University of Basel
Department Biozentrum

SIB Swiss Institute of Bioinformatics

BIOZENTRUM
The Center for Molecular Life Sciences

Basel Computational Biology Seminar

21563 Current research in Bioinformatics II

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Fitness effects of horizontal gene transfer

Bacteria living in multispecies communities can benefit from a gene pool shared through horizontal gene transfer (HGT). Because alleles, genes, and even operons can be acquired rapidly, HGT can drastically accelerate evolutionary processes and affect their predictability. We investigate the predictability of bacterial evolution driven by transformation, a prominent mechanism of HGT that allows bacteria to import DNA from the environment. We have developed laboratory evolution methods to examine the effects of interspecies HGT on genome dynamics. We find that allele exchange is nearly unrestricted between closely related Bacillus species but the rate of transfer decreases exponentially as a function of sequence diversity. Results of laboratory evolution suggest that a shared gene pool of closely related species accelerates adaptation in the recipient Bacillus subtilis. In a proof-of-principle experiment, we have shown that the distribution of fitness effects (DFE) can predict under which condition HGT is beneficial to B. subtilis. To better understand bacterial adaption to changing environments, we are currently investigating how robust these predictions are as the recipient evolves.

Date: Monday, March 31, 2025

Time: 16:15 h – 17:30h

Location: Biozentrum, U1.197

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