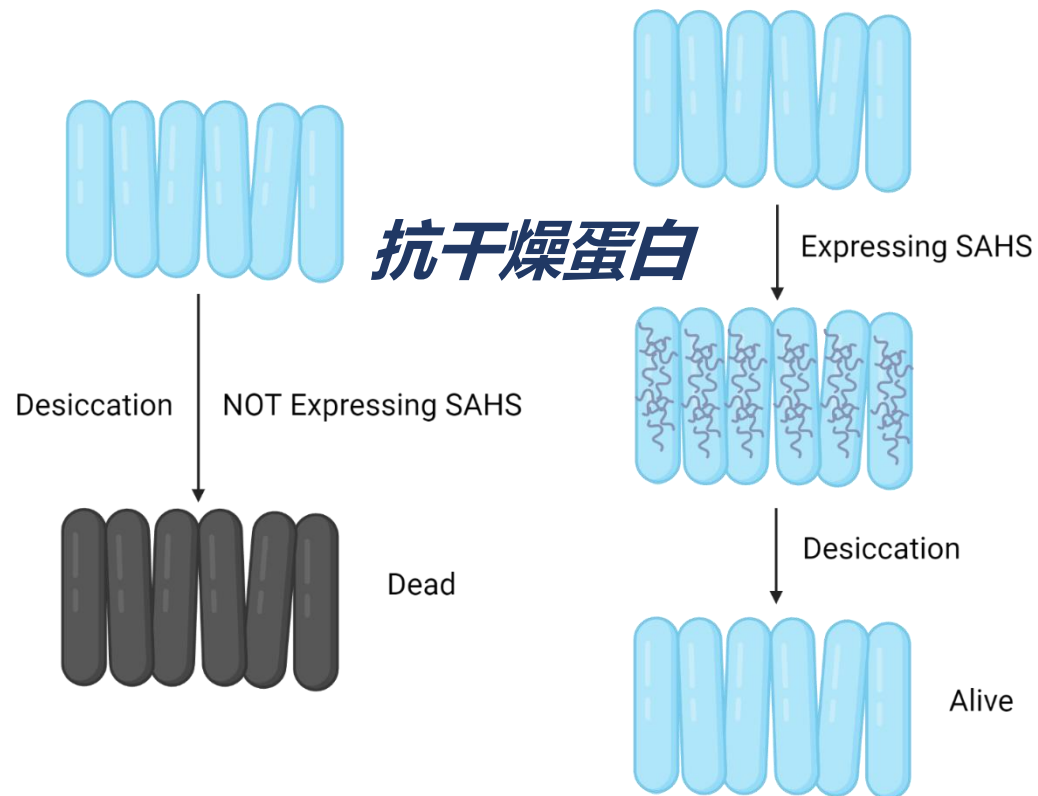
生存系统 —— 抗冻模块



冷冻处理后细菌生存率

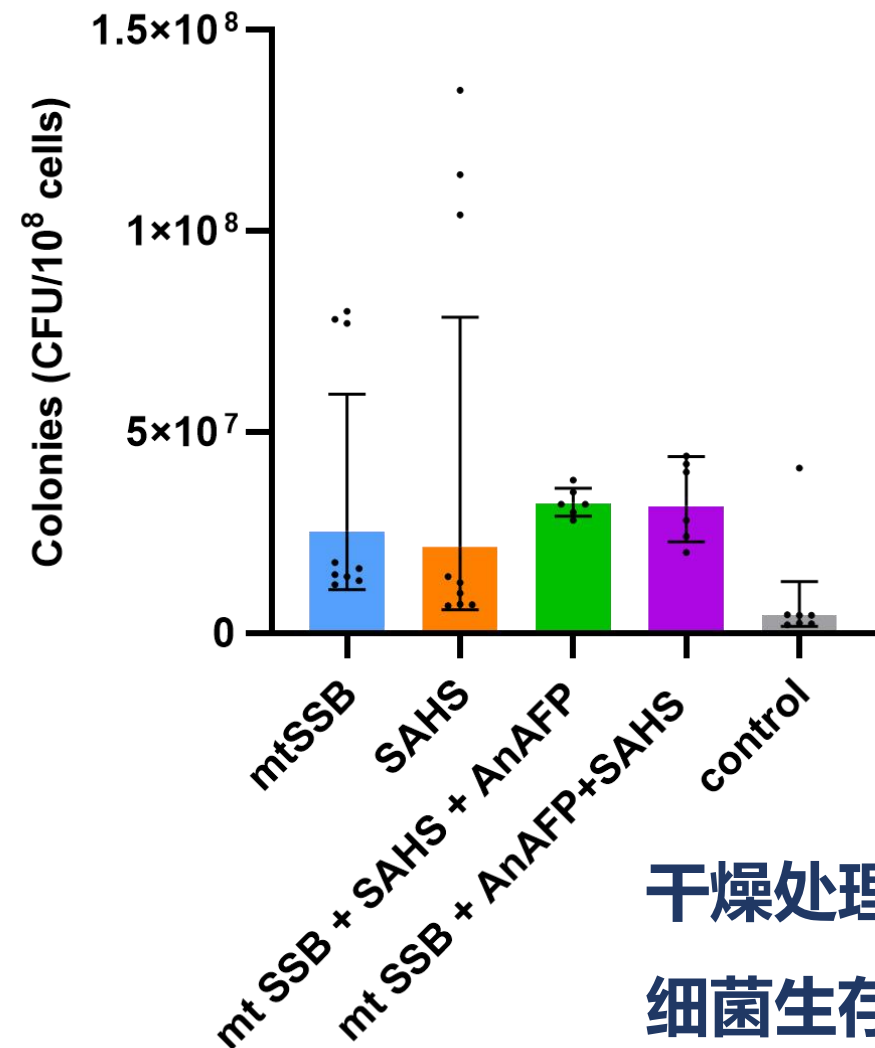
Deng et al. *Gene*, 2014

生存系统 —— 抗干燥模块



Boothby et al. *Cell*, 2017

Hibshman et al. *bioRxiv*, 2023



干燥处理后
细菌生存率

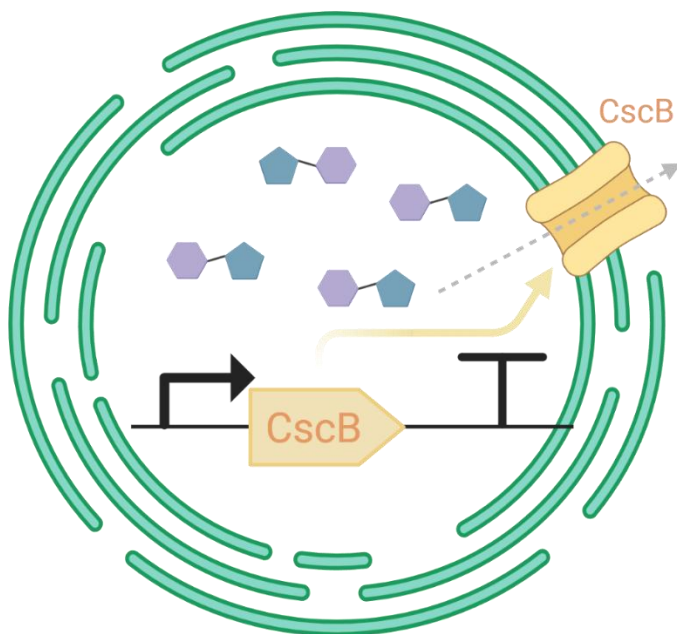
自养共生系统

消费者 & 功能执行者

大肠杆菌

Escherichia coli

生产者
蓝细菌
Cyanobacteria



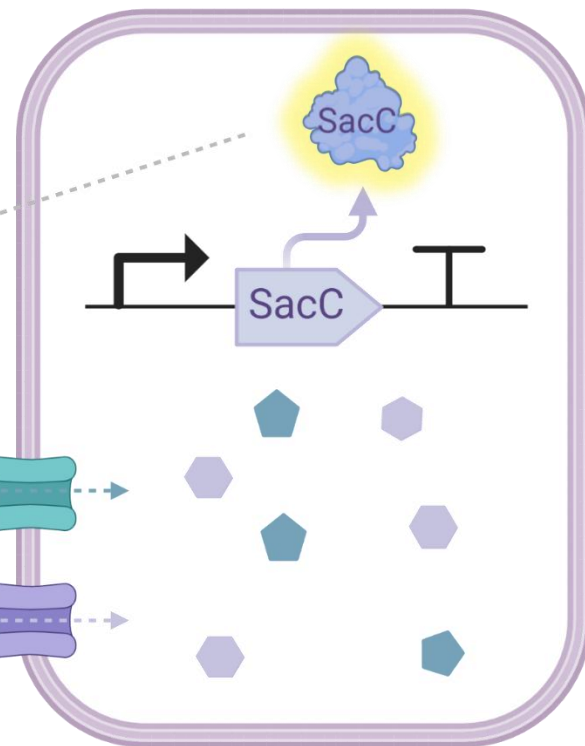
蔗糖分解酶

SacC

Sucrose
蔗糖

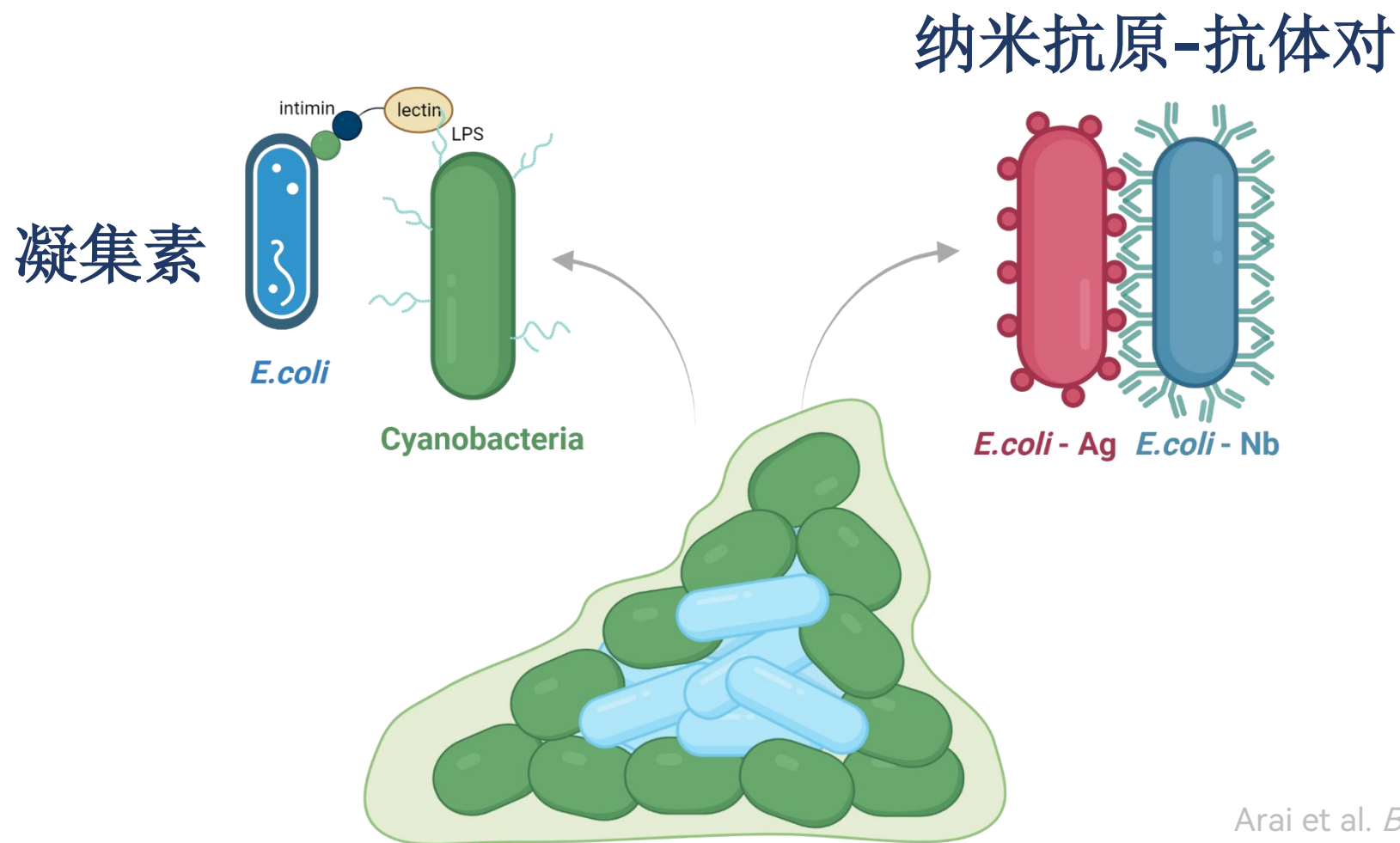
Glucose &
Fructose

果糖 & 葡萄糖



Lee et al. *Appl Microbiol Biotechnol*, 2010

菌膜形成系统



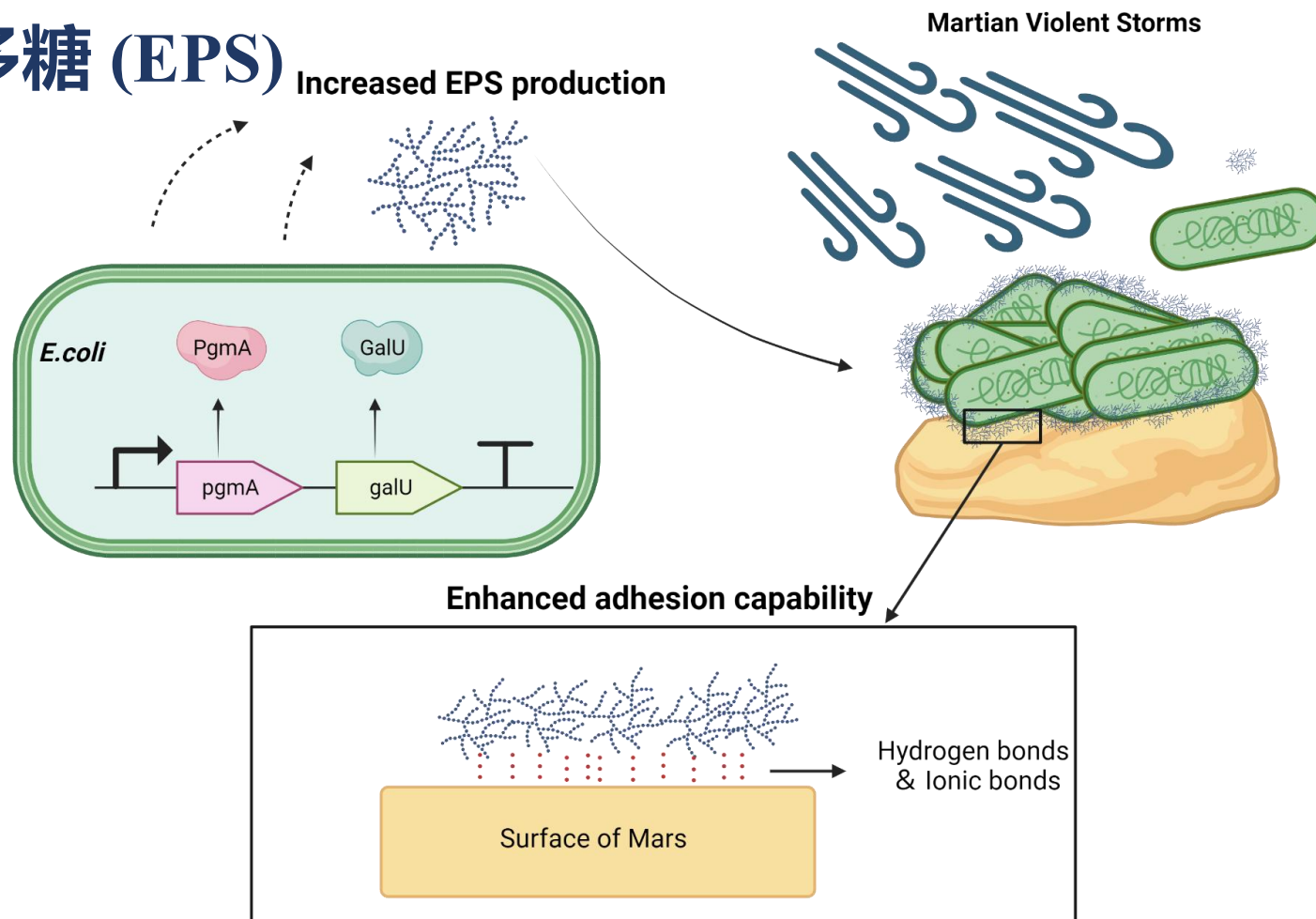
Arai et al. *Biotech. and Bioeng.*, 2016

David S et al. *Cell*, 2018

Honesty et al. *Nature*, 2022

地球化系统

胞外多糖 (EPS)



胞外多糖 (EPS)

- 酸性促岩石风化
- 粘性凝结沙砾
- 增加土壤肥力

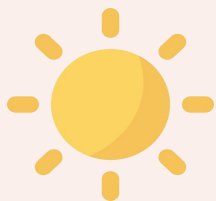
Limoli et al. *Microbiology spectrum*, 2015
Costa et al. *Frontiers in Microbiology*, 2018



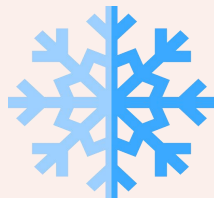
Fulfilling! B.HOME v1工程菌的构建



生存系统



抗紫外



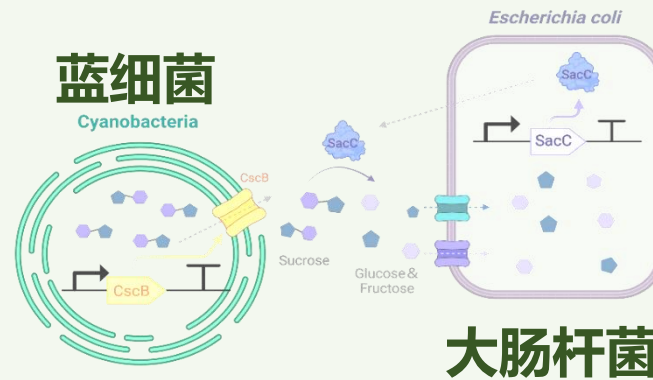
抗冻



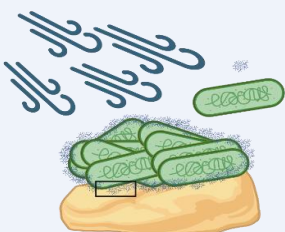
抗干燥



共生系统



类地化系统



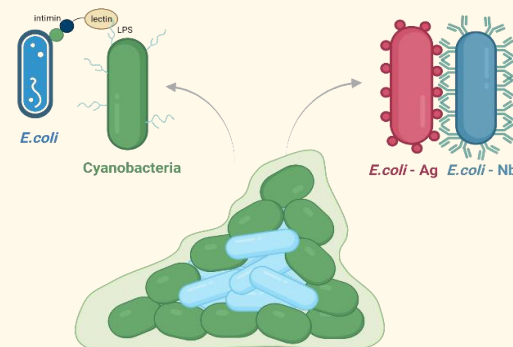
沙砾凝聚



地表风化

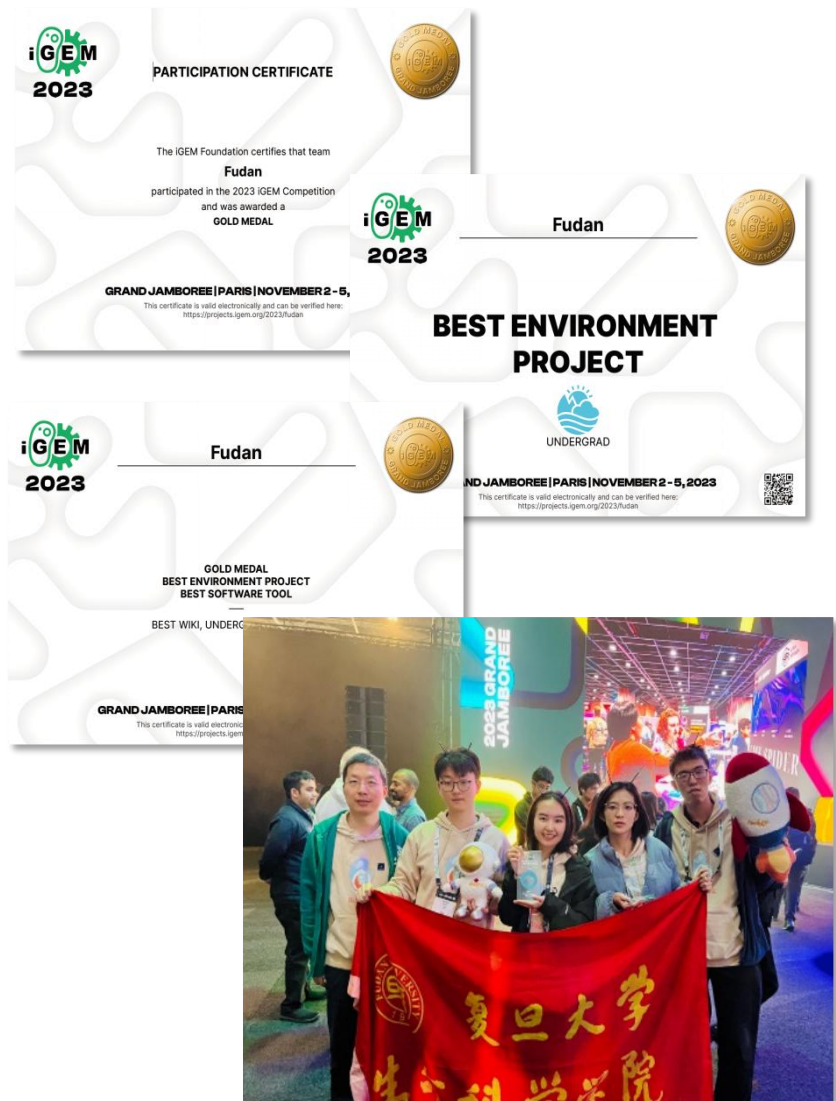


菌膜系统





Awarding! 斩获诸多奖项，复旦历史最佳成绩



- 奖牌：**金奖 (Gold Medal)**
- 赛道奖：**最佳环境项目 (Best Environment Project)** (全球仅15/400支队伍获得)
- 单项奖：**最佳软件奖 (Best Software Tool)**
- 提名：最佳网页奖 (Best Wiki)

大胆设想，勇敢尝试

iGEM 我的社团生活：贝塔朗菲社



百团大战+寒假团建



我的社团生活：贝塔朗菲社

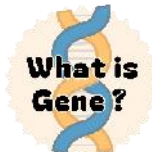


- 上海天文馆举办星空探索营
- 与自然博物馆合作举办“实习研究员”高中生夏令营
- 面向复旦附中举办合成生物学科普讲座
- 面向清华附中举办合成生物学科普讲座
- “解码生命”复旦大学高中生暑期座谈会
- ...

充分调动校内外平台资源，开展丰富多彩的**生物学科普活动**



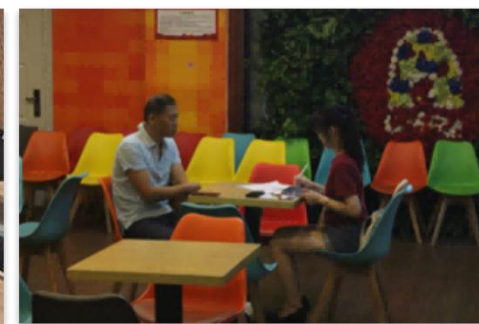
我的社团生活：贝塔朗菲社



提出“星愿计划”

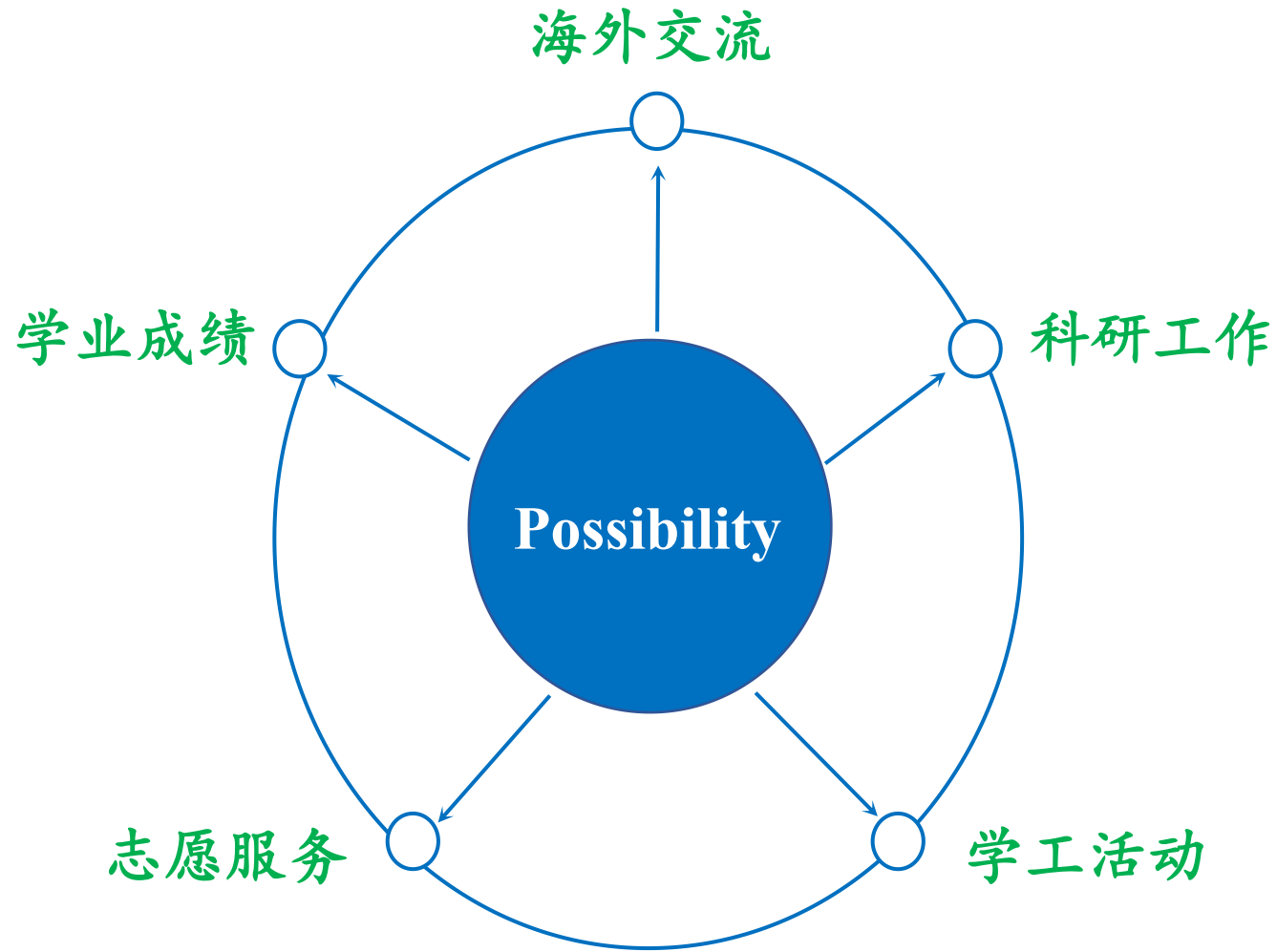
联合校友开创5项精品课程

让自闭症儿童接触生命科学

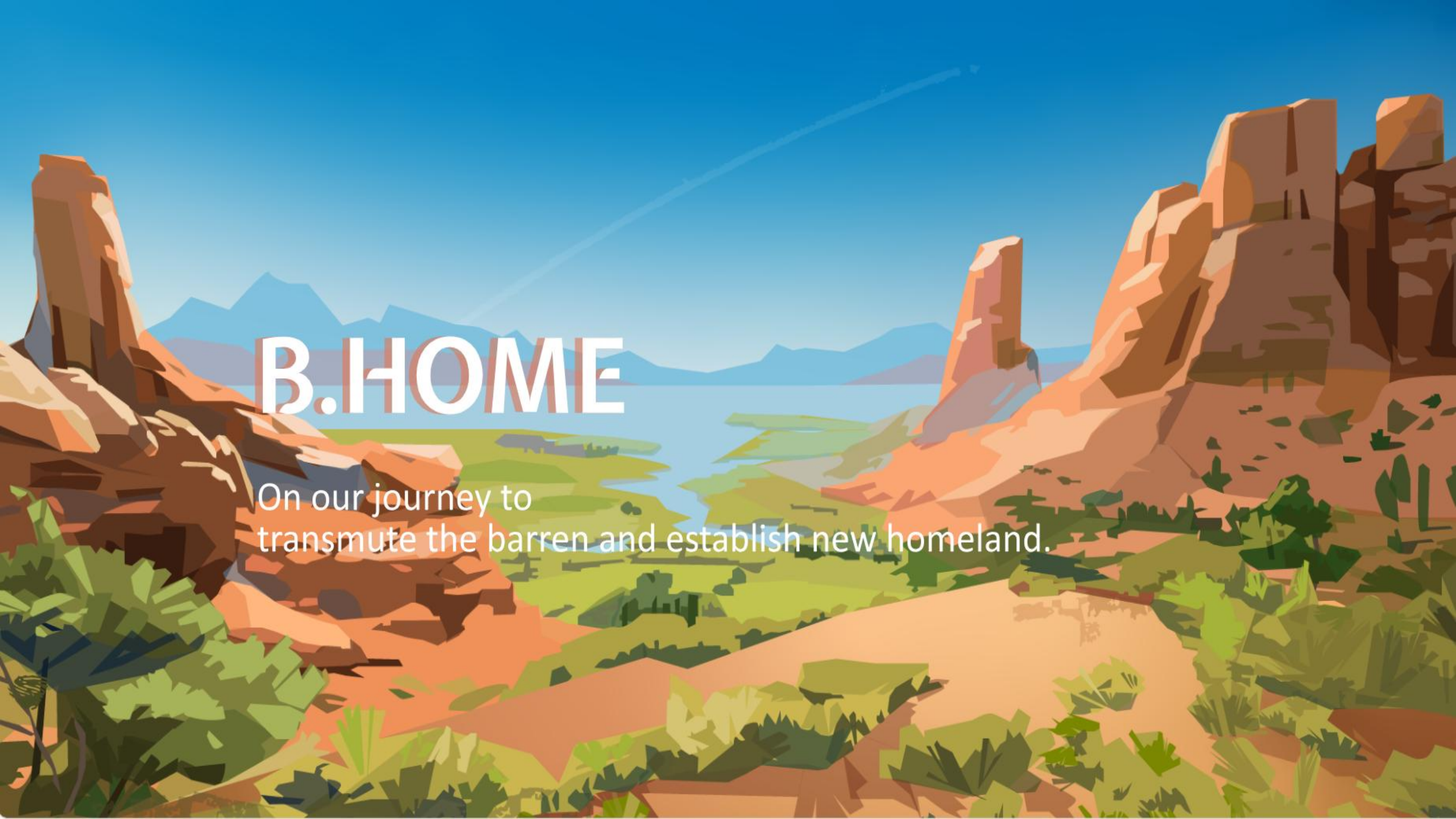




Again, where to go?



生活就像一块巧克力（更像砸罐子bushi）



B.HOME

On our journey to
transmute the barren and establish new homeland.