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## Combining genomic and genetic knowledge to discover the underlying mechanism of diabetic cardiac dysfunction

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Myocardial Infarction (MI) is a major cause of sudden death and one of the most common perioperative complications prevalent in diabetes mellitus. The underlying biological process is different from non-diabetes which is partially due to increased oxidative stress in diabetes. Cardioprotective interventions are effective in non-diabetic patients due to which it loses its effectiveness in diabetic patients, which in turn, exacerbates the susceptibility of diabetic hearts to myocardial Ischemia Reperfusion Injury (IRI). However, the mechanism is still largely unclear and as the evolution of genomic and genetic approaches rapidly, such as microarray and Genome-Wide Association Study (GWAS), provides additional insights into complex disease studies. Here, by combining gene co-expression network analysis from a set of microarray profiling and MI/Type 2 Diabetes (T2D) associated gene sets from GWAS, we can build a transcription factor (TF) based on regulatory network to explore the pathological behavior. By using this network of combination method, it was validated by high enrichment in several well-documented pathways of diabetic cardiac pathology (e.g. PI3K/Akt and Jak/Stat3 signaling pathway) and was also significantly improved than using only genomic or genetic data individually. This TF-based network also revealed number of previously unreported protein interactions linking distinct pathways, among which we verified a relation between Stat3 and Hif-1 $\alpha$  in diabetic myocardial IRI models. Thus, our study showed potency of combining knowledge from genomic and genetic studies in discovering the hidden mechanism in diabetic cardiac dysfunction.

### Biography

Zipeng Liu has obtained his MSc and PhD in Bioinformatics and Pharmacology at the University of Hong Kong, China. His research interest lies in the application of Bioinformatic approaches to study Diabetic Cardioprotection. He has published related research as either first author or co-authors on peer-reviewed journals such as *Nucleic Acids Research*, *Diabetes and Cardiovascular Diabetology*.

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