Multi-omics studies of the control of growth and antibiotic production of streptomyces

Du, C.

Propositions

Accompanying the PhD thesis

"Multi-omics studies of the control of growth and antibiotic production of *Streptomyces*"

1. The combination of advanced proteomics, metabolomics and genome mining is an efficient way to identify and dereplicate bioactive natural products from complex microbial extracts (this thesis, Chapter 3).
2. Structurally different, naturally occurring molecules can elicit similar changes in the secondary metabolome of *Streptomyces roseifaciens* (this thesis, Chapter 4).
3. Removing native biosynthetic gene clusters in *Streptomyces* can cause significant changes in regulatory networks and should be considered in the design of hosts for heterologous expression (this thesis, Chapter 5).
4. SCO1839 is a novel nucleoid-associated protein that binds to more than 2500 GATC sequences in the *Streptomyces coelicolor* genome (this thesis, Chapter 6).
5. Cross-kingdom manipulation of behaviour is widespread, as exemplified by changes in antibiotic production in Actinobacteria by signalling molecules released by plants (van der Meij *et al.*, 2018).
6. The application of systems biology can aid in developing bacterial strains with improved antibiotic production by bridging "black-box" and rational strain design approaches (Sulheim *et al.*, 2020).
7. The regulatory network of antibiotic production involves not only the 'traditional' pathway-specific and global regulators, but also nucleoid associated proteins that control chromosome architecture (Gehrke *et al.*, 2019).
8. "Nucleoid associated protein" and "transcription factor" are *ad hoc* operational definitions which constitute the two ends of the spectrum of structural and regulatory features (Dorman *et al.*, 2020).
9. Entering the new era of "Complexity Science" is both fortunate, owing to new discoveries, and unfortunate, as complexity doesn't make PhD life easier.
10. Newton's three laws are perfect for everyday life, but we still need the theory from Planck and Einstein to understand life and to conquer deep space.
11. Everything can be explained by science, including magic, and those things that are still inexplicable in biology.

Chao DU 杜超, 9th December 2020