ELIXIR-ITA Bioinformatics Training

Protein Networks and Systems Biology

Bologna, 14-18 December 2015

Network biology approaches to understand human diseases

Cited literature in the lecture

Goh KI, Choi IG. Exploring the human diseasome: the human disease network. Brief Funct Genomics. 2012 Nov;11(6):533-42. doi: 10.1093/bfgp/els032. Epub 2012 Oct 12. Review. PubMed PMID: 23063808.

Vidal M, Cusick ME, Barabási AL. Interactome networks and human disease. Cell. 2011 Mar 18;144(6):986-98. doi: 10.1016/j.cell.2011.02.016. Review. PubMed PMID: 21414488; PubMed Central PMCID: PMC3102045.

Wachi S, Yoneda K, Wu R. Interactome-transcriptome analysis reveals the high centrality of genes differentially expressed in lung cancer tissues. Bioinformatics. 2005 Dec 1;21(23):4205-8. Epub 2005 Sep 27. PubMed PMID: 16188928; PubMed Central PMCID: PMC4631381.

Jonsson PF, Bates PA. Global topological features of cancer proteins in the human interactome. Bioinformatics. 2006 Sep 15;22(18):2291-7. Epub 2006 Jul 14. PubMed PMID: 16844706; PubMed Central PMCID: PMC1865486.

Goh KI, Cusick ME, Valle D, Childs B, Vidal M, Barabási AL. The human disease network. Proc Natl Acad Sci U S A. 2007 May 22;104(21):8685-90. Epub 2007 May 14. PubMed PMID: 17502601; PubMed Central PMCID: PMC1885563.

Park J, Lee DS, Christakis NA, Barabási AL. The impact of cellular networks on disease comorbidity. Mol Syst Biol. 2009;5:262. doi: 10.1038/msb.2009.16. Epub 2009 Apr 7. PubMed PMID: 19357641; PubMed Central PMCID: PMC2683720.

Goehler H, Lalowski M, Stelzl U, Waelter S, Stroedicke M, Worm U, Droege A, Lindenberg KS, Knoblich M, Haenig C, Herbst M, Suopanki J, Scherzinger E, Abraham C, Bauer B, Hasenbank R, Fritzsche A, Ludewig AH, Büssow K, Coleman SH, Gutekunst CA, Landwehrmeyer BG, Lehrach H, Wanker EE. A protein interaction network links GIT1, an enhancer of huntingtin aggregation, to Huntington's disease. Mol Cell. 2004 Sep 24;15(6):853-65. PubMed PMID: 15383276.

Kaltenbach LS, Romero E, Becklin RR, Chettier R, Bell R, Phansalkar A, Strand A, Torcassi C, Savage J, Hurlburt A, Cha GH, Ukani L, Chepanoske CL, Zhen Y, Sahasrabudhe S, Olson J, Kurschner C, Ellerby LM, Peltier JM, Botas J, Hughes RE. Huntingtin interacting proteins are genetic modifiers of neurodegeneration. PLoS Genet. 2007 May 11;3(5):e82. PubMed PMID: 17500595; PubMed Central PMCID: PMC1866352.

Lim J, Hao T, Shaw C, Patel AJ, Szabó G, Rual JF, Fisk CJ, Li N, Smolyar A, Hill DE, Barabási AL, Vidal M, Zoghbi HY. A protein-protein interaction network for human inherited ataxias and disorders of Purkinje cell degeneration. Cell. 2006 May 19;125(4):801-14. PubMed PMID: 16713569.

Pujana MA, Han JD, Starita LM, Stevens KN, Tewari M, Ahn JS, Rennert G, Moreno V, Kirchhoff T, Gold B, Assmann V, Elshamy WM, Rual JF, Levine D, Rozek LS, Gelman RS, Gunsalus KC, Greenberg RA, Sobhian B, Bertin N, Venkatesan K, Ayivi-Guedehoussou N, Solé X, Hernández P, Lázaro C, Nathanson KL, Weber BL, Cusick ME, Hill DE, Offit K, Livingston DM, Gruber SB, Parvin JD, Vidal M. Network modeling links breast cancer susceptibility and centrosome dysfunction. Nat Genet. 2007 Nov;39(11):1338-49. Epub 2007 Oct 7. PubMed PMID: 17922014.

Hartwell LH, Hopfield JJ, Leibler S, Murray AW. From molecular to modular cell biology. Nature. 1999 Dec 2;402(6761 Suppl):C47-52. PubMed PMID: 10591225.

Barabási AL, Gulbahce N, Loscalzo J. Network medicine: a network-based approach to human disease. Nat Rev Genet. 2011 Jan;12(1):56-68. doi: 10.1038/nrg2918. Review. PubMed PMID: 21164525; PubMed Central PMCID: PMC3140052.

Oti M, Brunner HG. The modular nature of genetic diseases. Clin Genet. 2007 Jan;71(1):1-11. Review. PubMed PMID: 17204041.

Pizzuti C, Rombo SE. Algorithms and tools for protein-protein interaction networks clustering, with a special focus on population-based stochastic methods. Bioinformatics. 2014 May 15;30(10):1343-52. doi: 10.1093/bioinformatics/btu034. Epub 2014 Jan 22. Review. PubMed PMID: 24458952.

Cerami E, Demir E, Schultz N, Taylor BS, Sander C. Automated network analysis identifies core pathways in glioblastoma. PLoS One. 2010 Feb 12;5(2):e8918. doi: 10.1371/journal.pone.0008918. PubMed PMID: 20169195; PubMed Central PMCID: PMC2820542.

Wu G, Feng X, Stein L. A human functional protein interaction network and its application to cancer data analysis. Genome Biol. 2010;11(5):R53. doi: 10.1186/gb-2010-11-5-r53. Epub 2010 May 19. PubMed PMID: 20482850; PubMed Central PMCID: PMC2898064.

Pache RA, Zanzoni A, Naval J, Mas JM, Aloy P. Towards a molecular characterisation of pathological pathways. FEBS Lett. 2008 Apr 9;582(8):1259-65. doi: 10.1016/j.febslet.2008.02.014. Epub 2008 Feb 20. Review. PubMed PMID:18282477.

Zanzoni A, Soler-López M, Aloy P. A network medicine approach to human disease. FEBS Lett. 2009 Jun 5;583(11):1759-65. doi: 10.1016/j.febslet.2009.03.001. Epub 2009 Mar 6. Review. PubMed PMID: 19269289.

Soler-López M, Zanzoni A, Lluís R, Stelzl U, Aloy P. Interactome mapping suggests new mechanistic details underlying Alzheimer's disease. Genome Res. 2011 Mar;21(3):364-76. doi: 10.1101/gr.114280.110. Epub 2010 Dec 16. PubMed PMID: 21163940; PubMed Central PMCID: PMC3044851.

Arroyo R, Suñé G, Zanzoni A, Duran-Frigola M, Alcalde V, Stracker TH, Soler-López M, Aloy P. Systematic identification of molecular links between core and candidate genes in breast cancer. J Mol Biol. 2015 Mar 27;427(6 Pt B):1436-50. doi: 10.1016/j.jmb.2015.01.014. Epub 2015 Jan 29. PubMed PMID: 25640309.

Sahni N, Yi S, Zhong Q, Jailkhani N, Charloteaux B, Cusick ME, Vidal M. Edgotype: a fundamental link between genotype and phenotype. Curr Opin Genet Dev. 2013 Dec;23(6):649-57. doi: 10.1016/j.gde.2013.11.002. Epub 2013 Nov 26. Review. PubMed PMID: 24287335; PubMed Central PMCID: PMC3902775.

Sahni N, Yi S, Taipale M, Fuxman Bass JI, Coulombe-Huntington J, Yang F, Peng J, Weile J, Karras GI, Wang Y, Kovács IA, Kamburov A, Krykbaeva I, Lam MH, Tucker G,

Khurana V, Sharma A, Liu YY, Yachie N, Zhong Q, Shen Y, Palagi A, San-Miguel A, Fan C, Balcha D, Dricot A, Jordan DM, Walsh JM, Shah AA, Yang X, Stoyanova AK, Leighton A, Calderwood MA, Jacob Y, Cusick ME, Salehi-Ashtiani K, Whitesell LJ, Sunyaev S, Berger B, Barabási AL, Charloteaux B, Hill DE, Hao T, Roth FP, Xia Y, Walhout AJ, Lindquist S, Vidal M. Widespread macromolecular interaction perturbations in human genetic disorders. Cell. 2015 Apr 23;161(3):647-60. doi: 10.1016/j.cell.2015.04.013. PubMed PMID: 25910212; PubMed Central PMCID: PMC4441215.

Gargano LM, Hughes JM. Microbial origins of chronic diseases. Annu Rev Public Health. 2014;35:65-82. doi: 10.1146/annurev-publhealth-032013-182426. Epub 2013 Dec 16. Review. PubMed PMID: 24365095.

Grice EA, Segre JA. The human microbiome: our second genome. Annu Rev Genomics Hum Genet. 2012;13:151-70. doi: 10.1146/annurev-genom-090711 163814. Epub 2012 Jun 6. Review. PubMed PMID: 22703178; PubMed Central PMCID: PMC3518434.

Ottman N, Smidt H, de Vos WM, Belzer C. The function of our microbiota: who is out there and what do they do? Front Cell Infect Microbiol. 2012 Aug 9;2:104. doi: 10.3389/fcimb.2012.00104. eCollection 2012. Review. PubMed PMID: 22919693; PubMed Central PMCID: PMC3417542.

de Chassey B, Navratil V, Tafforeau L, Hiet MS, Aublin-Gex A, Agaugué S, Meiffren G, Pradezynski F, Faria BF, Chantier T, Le Breton M, Pellet J, Davoust N, Mangeot PE, Chaboud A, Penin F, Jacob Y, Vidalain PO, Vidal M, André P, Rabourdin-Combe C, Lotteau V. Hepatitis C virus infection protein network. Mol Syst Biol. 2008;4:230. doi: 10.1038/msb.2008.66. Epub 2008 Nov 4. PubMed PMID: 18985028; PubMed Central PMCID: PMC2600670.

Elde NC, Malik HS. The evolutionary conundrum of pathogen mimicry. Nat Rev Microbiol. 2009 Nov;7(11):787-97. doi: 10.1038/nrmicro2222. Epub 2009 Oct 6. Review. PubMed PMID: 19806153.

Via A, Uyar B, Brun C, Zanzoni A. How pathogens use linear motifs to perturb host cell networks. Trends Biochem Sci. 2015 Jan;40(1):36-48. doi: 10.1016/j.tibs.2014.11.001. Epub 2014 Dec 1. Review. PubMed PMID: 25475989.

Garamszegi S, Franzosa EA, Xia Y. Signatures of pleiotropy, economy and convergent evolution in a domain-resolved map of human-virus protein-protein interaction networks. PLoS Pathog. 2013;9(12):e1003778. doi: 10.1371/journal.ppat.1003778. Epub 2013 Dec 5. PubMed PMID: 24339775; PubMed Central PMCID: PMC3855575.

Hagai T, Azia A, Babu MM, Andino R. Use of host-like peptide motifs in viral proteins is a prevalent strategy in host-virus interactions. Cell Rep. 2014 Jun 12;7(5):1729-39. doi: 10.1016/j.celrep.2014.04.052. Epub 2014 May 29. PubMed PMID: 24882001; PubMed Central PMCID: PMC4089993.