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Computational biomarker discovery in the big data era: From translational biomedical informatics to systems medicine

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The biomedical big data era is coming with the accumulation of high throughput biomedical data, especially the next generation sequencing data. It becomes possible to integrate these biomedical data to identify important molecular features for the early diagnosis, prognosis and treatment of complex diseases. We may face many challenges for the integration and modeling of these heterogeneous and even non-structural data, such as 1) the modeling and simulation of the heterogeneous data at a systems network level 2) the collection of paired biological and personalized medical data to reconstruct personalized models for the precise diagnosis, prognosis and treatment of complex diseases. To take the advantage of these biomedical data and overcome these challenges as well as promote the application of informatics to translational research, we take prostate cancer as a case study and applied novel biomedical informatics methods to the integration and analysis of prostate cancer associated data to identify the putative prostate cancer biomarkers for diagnosis and prognosis, the identified biomarkers were further validated by experimental and informatics analysis. We concluded that, in the big data ear, the translational biomedical informatics will become the driver for discovery of biomarkers for complex diseases.

Biography

Bairong Shen is a Professor in Center for Systems Biology of Soochow University. He received his PhD degrees in Chemistry from Fudan University in 1997. He became an Associate Professor of Physical Chemistry at Fudan University in 1999. He changed his research to bioinformatics as a Post-Doc in 1999 and became an Assistant Professor of Bioinformatics at University of Tampere in 2004. He joined Soochow University and established the center for systems biology research in 2008. His recent researches focus on computational analyses of the disease associated systems and translational biomedical informatics.

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