Assessing glycolytic flux alterations resulting from genetic perturbations in E. coli using a biosensor - DTU Orbit (09/11/2017)

Assessing glycolytic flux alterations resulting from genetic perturbations in E. coli using a biosensor

We describe the development of an optimized glycolytic flux biosensor and its application in detecting altered flux in a production strain and in a mutant library. The glycolytic flux biosensor is based on the Cra-regulated ppsA promoter of E. coli controlling fluorescent protein synthesis. We validated the glycolytic flux dependency of the biosensor in a range of different carbon sources in six different E. coli strains and during mevalonate production. Furthermore, we studied the flux-altering effects of genome-wide single gene knock-outs in E. coli in a multiplex FlowSeq experiment. From a library consisting of 2126 knock-out mutants, we identified 3 mutants with high-flux and 95 mutants with low-flux phenotypes that did not have severe growth defects. This approach can improve our understanding of glycolytic flux regulation improving metabolic models and engineering efforts.

General information

State: Published
Organisations: Novo Nordisk Foundation Center for Biosustainability, Research Groups, Bacterial Synthetic Biology, Department of Biotechnology and Biomedicine
Authors: Lehning, C. E. (Intern), Siedler, S. (Intern), Ellabaan, M. M. H. (Intern), Sommer, M. O. A. (Intern)
Pages: 194-202
Publication date: 2017
Main Research Area: Technical/natural sciences

Publication information

Journal: Metabolic Engineering
Volume: 42
ISSN (Print): 1096-7176
Ratings:
BFI (2017): BFI-level 2
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 2
Scopus rating (2016): CiteScore 8.33 SJR 3.54 SNIP 1.864
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 2
Scopus rating (2015): SJR 3.611 SNIP 1.822 CiteScore 8.2
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 2
Scopus rating (2014): SJR 3.381 SNIP 2.034 CiteScore 7.23
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 2
Scopus rating (2013): SJR 4.004 SNIP 2.185 CiteScore 8.43
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 2
Scopus rating (2012): SJR 3.032 SNIP 1.858 CiteScore 6.72
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): SJR 3.124 SNIP 2.144 CiteScore 6.75
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 2.373 SNIP 1.802
Web of Science (2010): Indexed yes
BFI (2009): BFI-level 1
Scopus rating (2009): SJR 2.575 SNIP 1.421
Web of Science (2009): Indexed yes
BFI (2008): BFI-level 1
Scopus rating (2008): SJR 1.757 SNIP 1.028

Bibliographical note