

# Inserting oxygen in C-C bonds of (m)any substrates using natural and engineered Baeyer-Villiger monooxygenases

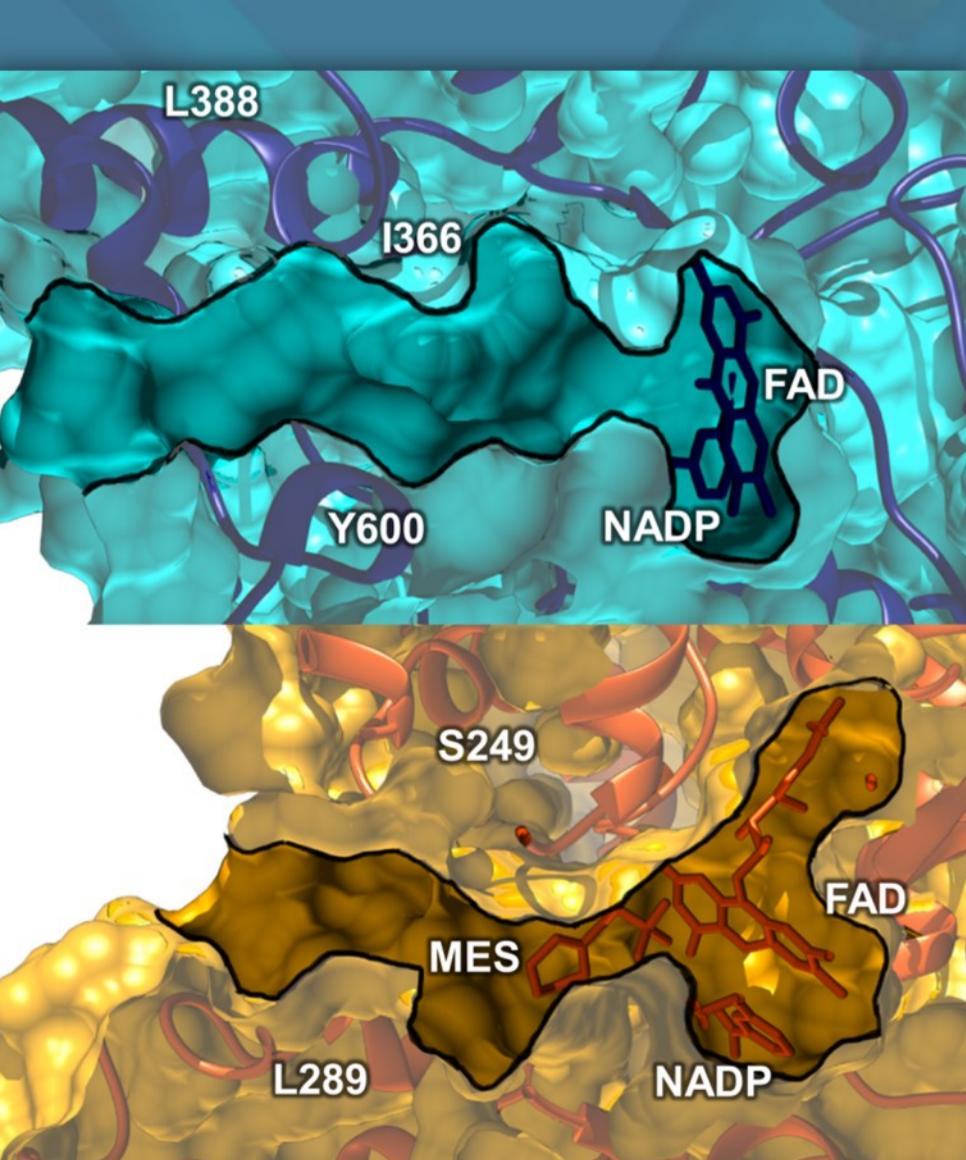
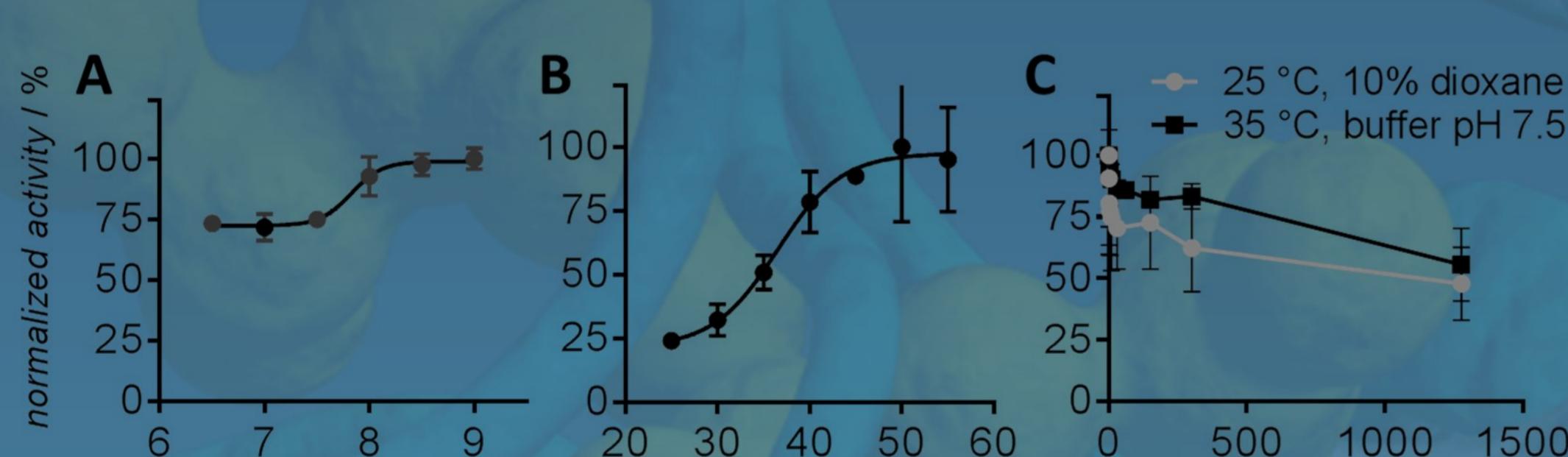
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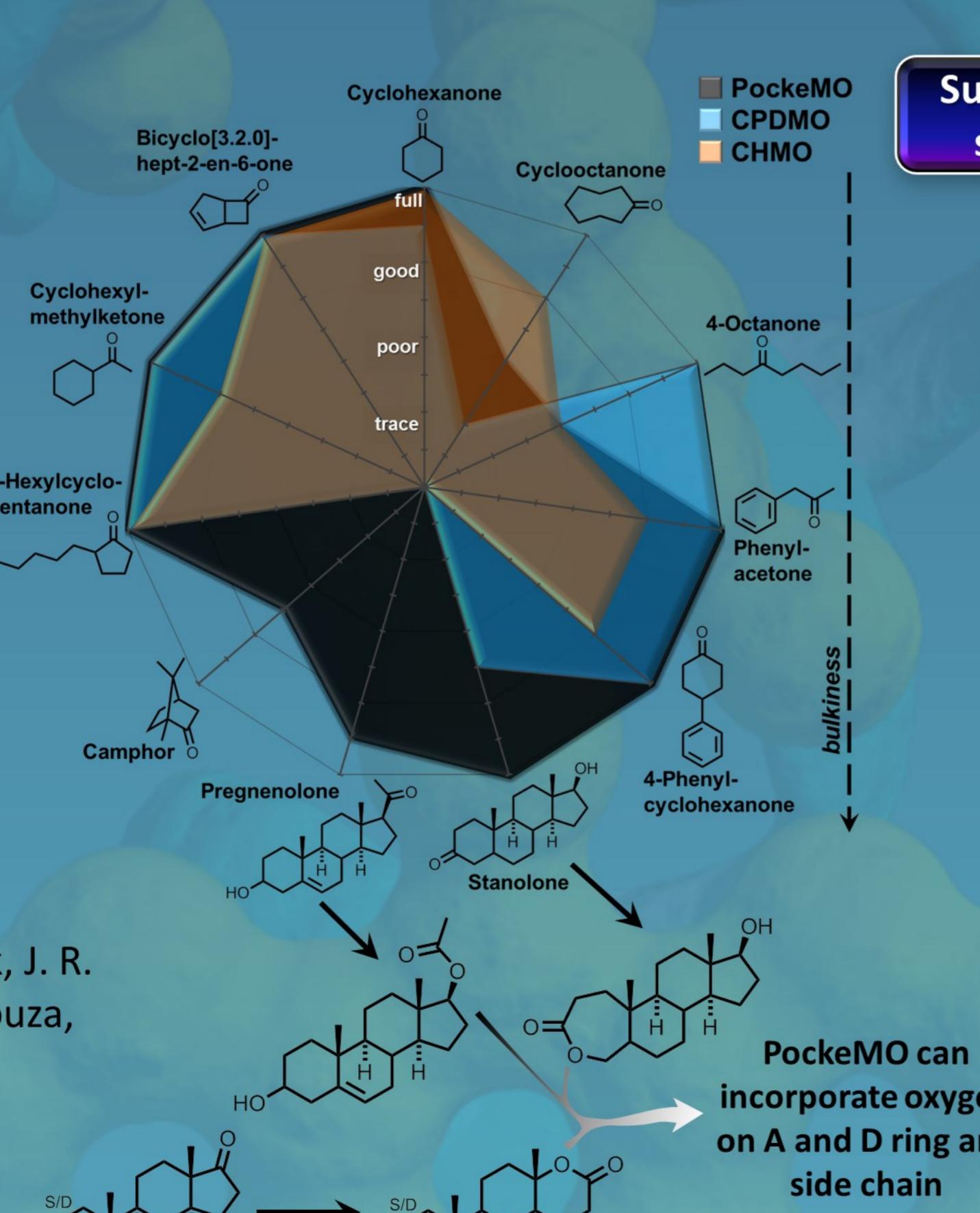
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BVMOs: flavoproteins that incorporate a single oxygen next to a carbonyl moiety  
Excellent for biocatalysis:  
→ control over regio-, stereo- and enantioselectivity & often promiscuous  
We close in on the 'last mile' for BVMOs towards industrial application:  
New thermostable variants with complementary substrate scope.  
Protein engineering design variants with desired selectivities



M. J. L. J. Fürst, S. Savino, H. M. Dudek, J. R. Gomez Castellanos, C. Gutierrez de Souza, S. Rovida, M. W. Fraaije, A. Mattevi, *J. Am. Chem. Soc.* **2017**, *139*, 627-630.



ROBOX



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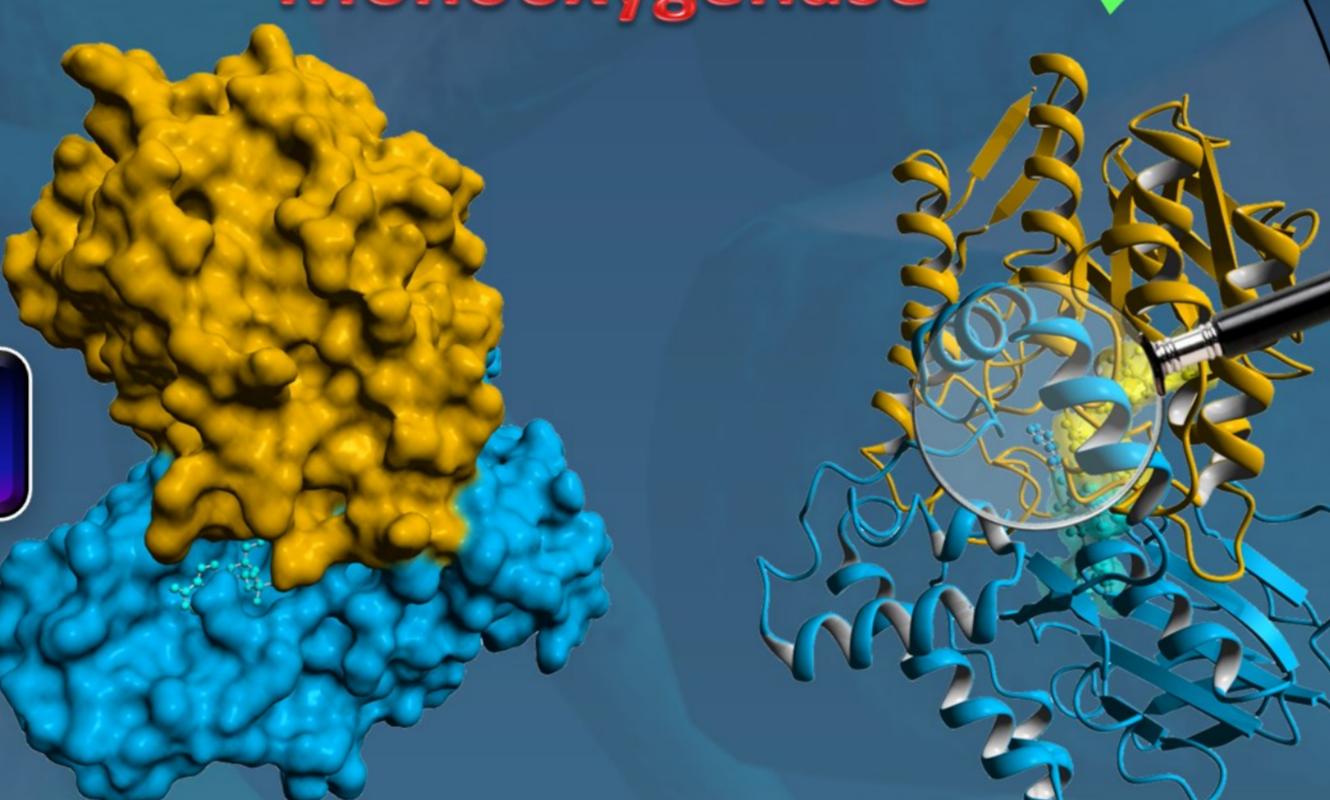
## BVMOs for synthetic chemistry..

.. by discovery

.. by engineering

for small substrates

Tm Cyclohexanone Monoxygenase



x-ray structure with Active site ligand

Directed evolution

Engineering enantioselectivity

TmCHMO WT

TmCHMO evolved mutant

L146F/F507C ee=94%

F507L ee=86%

L146V/F507L ee=91%

F507C ee=54%

F434I/T435F ee=53%

F434L/T435F ee=54%

F434I/T435L ee=74%

WT ee=99%

F434I ee=53%

F434L ee=54%

F434I ee=54%

F434L ee=54%