Development of a Transcription Factor-Based Lactam Biosensor - DTU Orbit (09/11/2017)

Development of a Transcription Factor-Based Lactam Biosensor

Lactams are an important class of commodity chemicals used in the manufacture of nylons, with millions of tons produced every year. Biological production of lactams could be greatly improved by high-throughput sensors for lactam biosynthesis. To identify biosensors of lactams, we applied a chemoinformatic approach inspired by small molecule drug discovery. We define this approach as analogue generation toward catabolizable chemicals or AGTC. We discovered a lactam biosensor based on the ChnR/Pb transcription factor-promoter pair. The microbial biosensor is capable of sensing Îµ-caprolactam, Î´-valerolactam, and butyrolactam in a dose-dependent manner. The biosensor has sufficient specificity to discriminate against lactam biosynthetic intermediates and therefore could potentially be applied for high-throughput metabolic engineering for industrially important high titer lactam biosynthesis.

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