Nano-bio and systems-bio platform technologies for diagnosis and drug target discovery

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Several nano-bio platform technologies were developed for the efficient diagnosis of microbial pathogens and to study protein-protein, protein-biomolecular interaction studies. Peptivator and new fusion platform technologies will be described with specific examples of diagnosis. Systems-level analysis of cellular network can provide new clues towards identifying drug targets. Previous studies on single gene or multi gene knock-outs revealed that organisms possess redundant or alternative pathways that can overcome those genes knocked-out. Thus, the number of genes that are lethal to the cell was found to be much less than expected. In this regard, the reaction-centric gene deletion study has a limitation in understanding the metabolic robustness. Results of our recent studies on the use of flux-sum will be disclosed, which is the summation of all incoming or outgoing fluxes around a particular metabolite under pseudo-steady state conditions, as a good conserved property for elucidating such robustness of organism from the metabolite point of view. Importance of nano-bio and systems-bio platform technologies for diagnosis and drug target discovery will be discussed along with detailed results.