7.344 Directed Evolution: Engineering Biocatalysts
Spring 2008

# Enzyme evolution using yeast surface display

Boder, E.T.; Wittrup, K.D. Yeast surface display for screening combinatorial polypeptide libraries. *Nat. Biotechnol.* **1997**, *15*, 553-557.

Shiraga, S.; Kawakami, M.; Ishiguro, M.; Ueda, M. Enhanced reactivity of *Rhizopus oryzae* lipase displayed on yeast cell surfaces in organic solvents: potential as a whole-cell biocatalyst in organic solvents. *App. Environ. Microbiol.* **2005**, *71(8)*, 4335-4338.

# Wittrup Lab yeast surface display

- What are the limitations the authors identify with previous display methods that make their system attractive?  What kinds of proteins are hard to express?
- Explain the display scaffold.  How are proteins displayed? (Figure 1)
- How is the surface expression of scFvs verified? (Figure 2)  How is the number of fusions quantified?
- How does the enrichment factor compare to previously discussed methods?
- Explain their library generation and selection strategy. What are the results?
- What are the benefits/downsides to using this method?

# Figure 1- Aga-based protein display

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# Figure 2 – characterization of yeast surface fusions

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# *Rhizopus oryzae* lipase display

- What are the authors trying to do and why is this significant?
- What is the strategy used?  How is the enzyme library made and screened?
- What are the results? (Table 2)
- What are the pros/cons of the method?