Press Release

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Casting the molecular net

The power of networks lets scientists unravel the complex control of biological processes

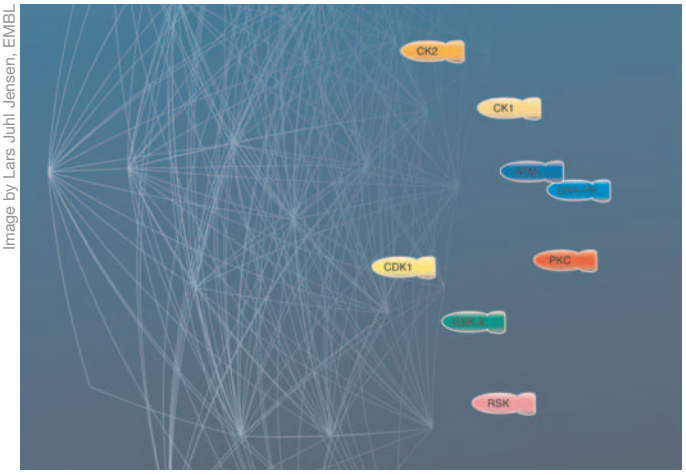

Image by Lars Juhl Jensen, EMBL

Artist's impression of the molecular net cast to catch kinases in action.

Toronto/Heidelberg/Cambridge, 14 June 2007 – Scientists at the Samuel Lunenfeld Research Institute of Mount Sinai Hospital (Canada), the European Molecular Biology Laboratory (Germany), and Massachusetts Institute of Technology (USA) have created a new computational method called NetworKIN. This method uses biological networks to better identify relationships between molecules. In a cover story featured in the 14 June 2007 edition of the journal *Cell*, the scientists report insights into the regulation of protein networks that will ultimately help to target human disease.

"Thousands of proteins can be changed (via phosphorylation) but until now, it has not been possible to know which protein has made the change," states Dr. Tony Pawson, distinguished investigator at the Lunenfeld.

Proteins are the functional agents that carry out all processes in a cell. But they only rarely act alone. Instead they accomplish their effects as part of big networks. How proteins interact in these networks often depends on phosphorylation, the addition of a phosphate at specific sites on a protein. Kinases are proteins that bring about the phosphorylation of other proteins and in this way regulate all cellular processes.

"Our method works a bit like getting a recommendation from Amazon," says Dr. Peer Bork, group leader at EMBL. "The fact that certain books have been bought by the same customers tells you that they have something in common. In the same way biological networks tell us about shared features between different proteins. These help us predicting which kinases are likely to act on them."

"By getting a network-wide view, multiple aberrant genes of kinase-controlled processes are more easily targeted," states Dr. Rune Linding, postdoctoral fellow, Samuel Lunenfeld Research Institute. "In the future, the treatment of complex human diseases will be treated by targeting multiple genes." Complex diseases like cancer often contain defects in several processes controlled by kinases.

Source Article

Linding, R., Jensen, L.J., Ostheimer, G.J., van Vugt, M.A.T.M., Jørgensen, C., Miron, J.M., Diella, F., Colwill, K., Taylor, L., Elder, K., Metalnikov, P., Nguyen, V., Pasculescu, A., Jin, J., Gyoon Park, J., Samson, L.D., Woodgett, J.R., Russell, R.B., Bork, P., Yaffe, M.B. and Pawson, T. Systematic Discovery of In Vivo Phosphorylation Networks. *Cell*. June 26, 2007

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About EMBL:

The European Molecular Biology Laboratory is a basic research institute funded by public research monies from 19 member states (Austria, Belgium, Croatia, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Israel, Italy, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom). Research at EMBL is conducted by approximately 80 independent groups covering the spectrum of molecular biology. The Laboratory has five units: the main Laboratory in Heidelberg, and Outstations in Hinxton (the European Bioinformatics Institute), Grenoble, Hamburg, and Monterotondo near Rome. The cornerstones of EMBL's mission are: to perform basic research in molecular biology; to train scientists, students and visitors at all levels; to offer vital services to scientists in the member states; to develop new instruments and methods in the life sciences and to actively engage in technology transfer activities. EMBL's International PhD Programme has a student body of about 170. The Laboratory also sponsors an active Science and Society programme. Visitors from the press and public are welcome.

About the Samuel Lunenfeld Research Institute

The Samuel Lunenfeld Research Institute of Mount Sinai Hospital, a University of Toronto affiliated research centre, established in 1985, is one of the world's leading centres in biomedical research. 32 principal investigators lead research in diabetes, cancer biology, epidemiology, stem cell research, women's and infants' health, neurobiology and systems biology. For more information on the Samuel Lunenfeld Research Institute, please visit www.mshri.on.ca