Inference of pluripotency control in mouse embryonic stem cells

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In embryonic stem cells, some transcription factors (TFs) are known to maintain the pluripotent process. To gain insights into the regulatory system to control pluripotency, I inferred regulatory relationships between TFs, which expressed in ES cells. In this study, I applied a method based on structural equation modeling (SEM), combined with factor analysis, to 649 expression profiles of 19 *TF* genes measured in mouse ES (mES) cells. By the factor analysis, 19 *TF* genes were regulated by several unmeasured factors. Since the known cell reprograming *TF* genes (*Pou5f1, Sox2, Nanog* and *Klf4*) were regulated by different factors, each estimated factor is considered to be an input signal transduction to control pluripotency in mES cells. In the inferred network model, *TF* proteins were also arranged as unmeasured factors which control the other TFs. The interpretation of the inferred network model allowed us to reveal the regulatory mechanism for controlling pluripotency in ES cells.

Biography

Sachiyo Aburatani is a Deputy Director of new laboratory for Computational Bio Big Data research (CBBD-Open Innovation Lab.) at National Institute of Advanced Industrial Science and Technology (AIST), Japan. She is also a Senior Research Scientist of Biotechnology Research Institute for Drug Discovery at AIST. Her research interests include Systems Biology, Computational Biology, Gene Regulatory Network and Structural Equation Modeling. Her achievements include research in network inferences between genes and other cellular components from expression profiles; inference of environmental chemical effects to human embryonic stem cell; and statistical analysis of the relationships between genes from expression profiles.

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