Universität Basel

Research Project

Genomic analysis of information transfer along the DNA by transcriptional interference

Project funded by own resources

Project title Genomic analysis of information transfer along the DNA by transcriptional interference
Principal Investigator(s) Becskei, Attila ;
Co-Investigator(s) Gencoglu, Mümün ;
Organisation / Research unit
Faculty of Science
Departement Biozentrum
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Prior studies have indicated that expression driven by a promoter sequence can be successfully modeled by describing the equilibrium binding of transcriptional activators and repressors to the promoter sequences. The cooperative binding of these factors is also affected by transcriptional interference as revealed in our earlier studies (A. BuettiDinh et al, Molecular Systems Biology (2009) 5:300). Transcriptional interference has been recognized as an important factor in the regulation of gene expression due to the pervasive production of noncoding RNAs during transcriptional initiation, which then acts as a horizontal transmitter of information along the chromosome.

The expression due to the endogenous activator (Gal4p) is not determined only by its (cooperative) binding to the DNA. Gal80 binds and blocks to the activator domain of Gal4, while Gal3 unblocks Gal4 when activated by galactose. Thus, the prediction of the effect of interference requires the measurement and modeling of the cooperative binding of these proteins to Gal4p and in addition to the modeling of the binding of Gal4p to DNA. Using proteomic approaches, we will start studying the cooperative effects in the Gal4Gal80Gal3 proteinprotein interactions on gene expression.

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