

Cover Page



Universiteit Leiden



The handle <http://hdl.handle.net/1887/138643> holds various files of this Leiden University dissertation.

Author: Zhang, Z.

Title: Group benefits from genomic instability: A tale of antibiotic warriors in *Streptomyces*

Issue date: 2020-12-14

Stellingen

behorende bij het proefschrift

Propositions accompanying the thesis

Group benefits from genomic instability: a tale of antibiotic warriors in *Streptomyces*

- (1) Division of labor is a fundamental principle that permeates every aspect of biological systems; hence, it can be broadly applied to solving many biological questions.

This thesis: Chapter 2.

- (2) In *Streptomyces coelicolor*, genomic instability creates diverse individuals that vary in antibiotic production and reproduction, which eventually leads to group level stability.

This thesis: Chapter 3

- (3) Genome rearranged *S. coelicolor* mutants are the ultimate altruists.

This thesis: Chapter 4

- (4) The links between the phenotype, the proteome and genome size suggest new ways of manipulating *Streptomyces*.

This thesis: Chapter 5

- (5) Although repeated discoveries have become less frequent due to the digital world, revisiting old discoveries still occasionally provides new insights from different angles.

Inspired by T. Kay *et al. Proceedings of the National Academy of Sciences of the United States of America* (2020).

- (6) Theoretical work provides the context to interpret experimental data, as exemplified by the use of Hamilton's rule on inclusive fitness to explain altruistic division of labor.

Inspired by S. A. West & G. A. Cooper. *Nature Reviews Microbiology* (2016).

- (7) Understanding the ecology and evolution of Actinobacteria helps to unravel the secrets behind cryptic biosynthetic gene clusters.

Adapted from D. A. van Bergeijk *et al. Nature Reviews Microbiology* (2020).

- (8) A successful academic career requires good scientific writing, and a compelling scientific article is never a stack but a sort of data.

Inspired by B. Mensh & K. Kording. *PLoS Computational Biology* (2017).

- (9) Microbial behaviors when studied from a philosophical lens can teach us more than what we observe on a Petri dish.
- (10) It would not be feasible to end the global pandemic of COVID-19 without the division of labor in humankind.
- (11) Human beings are neither the only nor the first species to find out you can contribute your legacy to society without even procreating.

Zheren Zhang

Leiden, 14 December 2020