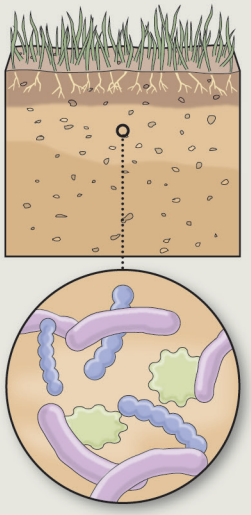
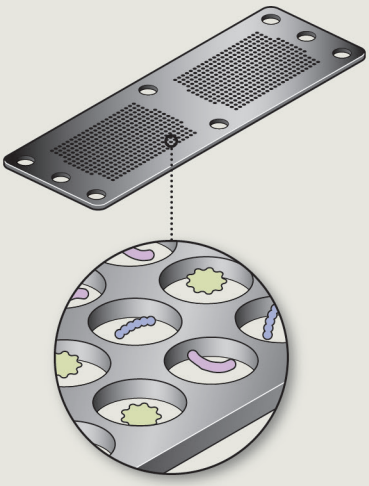
CULTURAL RICHES

To facilitate growing bacteria collected from the environment, researchers have devised new techniques that allow different microbes to communicate, while keeping them separate in order to give slower-growing species a fighting chance.

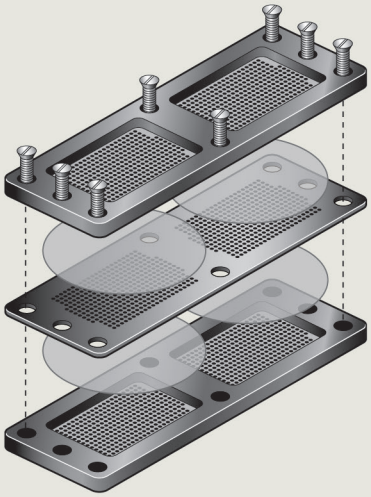
iCHIP: A multiwell diffusion chamber separates individual bacterial cells in the wells of a 384-well plate. A breathable membrane surrounding the plate allows interaction with the natural environment, such as soil or ocean water, and sensing of the multitudes of molecular factors produced by neighboring bacteria.



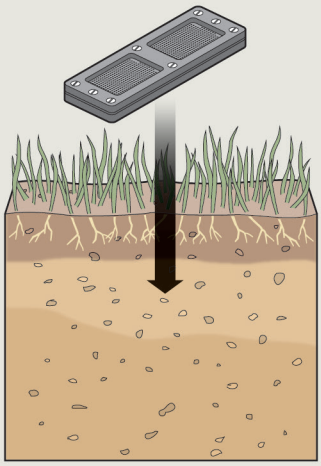
1 Collect environmental sample.



2 Place iChip plate in a diluted environmental sample to capture one bacterium per well.

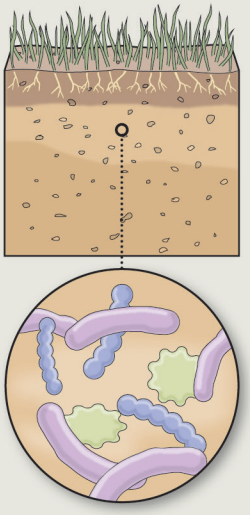


3 Enclose iChip plate in a breathable membrane that allows for bacterial communication.

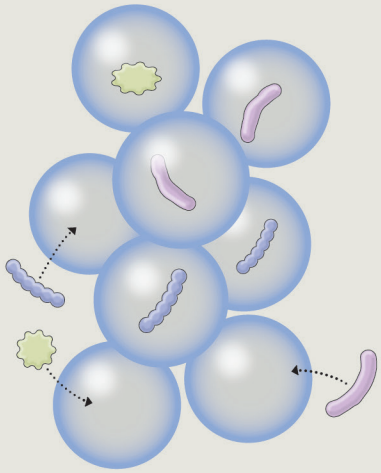


4 Place iChip device back into the environmental sample, where small molecules and metabolites can promote bacterial growth.

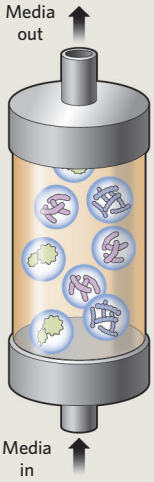
MICRODROPLET-MICROCOLONY FORMATION: A device traps individual bacteria inside tiny, permeable gel droplets, which allow interactions among bacteria while keeping them separate. The droplets are bathed in a nutrient-rich media until a microcolony of 40–200 cells forms inside, then sorted and plated for further analysis.



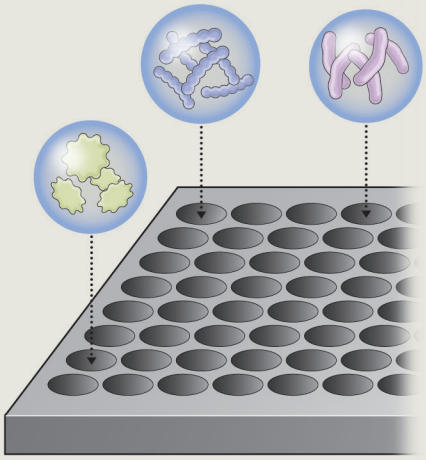
1 Collect environmental sample.



2 Encapsulate individual cells in microdroplets.



3 Nourish bacterial colonies until they are 40–200 cells strong.



4 Separate the droplet-enclosed colonies using flow cytometry and transfer to a 96-well plate.