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Biological Breathalyzer

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Biological Breathalyzer

The aim of this research is the construction of a biological breathalyzer through synthetic biology, specifically through use of the metabolic pathways of a species of the Pichia taxa. The yeast utilized is able to metabolize both ethanol and methanol. However, when both ethanol and methanol are present, the yeast prefers to metabolize ethanol such that an AOX gene is not expressed because the first known by-product of methanol metabolism is the AO enzyme from the AOX gene. 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.

Morgan Schiermeier is a senior at Missouri S&T majoring in biological sciences. He is from Vienna, Missouri and has been involved in the iGEM project for the last year.