

Metabolic networks in motion: 13C-based flux analysis



Many properties of complex networks cannot be understood from monitoring the components not even when comprehensively monitoring all protein or metabolite concentrations unless such information is connected and integrated through mathematical models. The reason is that static component concentrations, albeit extremely informative, do not contain functional information per se. The functional behavior of a network emerges only through the nonlinear gene, protein, and metabolite interactions across multiple metabolic and regulatory layers. I argue here that intracellular reaction rates are the functional end points of these interactions in metabolic networks, hence are highly relevant for systems biology. Methods for experimental determination of metabolic fluxes differ fundamentally from component concentration measurements; that is, intracellular reaction rates cannot be detected directly, but must be estimated through computer model-based interpretation of stable isotope patterns in products of metabolism.

Metabolic networks in motion: 13C-based flux analysis EMBO Press Nov 14, 2006 Abstract. Many properties of complex networks cannot be understood from monitoring the components not even when comprehensively **Metabolic networks in motion: 13C-based flux analysis** Nov 14, 2006 Metabolic networks in motion: 13C-based flux analysis Metabolic networks, in particular microbial ones, are arguably the best characterized **Metabolic networks in motion: 13C-based flux analysis eBook: Uwe Sauer, U. (2006) Metabolic networks in motion: 13C-based flux analysis. Molecular Systems Biology, 2, 62. doi:10.1038/msb4100109. 13C-based metabolic flux analysis : Article : Nature Protocols Enzyme Microb Technol 21:421428 Sauer U (2006) Metabolic networks in motion: 13C-based flux analysis. Mol Syst Biol 2:62 Sauer U, Zamboni N (2008) **Metabolic networks in motion: C-based flux analysis - BioMedSearch** Nov 14, 2006 Metabolic networks in motion: 13C-based flux analysis. The functional behavior of a network emerges only through the nonlinear gene, protein, and metabolite interactions across multiple metabolic and regulatory layers. **Bioreactor Engineering Research and Industrial Applications II - Google Books Result (2007) 13CO₂ as a universal metabolic tracer in isotopologue perturbation Sauer U (2006) Metabolic networks in motion: 13C-based flux analysis. Mol Sys **Metabolic networks in motion: 13C-based flux analysis** From measurement to implementation of metabolic fluxes. Curr Opin 15: Sauer U. Metabolic networks in motion: 13C-based flux analysis. Mol Syst Biol. 2006 **Current Challenges in Modeling Cellular Metabolism: - Google Books Result** Nov 14, 2006 Many properties of complex networks cannot be understood from monitoring the components not even when comprehensively monitoring all **Experimental Identification and Quantification of Glucose** May 1, 2009 Metabolic flux analysis (MFA) plays a central role in metabolic [Cross Ref] Sauer U. Metabolic networks in motion: 13C-based****

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