Hypoxia-Competent *Aspergillus fumigatus* strain

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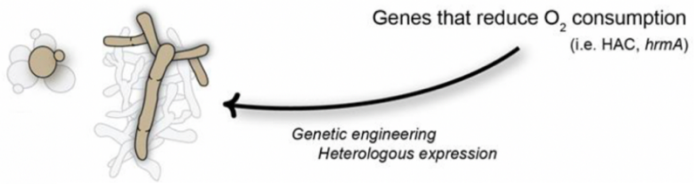
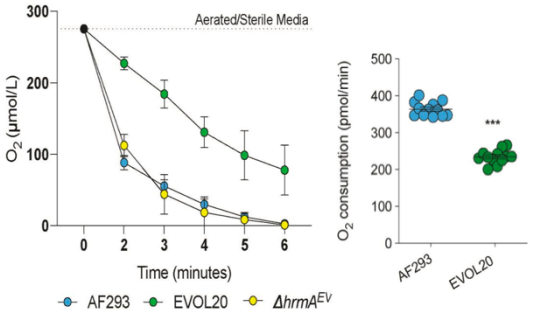
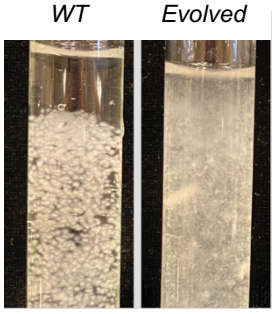


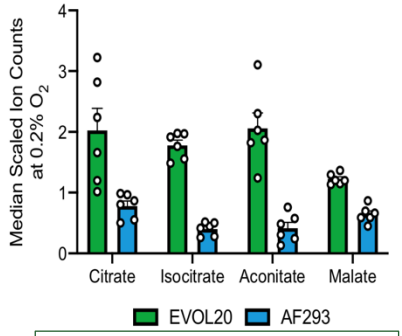
Lead Opportunity: Cost-Effective Industrial Enzyme Biomanufacturing



Mutated strains display significantly decreased oxygen consumption.



Mutated strain exhibits diffuse mycelial morphology, a desirable trait in fungal biomanufacturing.



Evolved strains increase secretion of industrially-relevant chemicals in hypoxia.

TECHNOLOGY SUMMARY:

The global enzymes market, valued at USD $11 billion, is dominated by biomanufacturing via large-scale fermentation of yeast or filamentous fungi. *Aspergillus* is the most common fungus used for this purpose; incremental improvements in *Aspergillus* productivity can significantly increase production volume. Specifically, fungal morphology and oxygen saturation are both known to have a major effect on enzyme yields in fermentation.

We present an *Aspergillus* strain with increased ability to grow in hypoxic conditions, and two mutations associated with this trait. The mutations convey a morphology with low biofilm formation; this is desirable in biomanufacturing, as adherent, biofilm-prone cultures are a problem in large-scale fermentations.

In addition, the mutations convey decreased oxygen consumption to strains, a desirable trait as poor oxygen penetration limits productivity in industrial culture. Introducing these mutations to industrial fungi (*Aspergillus* and other genera) may improve unit economics for enzyme manufacturers, and the invention may be of interest both to in-house research teams and contractors specializing in strain improvement.

NEAR-TERM GOALS:

- Experimental proof-of-concept with industrially-relevant enzymes
- Testing of engineered *A. niger* in pilot plant setting

CURRENTLY SEEKING:

- CEO
- Licensing Partnership
- Business Mentorship
- Access to pilot-scale capability for scaled-up data collection

ADVANTAGES:

- Targeted mutations can improve strains faster than random mutagenesis
- *Aspergillus* is relevant to a large segment of industry; large upside
- Pellet morphology is a crucial benefit to manufacturing potential

LITERATURE:

- Kowalski, C.H. *et al. Nat Microbiol 4* (2019). 10.1038.s41565-019-0558-7
- Kowalski, C.H. *et al. mBio 7* (2016) 10.1128/mBio.01414-16

PATENT APPLICATION:

Multiple Patent Applications Filed

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DARTMOUTH REFERENCE:

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