

分析与整合

祝贺北京大学系统生物医学研究所成立

人体的结构和功能、疾病与防治都是一个复杂的体系。只有在不同层次和水平上，不断进行分析和整合才能揭示生命的奥秘，了解疾病的发病机理，寻找到防治疾病的途径和方法。系统生物医学既是分析亦是整合，是分析和整合的结合，是21世纪新兴的生物医学。它既是方向，亦是道路。我们热烈祝贺我校系统生物医学研究所的成立。期望引领我校的医学生物学研究，为我国和世界医学的发展作出应有的贡献。

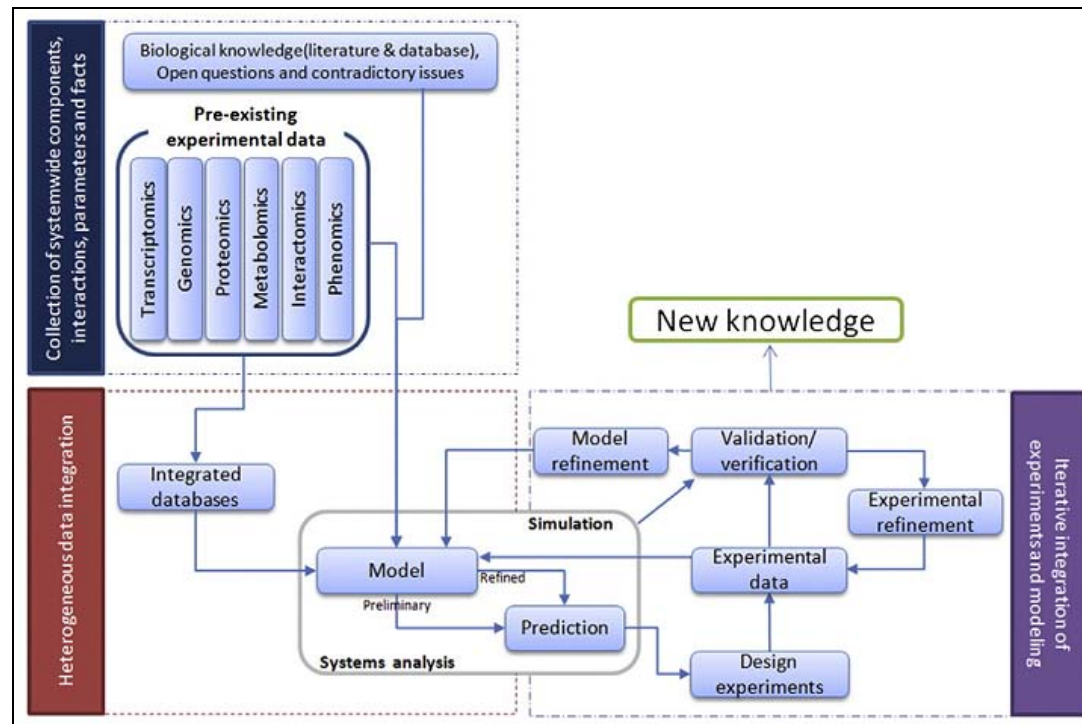
随着高通量技术、“组”生物学和交叉学科的发展，生物医学正面临着新的挑战和机遇。在21世纪初世界各国纷纷调整了生物医学研究的方向和战略，制定了通向未来的路线图计划，如NIH的Roadmap、斯坦福的BioX等。强调要进行复杂生命系统的“大科学”研究；强调科学研究的团队精神和人才培养；强调生命科学的定量化成为精细科学；强调新技术、新方法综合的平台建设；强调基础与临床结合的转化医学研究；强调原始创新、冒险精神和学科交叉。世界先进国家都纷纷组建了各种形式的系统生物医学的研究中心和专业研究所。在我国，中科院、清华大学、上海、交大等许多著名的院所亦在2004—2005年建立了以系统生物学为主要内容的研究机构。我们学校的一些青年科学工作者和一些专家在2001年亦自发地建立了“中国医学生物信息网”（CMBI），并成立了以生物信息学为中心的教研室：创建了心血管相关基因、生物活性多肽、肾上腺素能受体、心血管中草药和人MicroRNA疾病（HMDD）等多个数据库，编写了生物医学数据库指南和教材，开设了医学生物信息学课程，培养了多名生物信息的研究生和进修生。并在应对非典、克隆新基因、心血管研究等工作中发挥了积极作用。2008年又从国外引进了从事系统生物学的专业人才，在人员和经费十分困难的条件下，开展了数据挖掘、信息编程和MicroRNA与肿瘤等疾病的系统生物学研究。在短短的几年时间里，已在国际上著名的Nucleic Acid Res、Bioinformatics、Plos One等系统生物学有影响杂志上发表了十多篇SCI论文。我们天天盼日想，今天终于迎来了我校系统生物医学研究所建立的日子，我们期望着我校的系统生物医学研究有一个大转折、大进步、大发展，为全校医学生物研究服务，为全国医学生物学发展做出我们最大的贡献。虽然这是一个迟到的祝贺！但并不晚！后来居上的日子是屈指可待的。关键是我们自己的努力和领导的大力支持。

系统生物医学，分析和数据是基础，整合和系统是核心，交叉和融合是关键，模型和干预是工具，知识和预测是方向，转化和服务是目的。目前，系统生物医学还处在初创阶段，在方法、技术和组织上还有许多困难和限制。未来的道路还相当艰难和遥远。但大家已经认识到它是揭示生命本质，防治疾病的一条必由之路，一条根本途径。我们必须迎头赶上，加緊部署，创新工作，苦干实干，才能实现跨越式发展，为人类做出我们应有的贡献！加油！我们年轻的系统生物医学研究所。

自2001年起，CMBI收集了近万篇有关生物信息、系统生物学的综合文献和相关资料，组织了几十个特别报道，包括：基因调控网络（447）、转化医学（420，443）、组生物学（442，273，263，196，142，127，275）、重塑生命（433，456）、新一代测序技术（431）、系统生物学软件与工具（422）、建模和网络分析（418）、全基因组关联分析（403）、肿瘤的系统生物学（402）、复杂性疾病（399）、NIH十年规划（333，334）、合成生物学（331）、心血管组生物学（330）、系统生物学（272，189）、医学信息学（261，144）、e-Health（253，434，444）、虚拟细胞（199）、本体-Ontology（193）、组合化学（55，216，177）、领域数据库（175）、蛋白质芯片（58，120，40）、生物信息学（107）、计算生物学（66）、复杂系统（7）等等。这里我们又搜索了最近两年来有关系统生物学和整合医学的一些综合文献资料和资料，供大家参考。

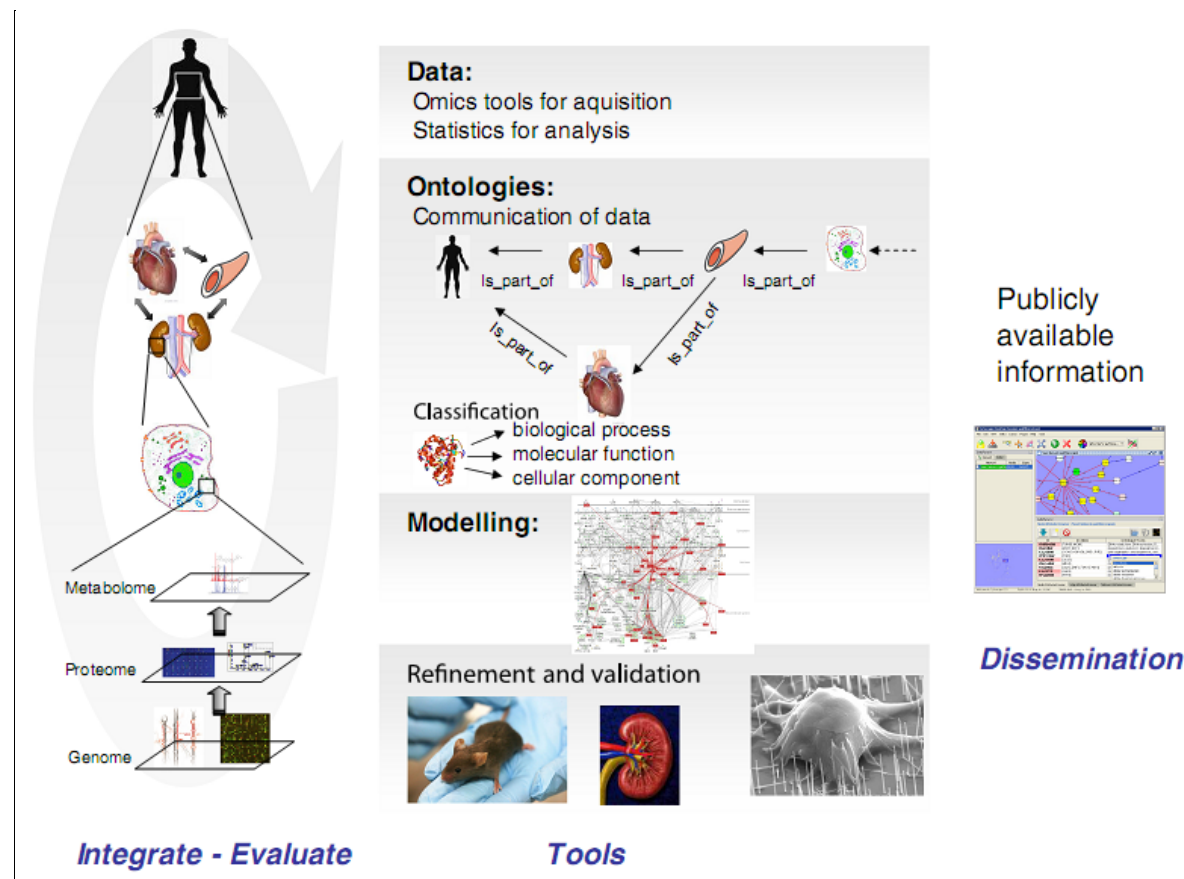
Framework of systems biology

(10.1016/j.yjmcc.2007.12.005)



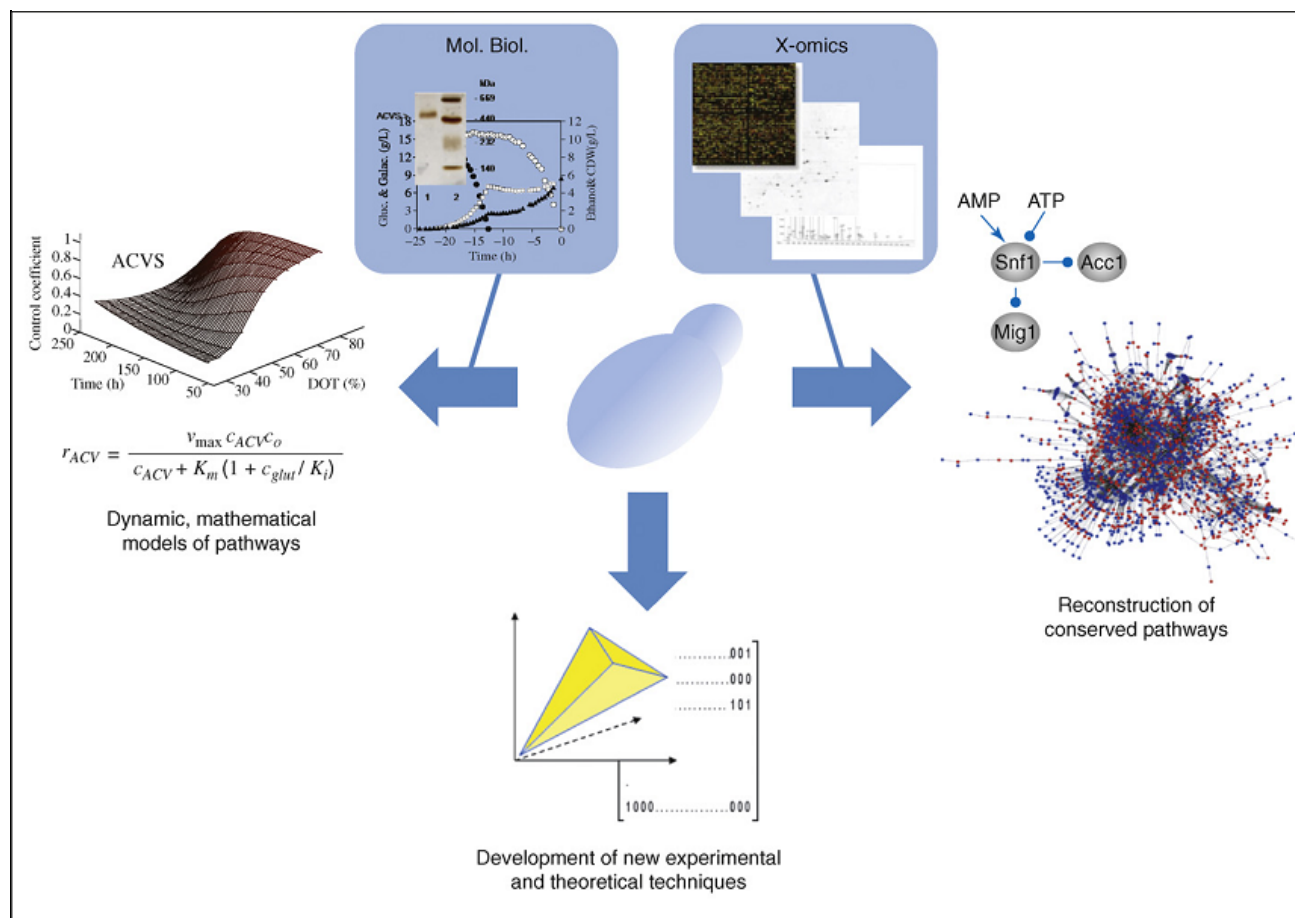
the major elements and requirements of systems biology

(10.1093/ndt/gfq033)



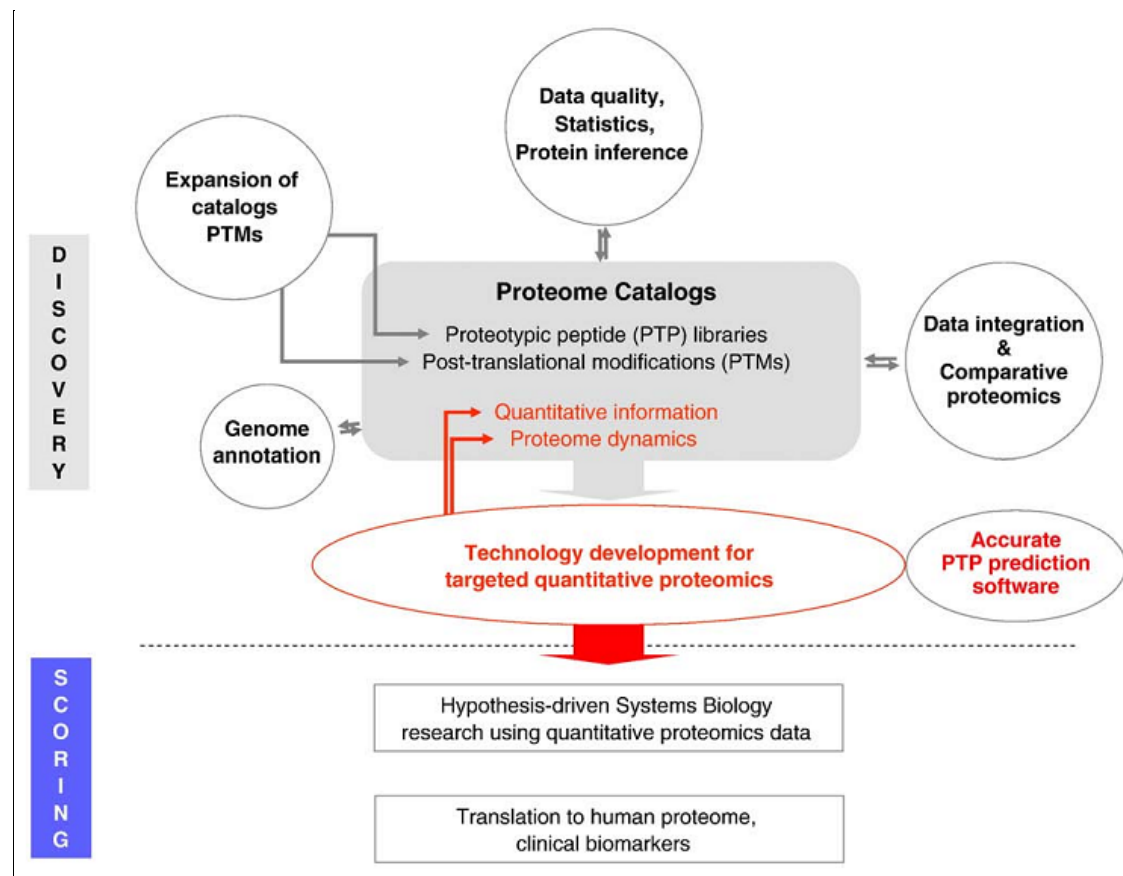
systems biology in the study of human diseases

(10.1016/j.tibtech.2008.07.008)



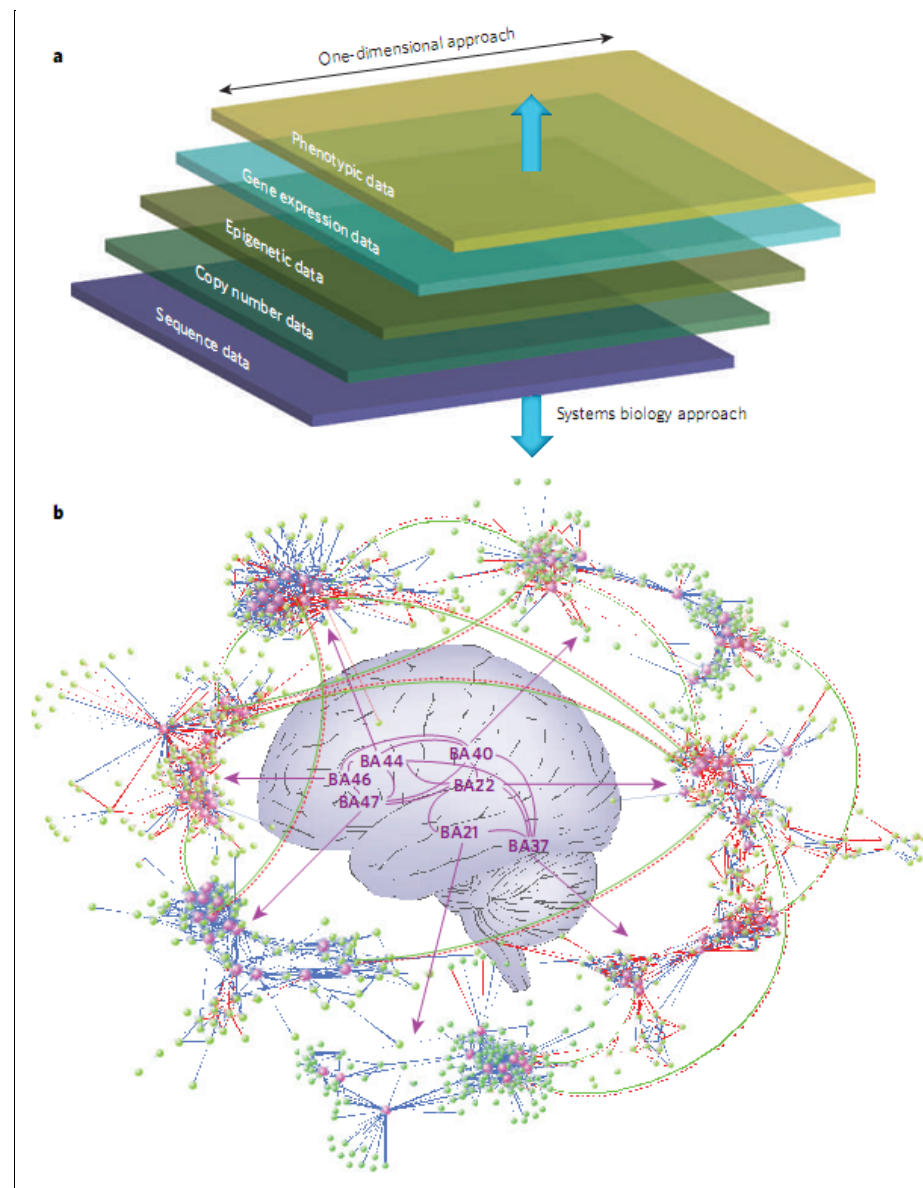
the generation of proteome catalogs

(10.1016/j.jprot.2009.12.007)



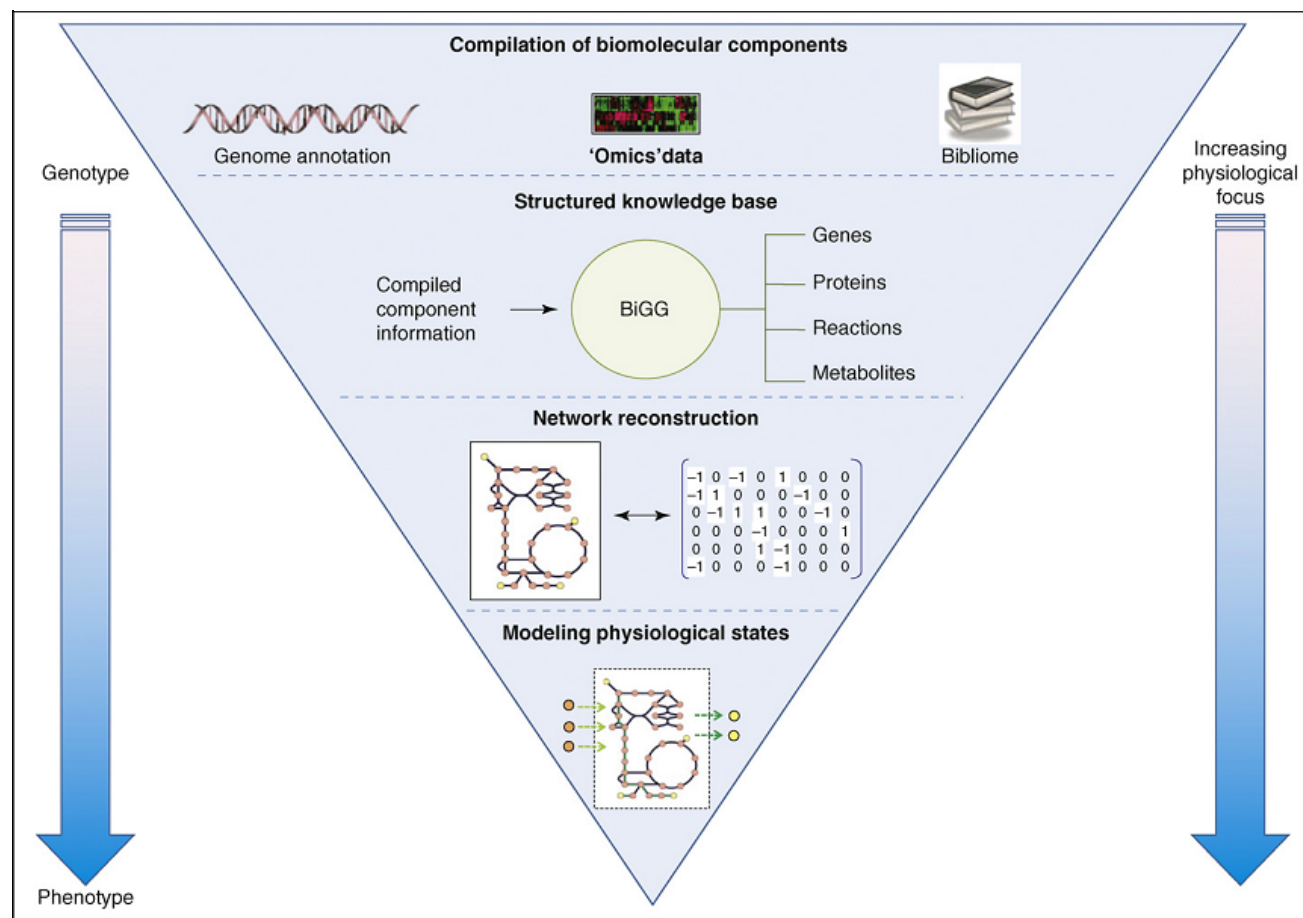
integration of multiple layers of data

(10.1038/nature08537)



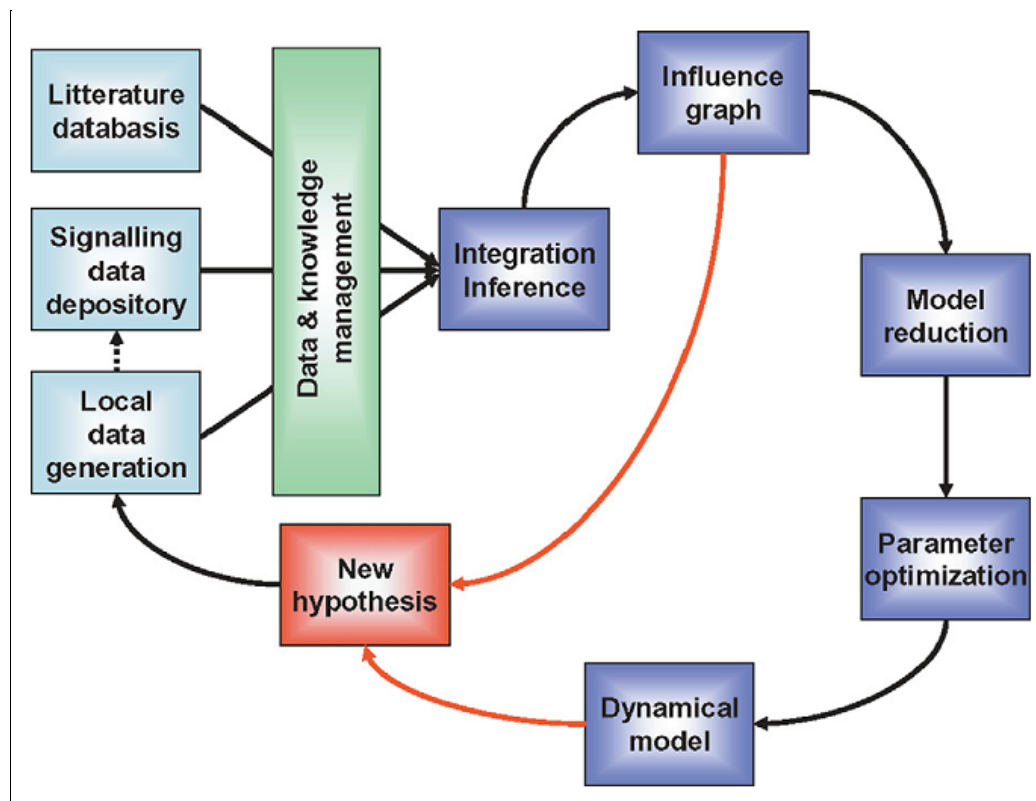
physiological system in silico

(10.1016/j.tibtech.2008.09.007)



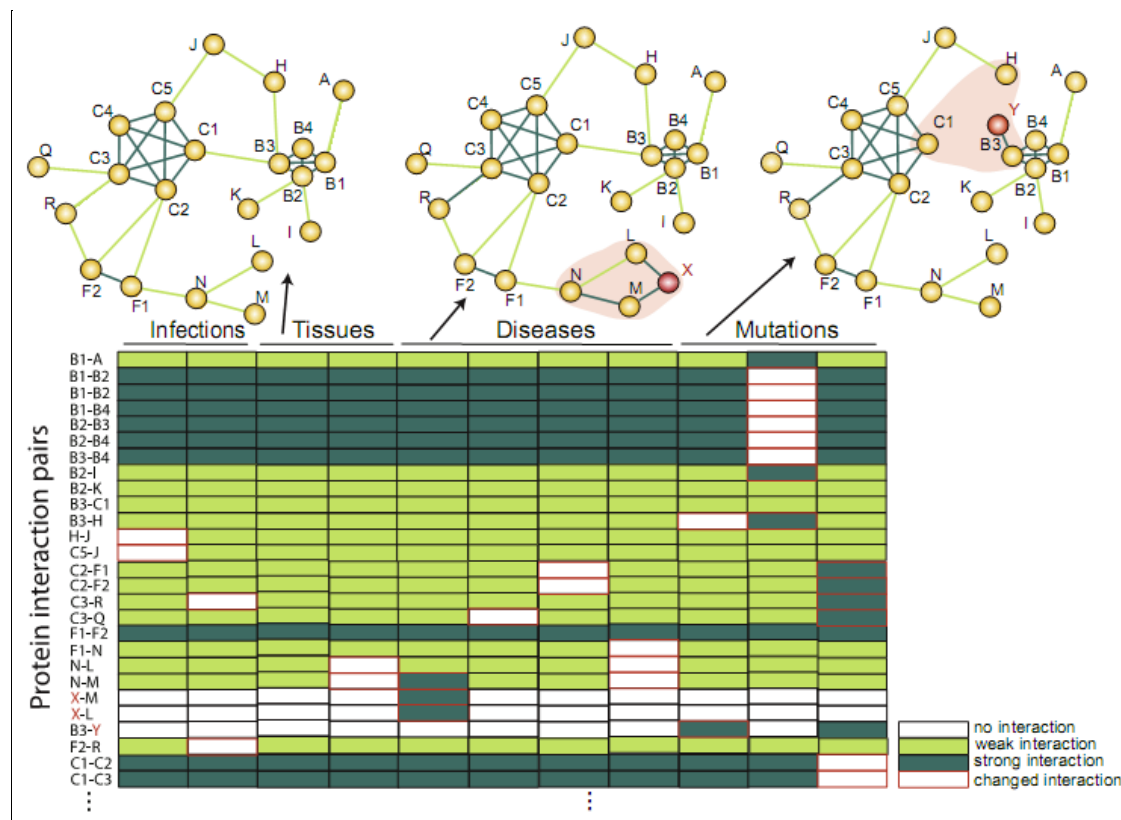
model signalling system

(10.1016/j.crvi.2009.09.002)



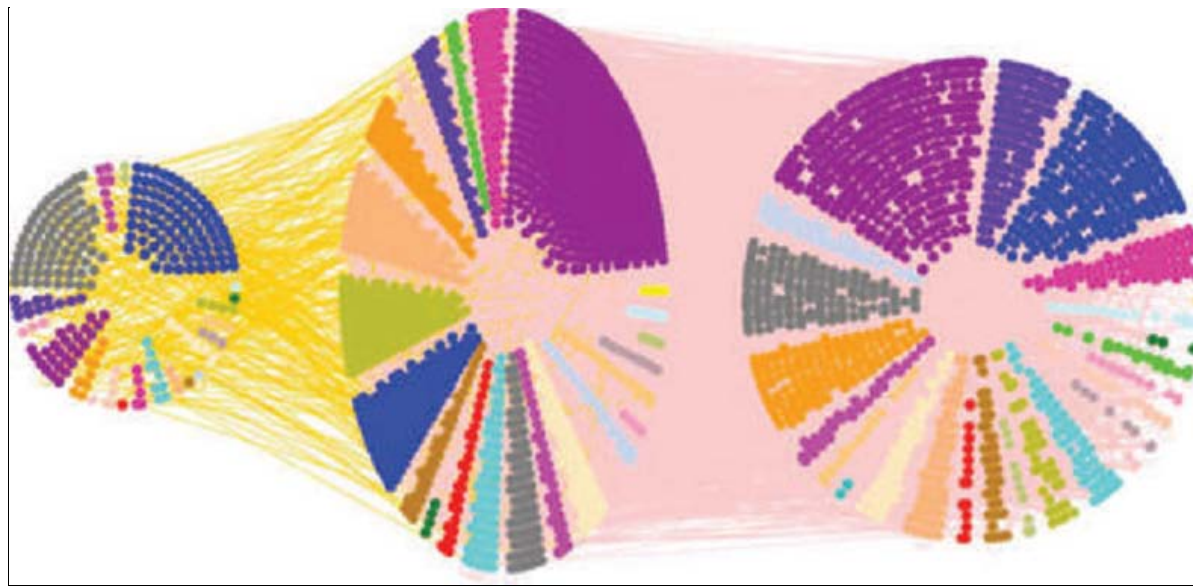
Protein interaction networks from different cellular status

(10.1016/j.febslet.2008.02.015)



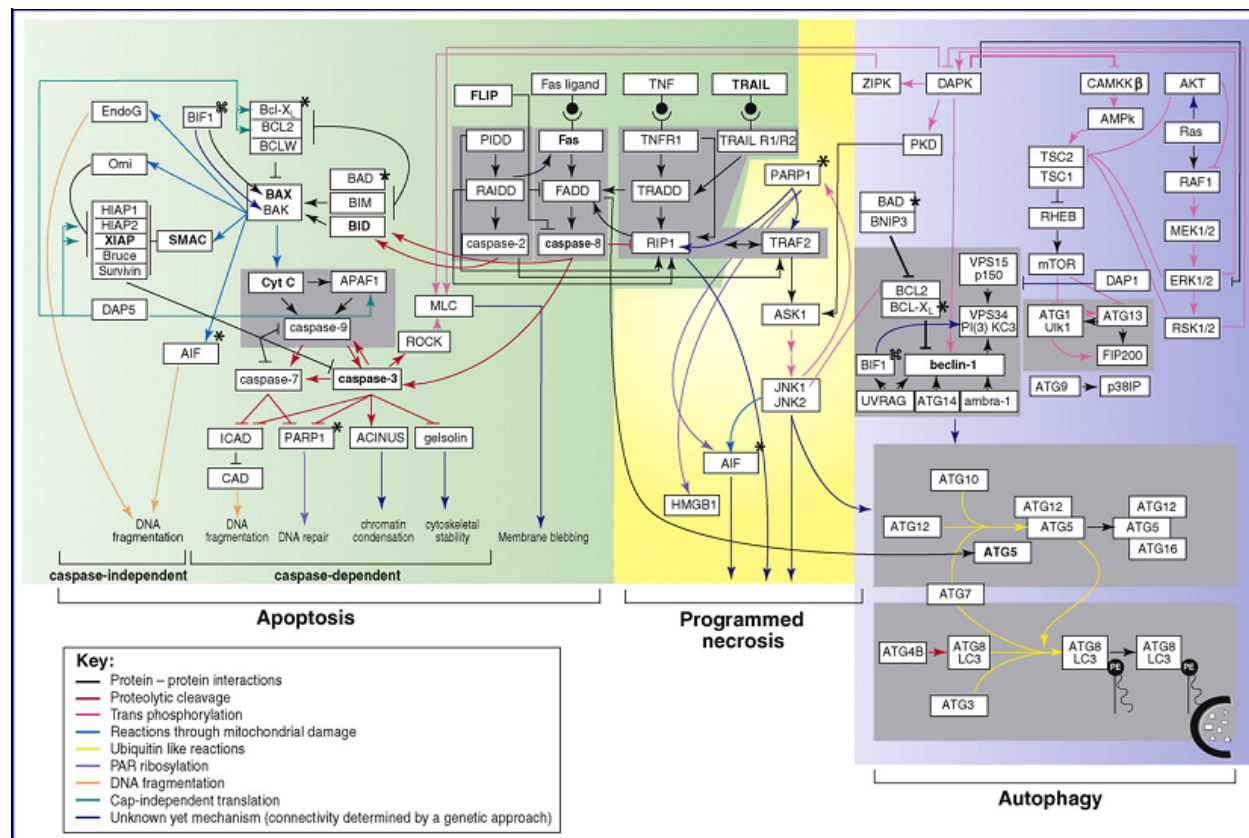
the current budding-yeast interaction network

(NATURE 460(16))



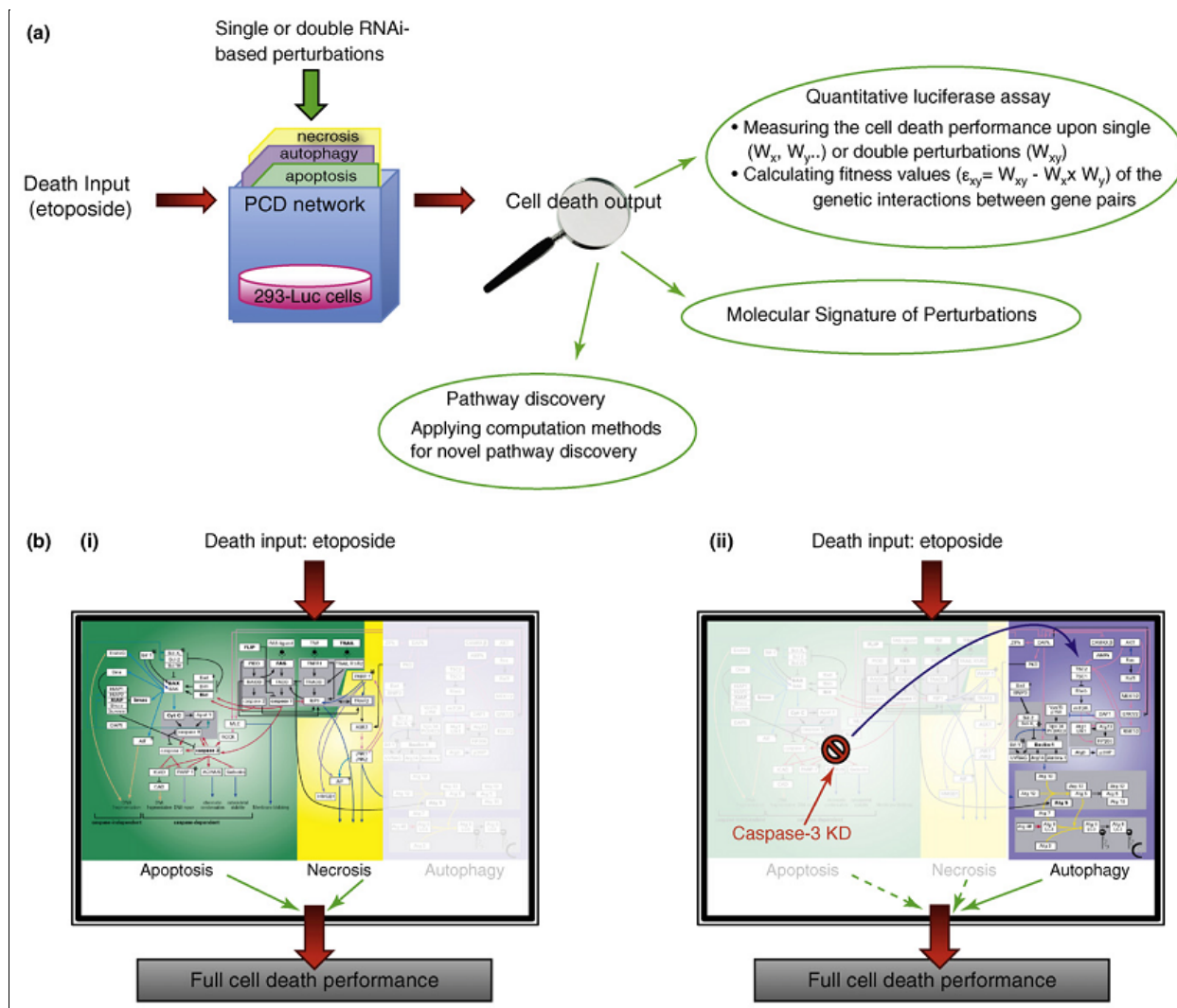
The apoptosis network

(10.1016/j.tibs.2010.04.008)



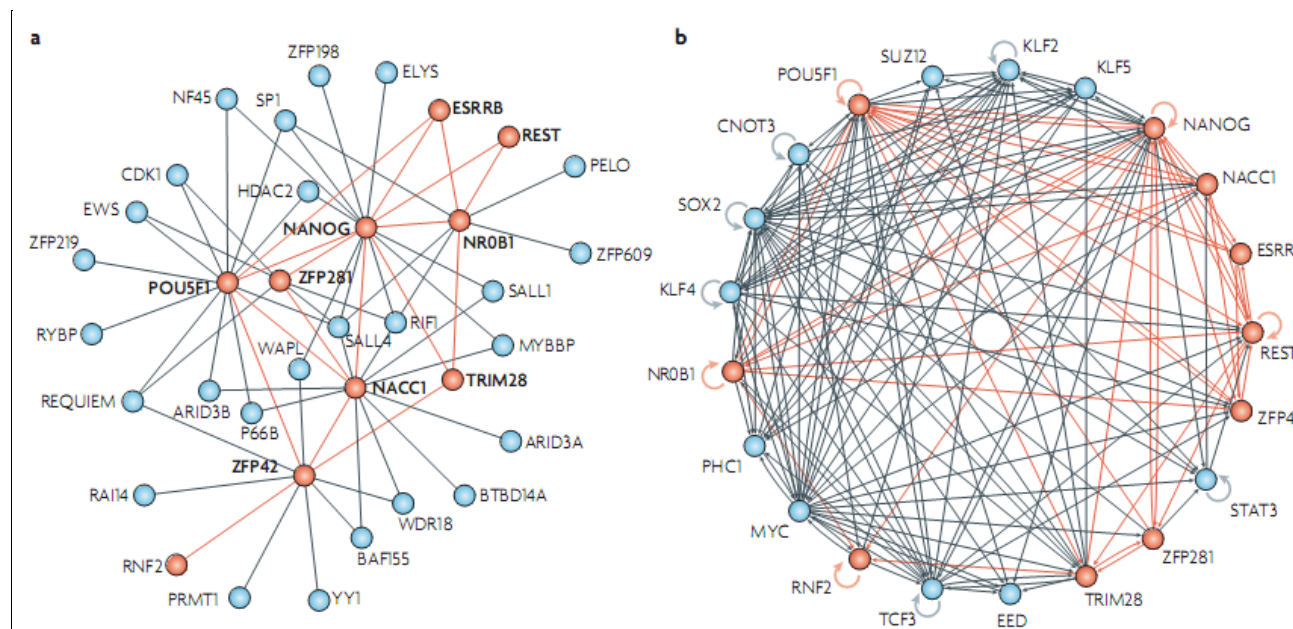
platform for analysis of the apoptosis network

(10.1016/j.tibs.2010.04.008)



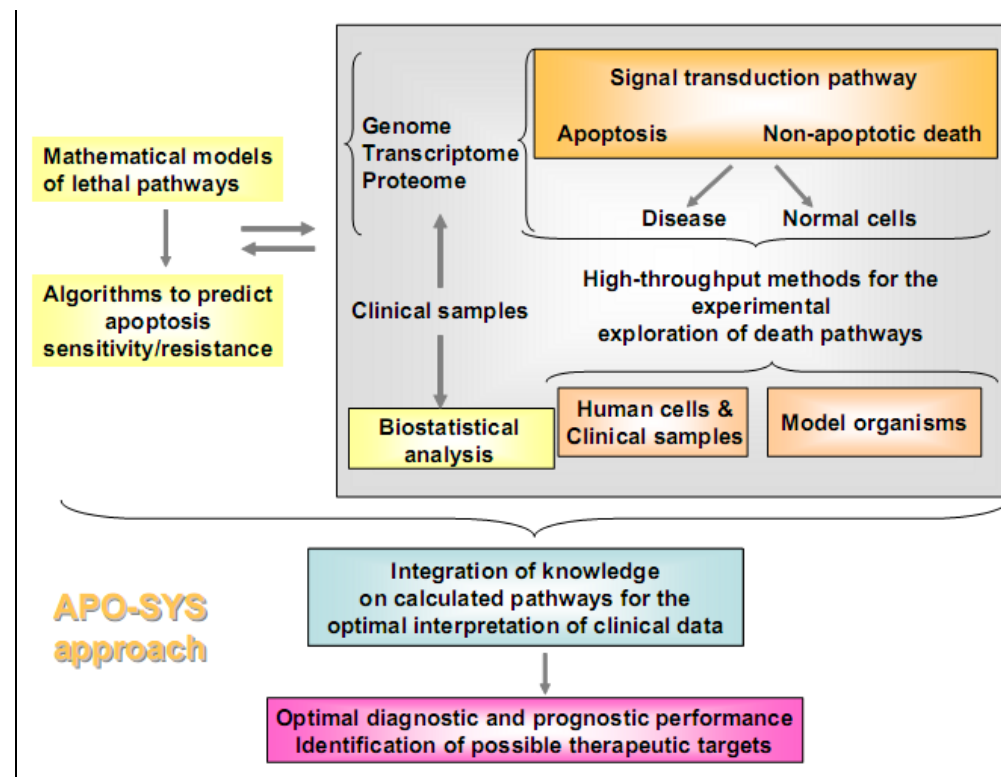
Stem cell regulatory networks

(10.1038/nrm2766)



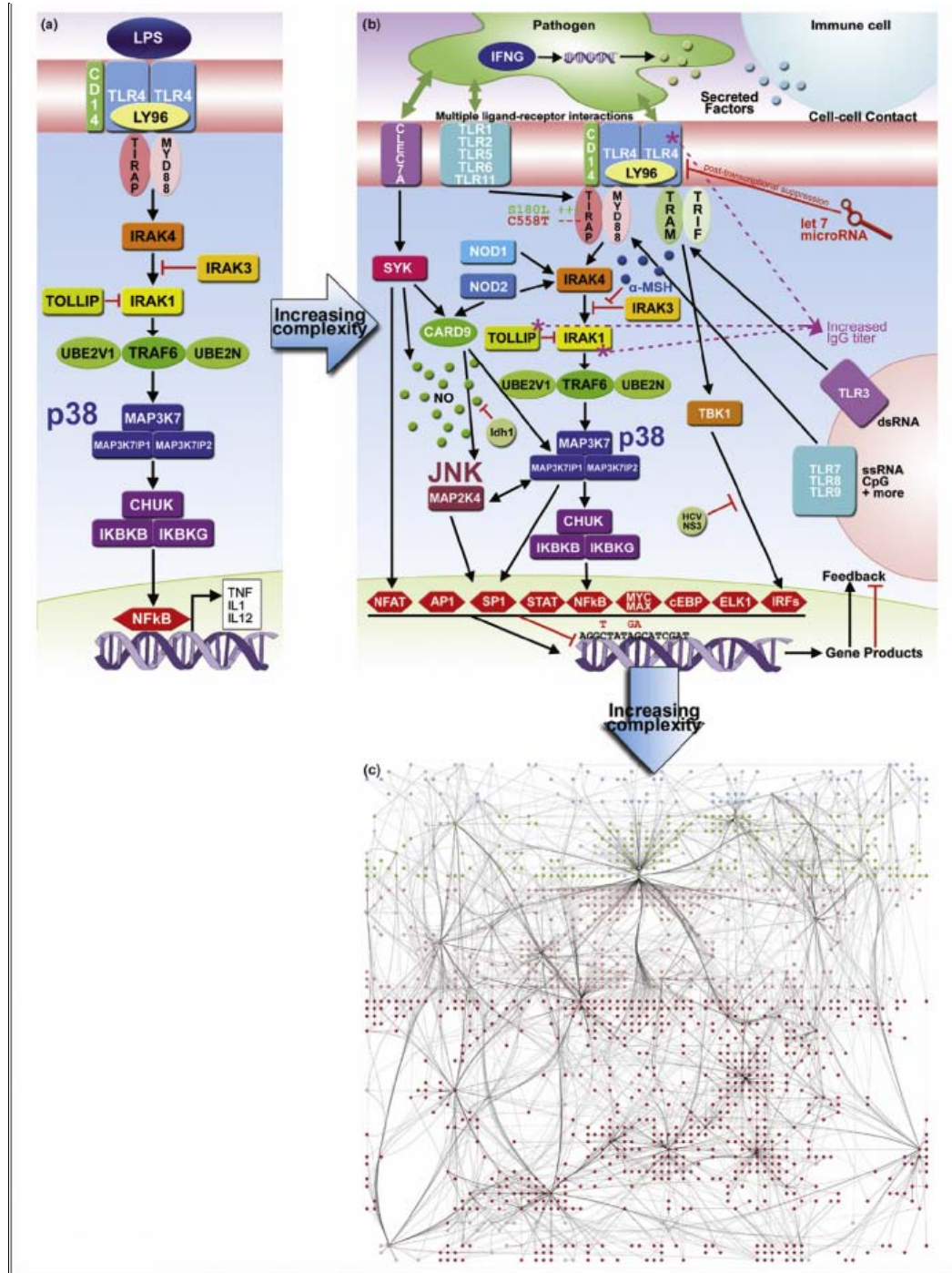
apoptosis systems biology approach to cancer

(10.1016/j.molonc.2008.11.003)



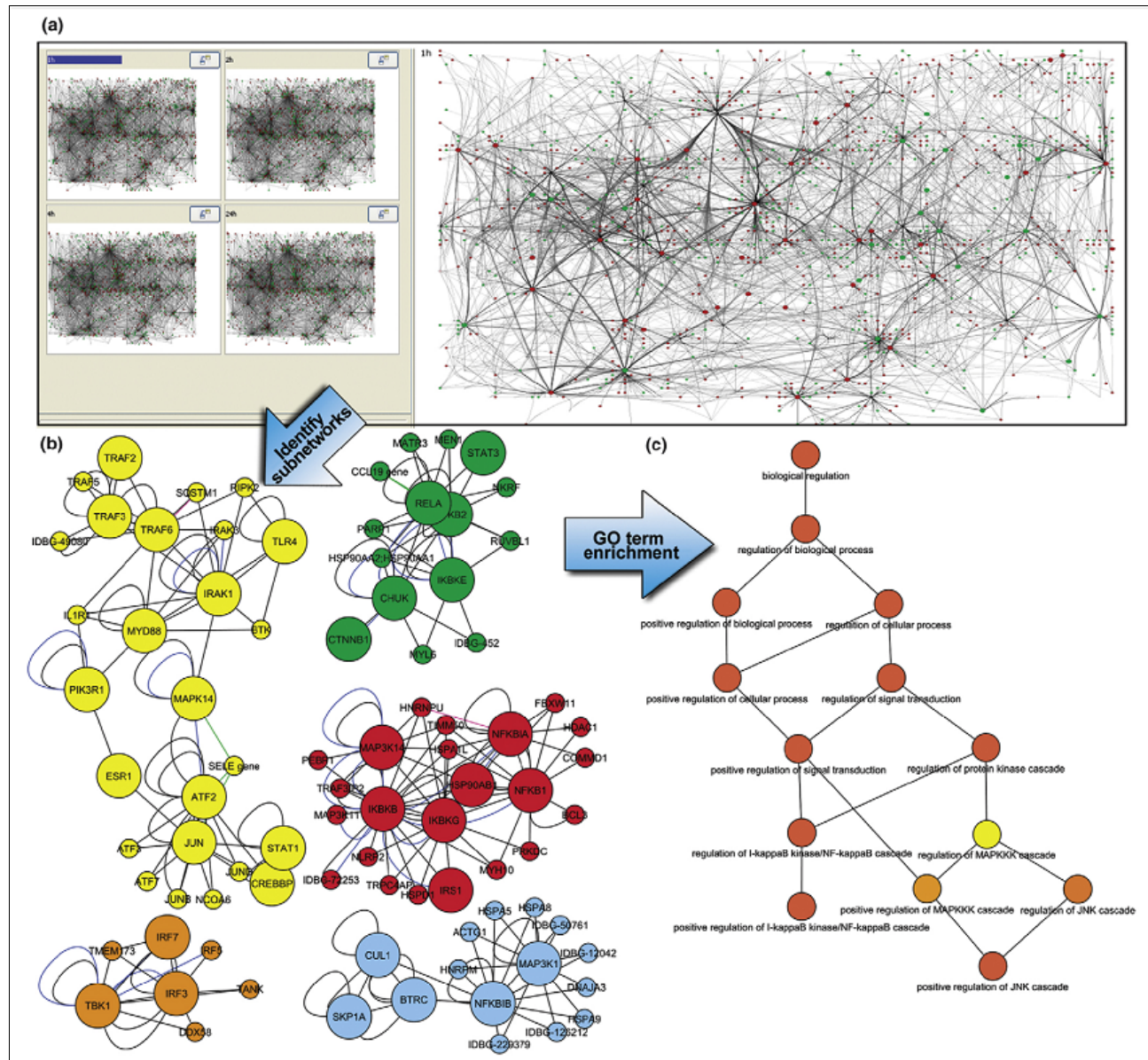
Systems biology represents a powerful and comprehensive paradigm (immunology)

(10.1016/j.it.2009.03.009)



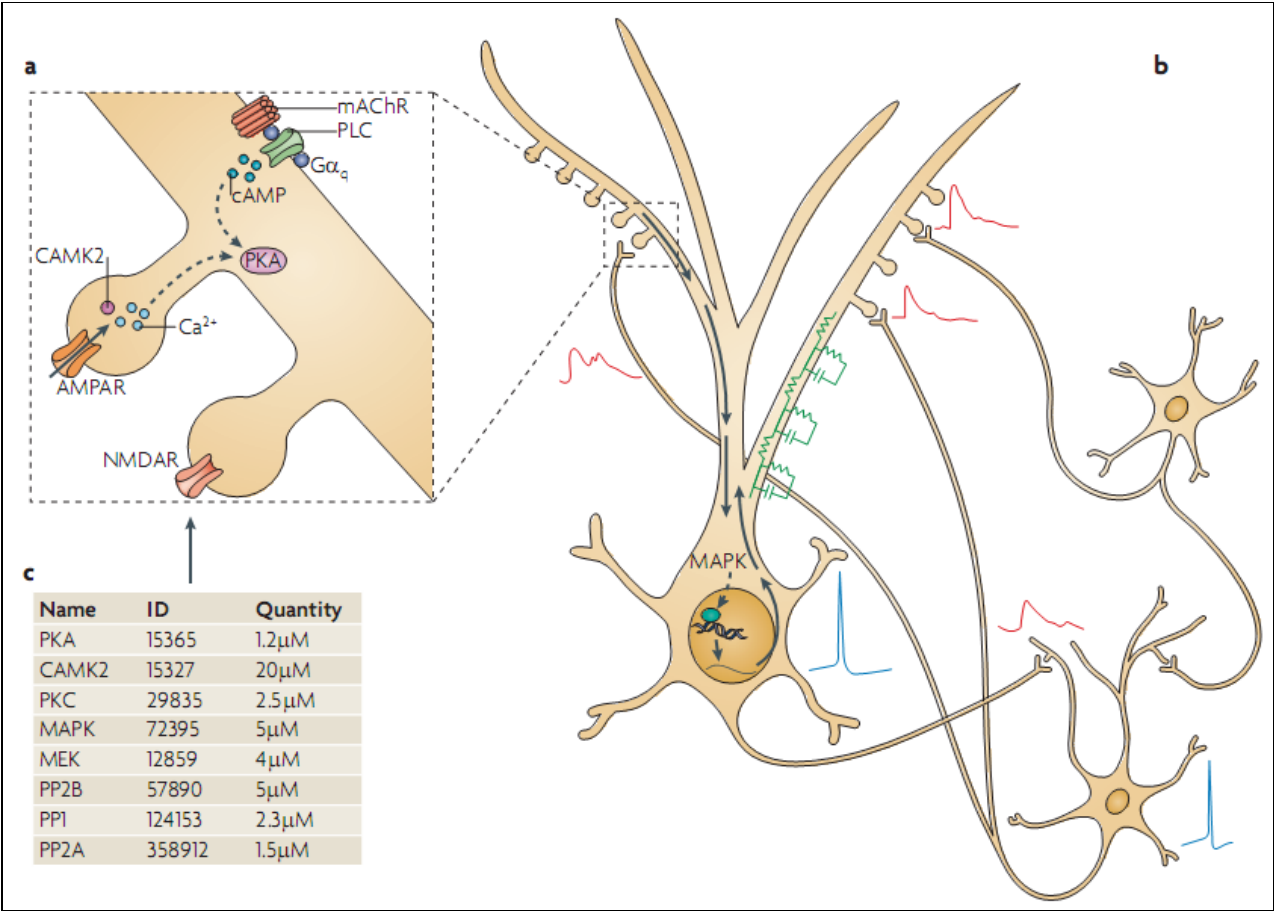
Network-based visualization and analysis (immunology)

(10.1016/j.it.2009.03.009)



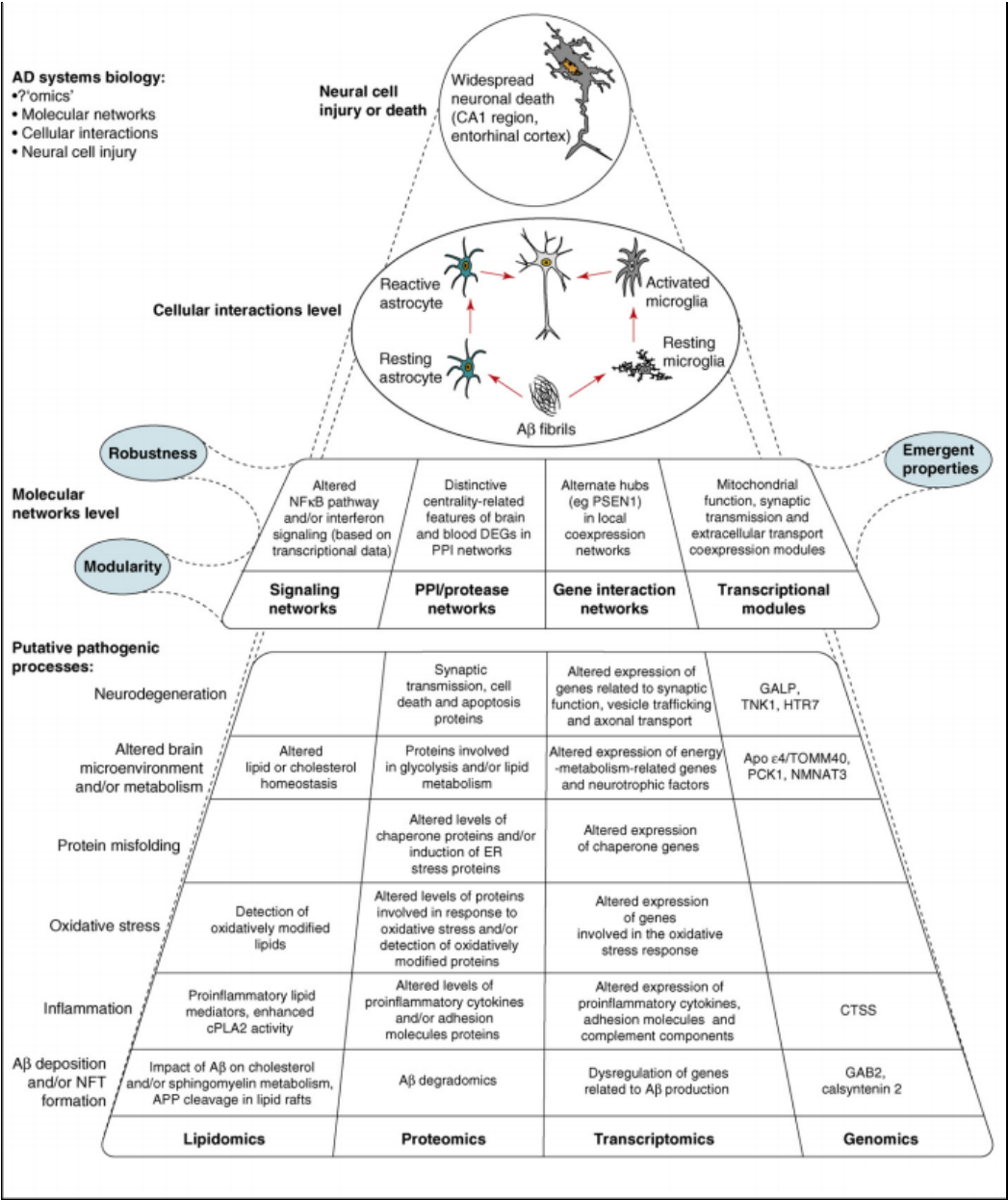
computational neuroscience

(10.1038/nrn2807)



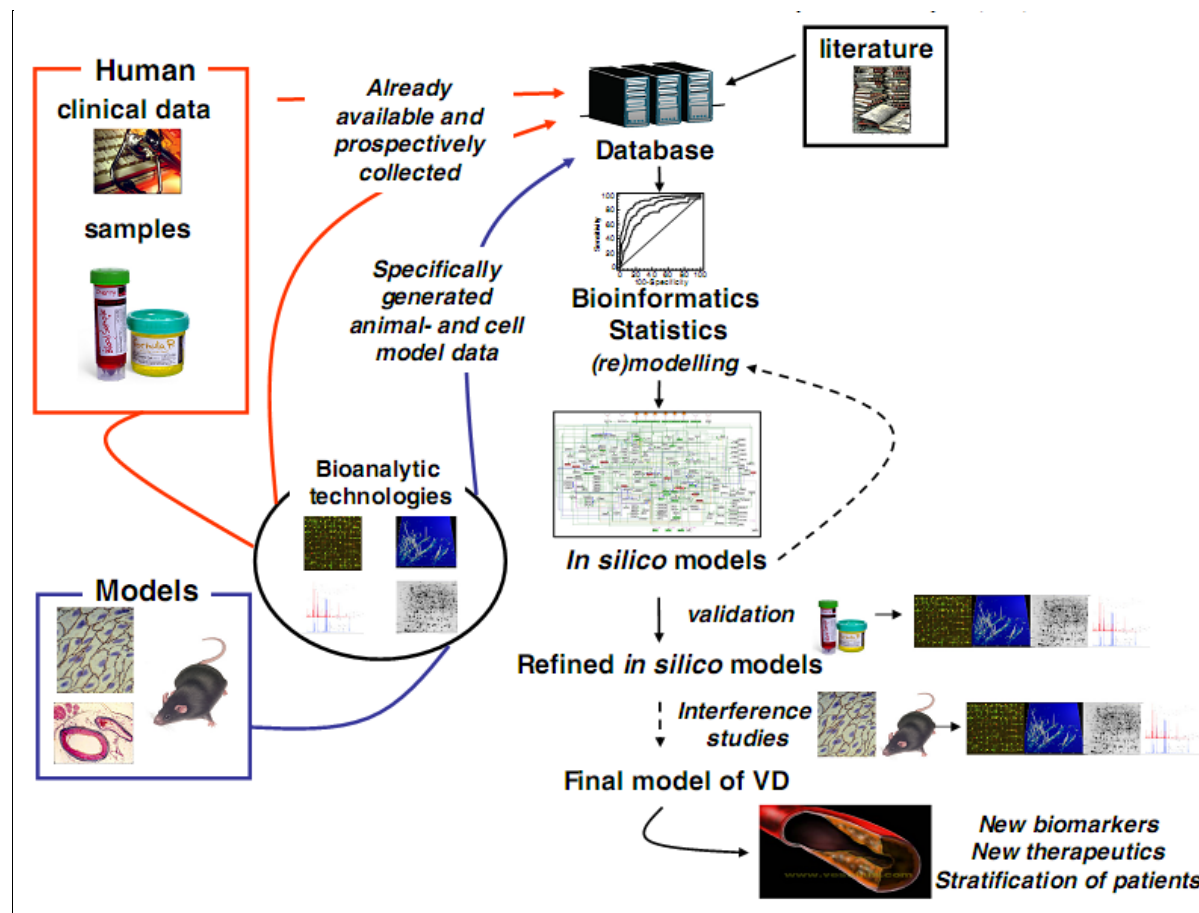
Systems biology of Alzheimer's disease

(10.1016/j.tins.2008.10.003)



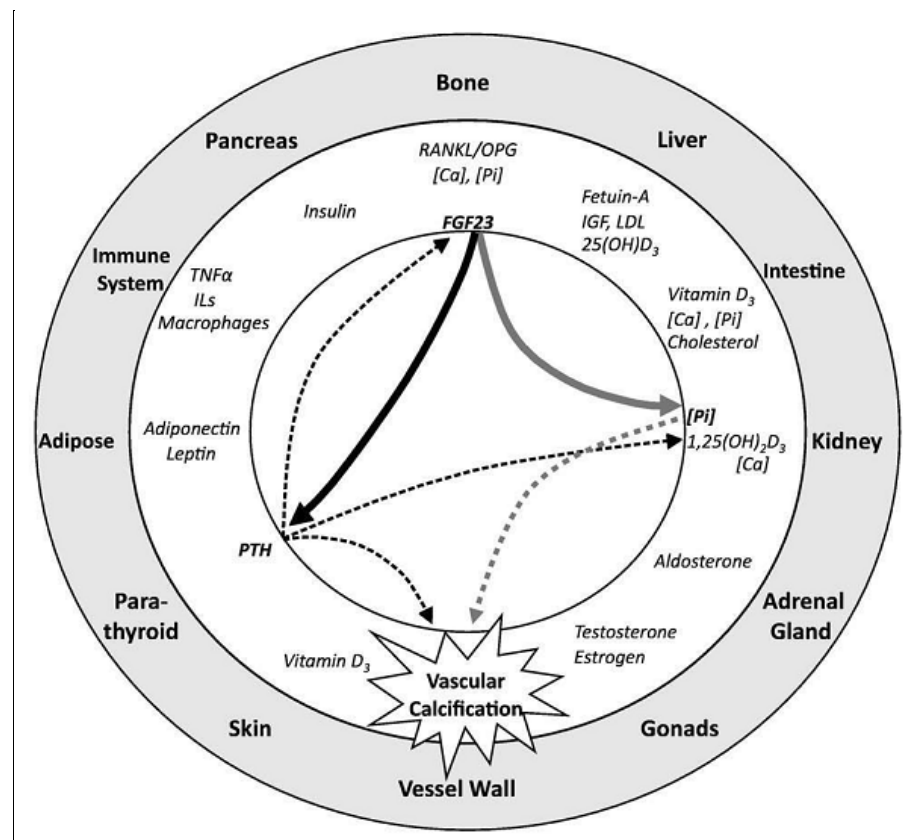
Systems biology to vascular disease

(10.1093/ndt/gfq025)



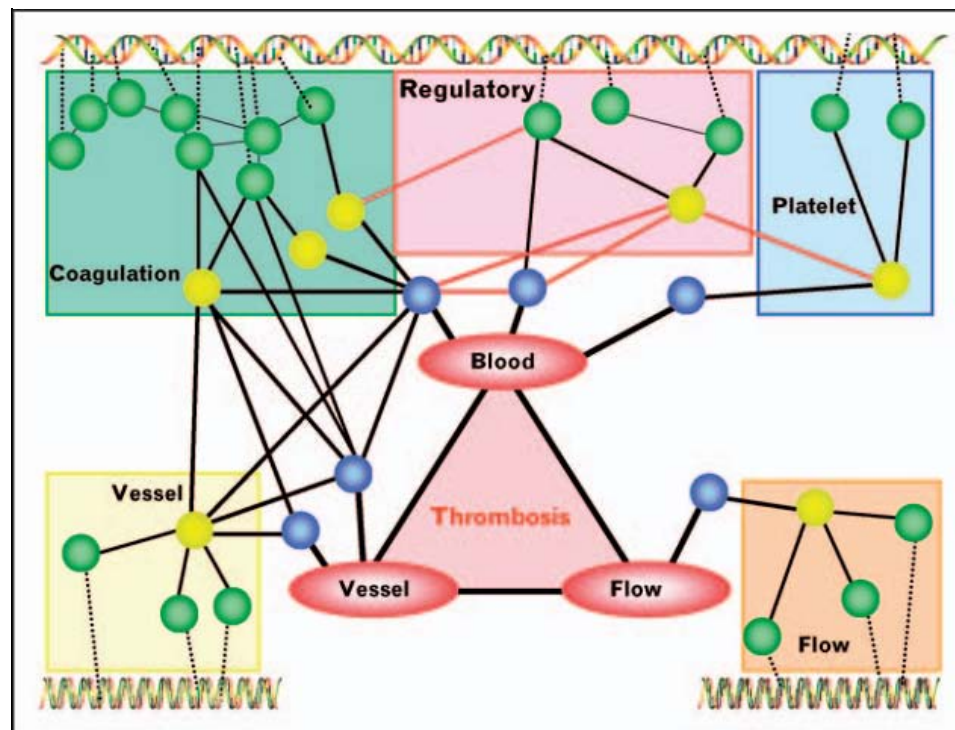
network Vascular Calcification

(TCM 2009;19:118–123)



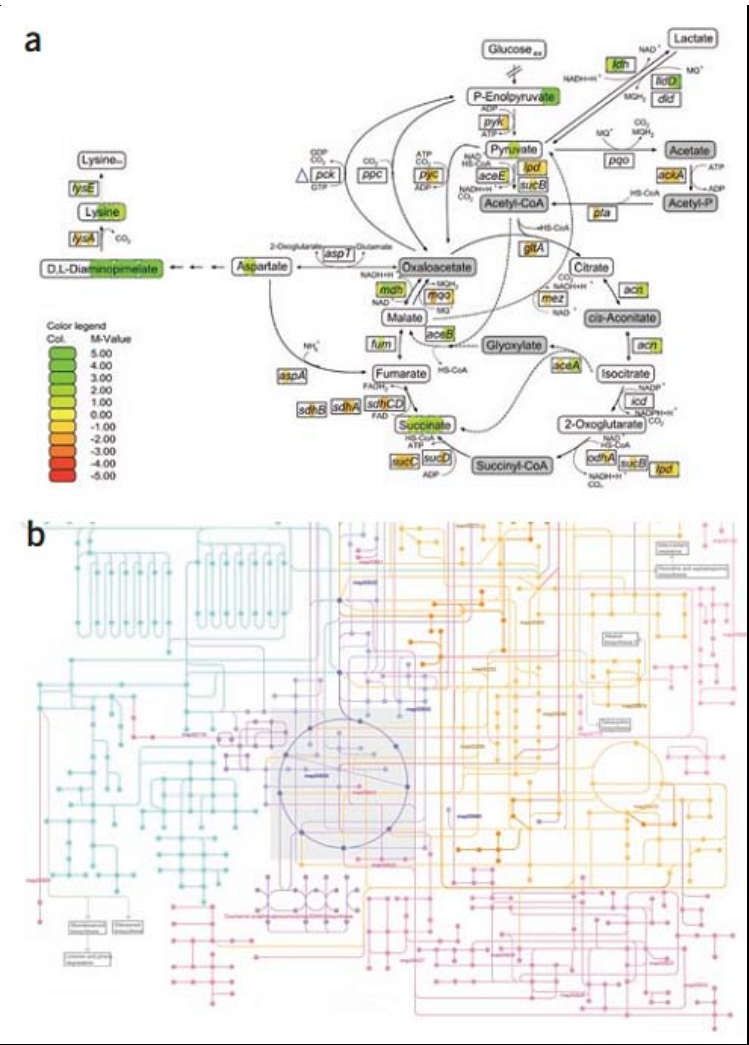
Hypothetical scheme for the systems biology approach to thrombosis

(Blood Coagulation and Fibrinolysis 2007, 18:215–217)



Visualization of metabolic pathways and profile data

(10.1038/NmETH.1436)



附：

迎接系统生物医学的新时代（中华医学杂志 2005 评论员文章）

2009-2010有关系统生物学和整合医学文献

- [A perspective on redox systems biology](#)
- [A phosphoproteomic strategy compatible with systems biology analysis](#)
- [A Review of a Historical Summit on Integrative Medicine](#)
- [A systems biology approach to the diagnosis of venous thrombosis risk](#)
- [A systems biology approach to understanding cis-regulatory module function](#)
- [A systems biology view of cancer](#)
- [A systems biology view on cell death](#)

- A unifying view of 21st century systems biology
- Accelerating systems biology
- Advanced Methods in Molecular Systems Biology
- Advances in proteomic prostate cancer biomarker discovery
- An overview of cardiac systems biology
- Application of proteomics to neutrophil biology
- Application of systems biology for bioprocess development
- Assumptions, constraints and interpretation in systems biology
- Biochemical modeling with Systems Biology Graphical Notation
- Bioinformatic and Systems Biology Tools to Generate Testable Models of Signaling Pathways and Their Targets
- Can yeast systems biology contribute to the understanding of human disease
- Cancer systems biology
- Cancer-A Systems Biology disease
- characterizing populations in the era of genomics and systems biology
- Complex Systems-From chemistry to systems biology
- Complexity in bacterial cell–cell communication
- Exploring the roles of noise in the eukaryotic cell cycle
- Internal coarse-graining of molecular systems
- Kinetic laws, phase–phase expansions, renormalization group, and INR calibration
- Modeling the temporal interplay of molecular signaling and gene expression
- Modularity and interactions in the genetics of gene expression
- Phenotypes and tolerances in the design space of biochemical systems
- Computational approaches to the integration of gene expression, ChIP-chip and sequence data in the inference of gene regulatory networks
- Computational Biochemistry-Systems Biology Minireview Series
- Computational biology — Modeling of primary blast effects on the central nervous system
- Computational biology for cardiovascular biomarker discovery
- Computational challenges in systems biology
- Computational systems biology of the cell cycle
- Deciphering complex mechanisms in neurodegenerative diseases-the advent of systems biology
- Developmental systems biology flourishing on new technologies
- Enabling a systems biology approach to immunology
- ENFIN – A European network for integrative systems biology
- Event extraction for systems biology by text mining the literature
- From molecules to systems
- Functional cis-regulatory genomics for systems biology
- Future of Personalized Medicine in Oncology
- gateway into systems biology
- Gene regulatory network inference
- GPU computing for systems biology
- How Systems Biology Can Advance Cancer Research
- Integrated omics approaches in plant systems biology
- integrated software for pathway-genome informatics and systems biology
- Integrative Approaches for Cardiovascular Disease
- Integrative biology — a strategy for systems biomedicine
- Integrative Medicine – Medicine of the future
- Integrative Medicine and Clinical Practice
- Integrative Oncology for the Whole Person
- Interaction networks for systems biology
- Interpreting endocrine disruption from an integrative biology perspective
- Metabolic systems biology
- Metabolomic systems biology of trypanosomes
- Modeling and simulation in signal transduction pathways
- Modelling the molecular mechanisms of synaptic plasticity using systems biology approaches

- Network Systems Biology for Drug Discovery
- Networks, biology and systems engineering
- Neuroscience in the era of functional genomics and systems biology
- Next-generation platform for systems biology
- nutritional sciences-analysis of complex data in the era of systems biology
- Personalizing medicine-a systems biology perspective
- Quality and safety of Chinese herbal medicines guided by a systems biology perspective
- Quantifying oncogenic phosphotyrosine signaling networks through systems biology
- Quantitative proteomics-A central technology for systems biology
- Rembrandt-Helping Personalized Medicine Become a Reality through Integrative Translational Research
- Reverse engineering and verification of gene networks-Principles, assumptions, and limitations of present methods and future perspectives
- SBRML-a markup language for associating systems biology data with models
- Scale relativity theory and integrative systems biology 1-Founding principles and scale laws
- Scale relativity theory and integrative systems biology-2 Macroscopic quantum-type mechanics
- SensSB-A software toolbox for the development and sensitivity analysis of systems biology models
- Single cell analysis-the new frontier in 'omics'
- Stem cell biology meets systems biology
- Structures in systems biology
- Systems analysis of cellular networks under uncertainty
- Systems and Synthetic biology-tackling genetic networks and complex diseases
- Systems Biologists Seek Fuller Integration of Systems Biology Approaches in New Cancer Research Programs
- Systems biology analysis of programmed cell death
- Systems biology and the heart
- Systems biology and the virtual physiological human
- Systems biology from a yeast omics perspective
- Systems Biology Modeling of the Radiation Sensitivity Network
- Systems Biology of Cellular Signaling
- Systems biology of lipid metabolism
- Systems biology of microbial metabolism
- Systems biology of stem cell fate and cellular reprogramming
- Systems Biology of Vascular Calcification
- Systems biology strategy to study lipotoxicity and the metabolic syndrome
- Systems Biology Strikes Gold
- Systems biology to battle vascular disease
- Systems biology unlimited
- Systems Biology Update-Cell Type-Specific Transcriptional Regulatory Networks
- Systems Biology-Functional analysis of natural microbial consortia using community proteomics
- Systems biology-opening new avenues in clinical research
- Systems biology-Playing by the rules
- Systems Biology-The elements and principles of Life
- Systems biology-Untangling the protein web
- Systems biology-When it is time to die
- the advent of systems biology
- The chemokine system in cancer biology and therapy
- The second wave of synthetic biology-from modules to systems
- The Systems Biology Approach to Drug Development
- Toward a systems biology approach to investigate cellular networks in normal and malignant B cells
- Towards a systems biology approach of G protein-coupled receptor signalling
- Training Interdisciplinary Scientists for Systems Biology
- Understanding human metabolic physiology-a genome-to-systems approach
- Unveiling the role of network and systems biology in drug discovery
- Using systems biology to simplify complex disease
- Virus–host interactions-from systems biology to translational research

- [Visualization of omics data for systems biology](#)

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