SIGNOR: a database of causal relationships between biological entities

Livia Perfetto, Leonardo Briganti, Alberto Calderone, Andrea Cerquone Perpetuini, Marta Iannuccelli, Francesca Langone, Luana Licata, Milica Marinkovic, Anna Mattioni, Theodora Pavlidou, Daniele Peluso, Lucia Lisa Petrilli, Stefano Pirrò, Elena Santonico, Filomena Spada, Luisa Castagnoli and Gianni Cesareni

Molecular Genetics Group, Department of Biology, Tor Vergata University, Rome, Italy

De novo network reconstruction, for large biochemical networks, is achieved by confronting the experimental data with an interaction subspace constrained by available literature evidence. SIGNOR (http://signor.uniroma2.it), the SIGnaling Network Open Resource is a new database designed to facilitate the storage and analysis of causal interactions, i.e. interactions where a source entity has an effect (up-regulation, down-regulation, etc.) on a target entity, and it is suitable to support such a strategy by providing a scaffold of prior experimental evidence.

An on-going curation effort in our group aims at making SIGNOR a prominent resource in the biological community by offering a comprehensive network of experimentally validated functional relationships between signalling proteins. At the time of writing, the core of SIGNOR is a collection of approximately 12000 manually-curated causal relationships between proteins and other biological entities that participate in signal transduction. Each relationship is linked to the literature reporting the experimental evidence and it is assigned a score. More than 4,900 modified residues causing a change in protein concentration or activity have been curated and linked to the modifying enzymes (about 351 human kinases and 94 phosphatases).

This wealth of structured information can be used to support experimental approaches based on multi-parametric analysis of cell systems after physiological or pathological perturbations.