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Merging experimental data and in silico analysis: a systems-level approach to cancer

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Abstract

Systems biology, or more specifically network biology, is driven by the assumption that a single gene is seldom accountable for a discrete biological function. In other words, studying molecules one by one will not satisfactorily address the function of complex organisms and/or predict the consequences of biological interactions. On the other hand, interpretation of large-scale data sets provided by the development of high-throughput techniques, which form the core of systems-level analysis, does raise methodological issues. Enhancement of such methodologies will be of key importance for health research in the coming years, as studies have provided convincing evidence that integration of experimental data with in silico analysis can lead to scientific advances that lay the foundations for translational research applied to human disease.

These topics have been discussed in the talk and two case studies exemplifying our experience in the field will also be presented. We suggest that the process of integrating in silico analysis (dry laboratory) with experimental verification (wet laboratory) is likely to have a broad impact on the study of biological systems in physiology and disease.