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Design and Testing of a Biological Breathalyzer

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Joint project with Herman Armstrong, Rachel Klapper, Brian Pink, and Morgan Schiermeier

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Design and Testing of a Biological Breathalyzer

The aim of this research is the construction of a biological breathalyzer through synthetic biology. The metabolic pathways of a species of the *Pichia* taxa are used. The yeast is able to metabolize both ethanol and methanol. The first known by-product of methanol metabolism is the AO enzyme from the AOX gene. When both ethanol and methanol are present, the yeast prefers to metabolize ethanol so the AOX gene is not expressed. The AOX gene promoter is fused with a fluorescence protein gene so expression of the AOX gene can be visually detected. When the cell is supplied with both ethanol and methanol, the amount of time before fluorescence will correspond to the amount of ethanol given to the cell. In this way, the concentration of ethanol can be determined.

Jackie Schneider is a junior in biochemical engineering from O'Fallon, Missouri. She is involved in the International Genetically Engineered Machines Team, the American Institute of Chemical Engineers, and Engineers Without Borders.