SFB 680

Molecular Basis of Evolutionary Innovations

Molekulare Grundlagen evolutionärer Innovationen

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Statistical mechanics and the evolution of complex traits

The evolution of complex traits depends on the underlying allele frequencies , yet these cannot usually be measured. An analogy with statistical mechanics leads to an approximation that accurately predicts the dynamics of the trait, without knowing the allele frequencies. The stationary distribution of the traits under mutation, selection and random drift maximises the entropy, subject to constraints on the expectations of the traits, and the distribution is accurately predicted even when conditions change abruptly. This approach suggests ways to understand the overall evolution of a population, without the need to specify the detailed genetics.

May 03, 2011

5:15 p. m.

Institute for Genetics, Zülpicher Str. 47a, Lekture Hall, 4th floor

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