Synthetic biology of polyketide synthases

Synthetic biology of polyketide synthases

Complex reduced polyketides represent the largest class of natural products that have applications in medicine, agriculture, and animal health. This structurally diverse class of compounds shares a common methodology of biosynthesis employing modular enzyme systems called polyketide synthases (PKSs). The modules are composed of enzymatic domains that share sequence and functional similarity across all known PKSs. We have used the nomenclature of synthetic biology to classify the enzymatic domains and modules as parts and devices, respectively, and have generated detailed lists of both. In addition, we describe the chassis (hosts) that are used to assemble, express, and engineer the parts and devices to produce polyketides. We describe a recently developed software tool to design PKS system and provide an example of its use. Finally, we provide perspectives of what needs to be accomplished to fully realize the potential that synthetic biology approaches bring to this class of molecules.

General information

State: Published
Organisations: Novo Nordisk Foundation Center for Biosustainability, Synthetic Biology Tools for Yeast, Lawrence Berkeley National Laboratory, University of California at Berkeley
Contributors: Yuzawa, S., Backman, T. W., Keasling, J. D., Katz, L.
Pages: 621-633
Publication date: 2018
Peer-reviewed: Yes

Publication information

Journal: Journal of Industrial Microbiology and Biotechnology
Volume: 45
Issue number: 7
ISSN (Print): 1367-5435
Ratings:
  BFI (2018): BFI-level 1
  Web of Science (2018): Indexed yes
  BFI (2017): BFI-level 1
  Scopus rating (2017): CiteScore 3.21 SJR 1.107 SNIP 1.02
  Web of Science (2017): Impact factor 3.103
  Web of Science (2017): Indexed yes
  BFI (2016): BFI-level 1
  Scopus rating (2016): CiteScore 2.87 SJR 0.958 SNIP 0.94
  Web of Science (2016): Impact factor 2.81
  Web of Science (2016): Indexed yes
  BFI (2015): BFI-level 1
  Scopus rating (2015): CiteScore 2.65 SJR 0.966 SNIP 0.998
  Web of Science (2015): Impact factor 2.745
  Web of Science (2015): Indexed yes
  BFI (2014): BFI-level 1
  Scopus rating (2014): CiteScore 2.66 SJR 0.964 SNIP 1.328
  Web of Science (2014): Impact factor 2.439
  Web of Science (2014): Indexed yes
  BFI (2013): BFI-level 1
  Scopus rating (2013): CiteScore 2.86 SJR 1.055 SNIP 1.272
  Web of Science (2013): Impact factor 2.505
  ISI indexed (2013): ISI indexed yes
  Web of Science (2013): Indexed yes
  BFI (2012): BFI-level 1
  Scopus rating (2012): CiteScore 2.78 SJR 1.094 SNIP 1.52
  Web of Science (2012): Impact factor 2.321
  ISI indexed (2012): ISI indexed yes
  Web of Science (2012): Indexed yes
  BFI (2011): BFI-level 1
  Scopus rating (2011): CiteScore 2.94 SJR 1.168 SNIP 1.443
  Web of Science (2011): Impact factor 2.735