

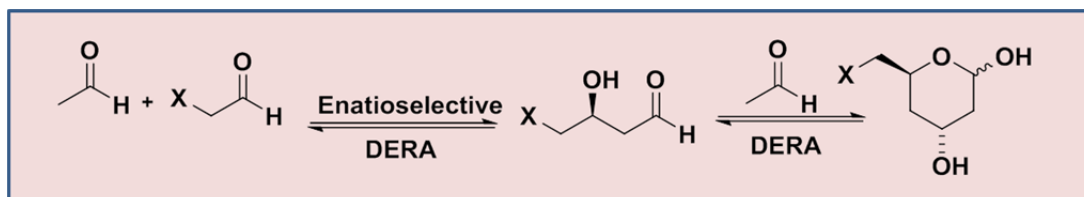
## ENANTIOSELECTIVE SEQUENTIAL ALDOL CONDENSATION

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Enantioselective aldol reactions are important methods to synthesize  $\beta$ -hydroxy carbonyl compounds in optical pure form. 2-deoxy-d-ribose-5-phosphate aldolase (DERA) is a class 1 aldolase that offers access to several building blocks for organic synthesis by catalyzing a stereoselective C-C bond formation between acetaldehyde and other aldehydes such as chloroacetaldehyde, propionaldehyde or ketones like acetone and fluoroacetone [1].

The gene encoding DERA 1b [2] from *Lactobacillus brevis* ECU8302 was expressed in *Escherichia coli* and two points mutation E78K and C42M were introduced to improve both the acetaldehyde resistance of the enzyme and its thermostability. As a result of its high substrate tolerance, DERA could catalyze sequential aldol condensation with 1.4 M acetaldehyde affording the chiral lactol intermediate in good yield. This intermediate is a synthon for the preparation of a large variety of optically pure superstatins, such as Rosuvastatin and Pitavastatin.



[1] Meera Haridas, Eman M. M. Abdelraheem, Ulf Hanefeld, 2-Deoxy-D-ribose-5-phosphate aldolase (DERA): applications and modifications, *Appl. Microbiol. Biotechnol.*, 2018, 102, 9959–9971.

[2] Xue-Cheng Jiao, Jiang Pan, Guo-Chao Xu, Xu-Dong Kong, Qi Chen, Zhi-Jun Zhang and Jian-He Xu, Efficient synthesis of a statin precursor in high space-time yield by a new aldehyde-tolerant aldolase identified from *Lactobacillus brevis*, *Catal. Sci. Technol.*, 2015, 5, 4048–4054.