Improved production of membrane proteins in Escherichia coli by selective codon substitutions - DTU Orbit (05/10/2019)

Improved production of membrane proteins in Escherichia coli by selective codon substitutions

Membrane proteins are extremely challenging to produce in sufficient quantities for biochemical and structural analysis and there is a growing demand for solutions to this problem. In this study we attempted to improve expression of two difficult-to-express coding sequences (araH and narK) for membrane transporters. For both coding sequences, synonymous codon substitutions in the region adjacent to the AUG start led to significant improvements in expression, whereas multi-parameter sequence optimization of codons throughout the coding sequence failed. We conclude that coding sequences can be re-wired for high-level protein expression by selective engineering of the 5’ coding sequence with synonymous codons, thus circumventing the need to consider whole sequence optimization.

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