

Directed evolution on a nanofabricated chip: Electronic hydrogen gas detection

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Ordinarily evolution experiments are done in chemostats which maintain a constant inflow of nutrients and outflow of waste in a stirred vessel containing a colony of bacteria or similar microorganisms in solution. We wish to take the present chemostat design a dramatically big step further using our micro/nanofabrication technology to construct interacting arrays of chemostats, and then use our ability to sense the level of hydrogen gas production within each microchemostat to punish colonies that have low hydrogen gas production and reward colonies that have high hydrogen gas production. As part of this project to evolve efficient bioenergy production, we are fabricating electronic hydrogen gas sensors on our chips. I will give a progress report on how well this project is proceeding.