

Team Salty Microbial Helix

3 Ideas Presentation

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Idea 1: Water Desalination

- Water demand is growing
- 1.2 billion people lack access to fresh drinking water
- Droughts are increasing
- Clean water is necessary for irrigation, consumption, and industry

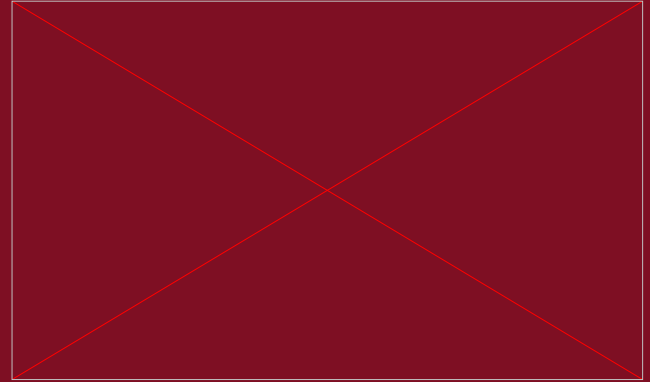
Idea 2: Plastic Decomposition

- Decomposition takes up to 1000 years
- May leak pollutants
- Floating plastic hurts marine life
- Pacific Gyres



Idea 3: Probiotics For Mental Health and Stability

- The gut microbiome is essential to our health
- Societal practices (birth, diet, antibiotics) disrupt our gut microbiota, leading to mental illness
- Stress facilitates gut microbial disruption

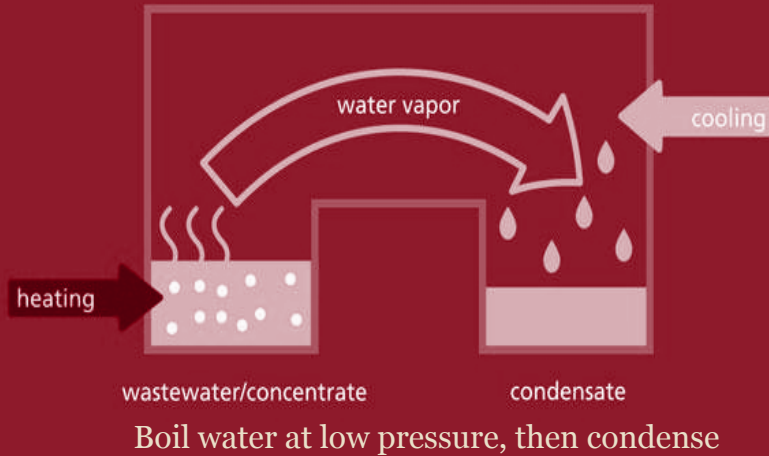


Water Desalination

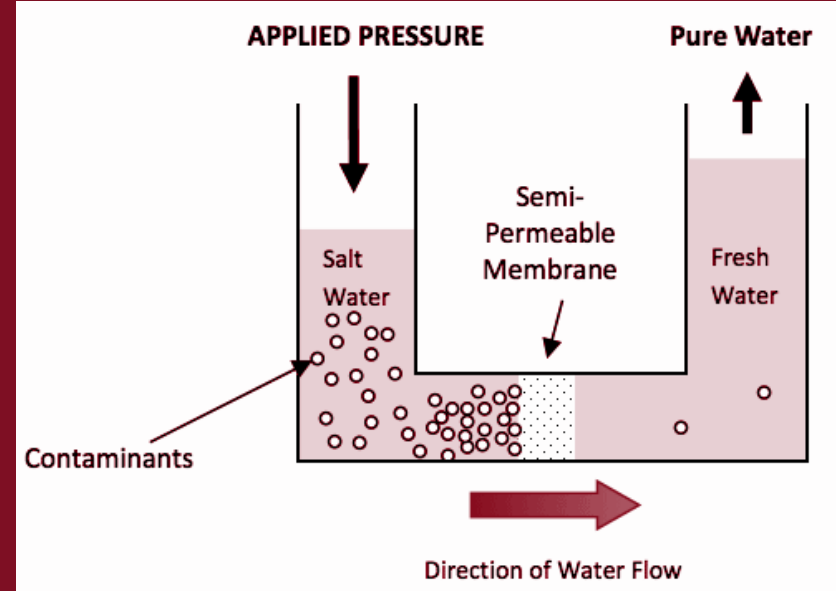
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Current Situation

Vacuum Distillation



Reverse osmosis



Force water through a filter

Energy inefficient, huge capital costs

Goal

Develop an industrial scale,
biological process for
desalination of seawater.

Knowns

Natural cells can:

- Import and export NaCl

Engineered cells can:

- Grow then activate
- Fill up with NaCl, then die off

Unknowns

- Can it be a continuous process?
- Can cells control direction of salt flow?
- What do we do with the salt?
- Are these bacteria safe for drinking?
- What happens with other substances?

Plastic Decomposition



Current Solutions

- Biodegradable plastic
- Incineration
- Plastic-to-oil conversion



Goal

Develop a biological process to eliminate existing plastics from oceans and/or landfills.

Knowns

- Natural bacteria can degrade phthalates, polyethylene, polystyrene



Unknowns

- Which kinds of plastics do we target?
- Can we engineer an input-response system?
- How would the technology be deployed?
- What are the products of degradation?

Probiotics for Mental Health and Stability



Current Solutions

- Probiotic Yogurt
- Fecal Bacteriotherapy
- Prebiotic Supplements



Goal

Combining known prebiotic and probiotic supplements imbued with antibiotic resistance into a comprehensive package



Knowns

- Bacteroidetes and firmicutes phyla are keystones in gut microbiota
- Fiber is essential source of energy
- Conferring antibiotic resistance would stave off further microbial disruptions from modern medicine

Unknowns

- What delivery mechanism will reach the gut?
- Which probiotic factors will benefit *all* hosts?
- Will conferring antibiotic resistance backfire in the long-term?

