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Opportunities for protein interaction network guided cellular engineering

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As we move further into the post-genomics age where the mountain of systems biology generated data keeps growing, as does the numbers of genomes who have been sequenced, we have the exciting opportunity to understand more deeply the biology of 'important' systems. This is, of course, if we can make 'head or tail' of what we have measured and use this for robust predictions. Use of modern mass spectrometry tools has greatly facilitated our understanding of which proteins are present in a particular phenotype, their relative and absolute abundances and their state of modifications. Coupled with modern bioinformatics and systems biology tools this has the opportunity of not just providing information and understanding but also to provide targets for engineering. Cellular engineering, whether it be via metabolic engineering or synthetic biology approaches, offers exciting potential for biotechnological exploitation in fields as diverse as medicine and energy as well as fine and bulk chemicals production. In this work, we examine the work done until now in protein-protein interactions and how this network knowledge can be used to inform ambitious cellular engineering strategies. Some examples demonstrating biofuels and biopharmaceuticals applications will be presented.

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