Predictive Models of Biological Networks – Strategies for Personalized Medicine and for Sustainable Environments

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Biological systems exist in a quasi-stable state so they can evolve and adapt to environmental change, yet withstand stressful conditions and antagonistic interactions. Critical transitions across physiological and developmental states lays at the heart of understanding all complex problems in biology - including reversible physiological adaptation to environmental change, evolution of interactions in the microbial loop, development of an adult body plan from an embryo, differentiation of a stem cell, and transition from health to disease.

We are developing systems biology strategies to characterize dynamics of such state transitions in diverse microbial and eukaryotic organisms, with a primary focus on finding the underlying causal molecular mechanisms. I will discuss how systems biology can be used to predict and manipulate resilience of ecologically important microbial communities, immune response and drug tolerance in TB, and system-wide and molecular dysfunction in glioblastoma.

More about the Hohenheimer SchlossGeister Lecture Series: <u>https://health.uni-hohenheim.de/en/schlossgeister_model-organisms-and-systems</u>