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Visualization and analysis of data using atlas of cancer signalling networks (ACSN) and NaviCell tools for integrative systems biology of cancer

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Studying reciprocal regulations between cancer-related pathways is essential for understanding signalling rewiring during cancer evolution and in response to treatments. To allow systematic analysis of cancer signalling, the knowledge about cell mechanisms dispersed in scientific literature can be collectively represented in the form of comprehensive maps of signalling networks amenable for computational analytical methods. The Atlas of Cancer Signalling Networks is a resource of cancer signalling tools with interactive web-based environment for navigation, curation and data visualisation supported by a user friendly Google Maps-based tool NaviCell. Construction and update of ACSN involves manual mining of molecular biology literature and participation of the experts in the corresponding fields. ACSN covers major mechanisms involved in cancer progression systematically represented in the form of comprehensive interconnected maps. Cell signalling mechanisms are depicted on the maps in great detail, together creating a seamless map of molecular interactions in cancer. The content of ACSN is visually presented in the form of a global 'geographic-like' molecular map browsable using the Google Maps engine and semantic zooming. The associated blog provides a forum for commenting and curating the ACSN maps content. ACSN and NaviCell are systems biology tools for integration and visualization of cancer molecular profiles generated by high through-put techniques as genome, transcriptome, proteome or analysing results from drug screenings or synthetic interaction studies. Integration and analysis of these data in the context of ACSN may help in interpretation, understanding the biological significance of the data and rationalising the scientific hypothesis. This network-based approach will help in deciphering complex molecular characteristics of cancers, improving patient's stratification, predicting responses and resistance to cancer drugs and proposing new treatment strategies.

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