Haobo Li et al., J Diabetes Metab 2016, 7:7(Suppl)
http://dx.doi.org/10.4172/2155-6156.C1.048

Diabetes abolishes ischemic post-conditioning cardioprotection by impairing adipoR1/caveolin-3/ STAT3 signaling

Haobo Li[1, 2], Michael G Irwin[1] and Zhengyuan Xia[1, 2]
[1]The University of Hong Kong, Hong Kong
[2]Affiliated Hospital of Guangdong Medical College, China

Ischemic post-conditioning (IPo) protects against myocardial ischemia reperfusion injury (MIRI) by activating signal transducer and activator of transcription 3 (STAT3) in non-diabetes, but lost its effectiveness in diabetes in which cardiac STAT3 activation is reduced concomitant with malfunction of adiponectin. Here, we found that IPo increased post-ischemic cardiomyocyte-derived adiponectin and enhanced mitochondrial STAT3 (mitoSTAT3) activation, and improved myocardial mitochondrial biogenesis and reduced oxidative stress, and eventually attenuated MIRI and improved cardiac functional recovery, in wild-type (WT) but not in adiponectin knockout (Adipo$^{-/-}$) mice. Recombinant globular adiponectin (gAd) reversed the reduction of hypoxic post-conditioning (HPo)-induced cardioprotective effects in cardiomyocytes isolated from Adipo$^{-/-}$ mice, but all these effects of adiponectin supplementation were abolished respectively by either specific STAT3 or adiponectin receptor 1(AdipoR1) gene knockdown, or caveolin-3 disruption. Adiponectin overexpression restored IPo cardioprotection by activating STAT3 in 4-week type-1 diabetic where AdipoR1 and Cav3 were functionally interactive, but not in 8-week diabetic rats whose cardiac caveolin-3 was severely reduced and AdipoR1/ caveolin-3 signaling impaired. Together, our data indicated that, under non-diabetic condition, IPo, by increasing cardiac adiponectin, activates mitoSTAT3 through AdipoR1/caveolin-3 to confer cardioprotection, while under diabetic condition, reduced adiponectin and impaired AdipoR1 and caveolin-3 interaction leads to the loss of IPo cardioprotection.

Biography

Haobo Li has completed his PhD from Department of Anaesthesiology, The University of Hong Kong, Hong Kong SAR China, and is now a Research Scientist in the same department and honorary Assistant Professor in Department of Anesthesiology, Affiliated Hospital of Guangdong Medical College, Zhanjiang, China. His major focus of research is the mechanism of myocardial ischemia reperfusion injury and ischemic postconditioning cardioprotection against myocardial ischemia reperfusion injury, particularly, of diabetic hearts. He has published more than 20 peer-reviewed papers and services as a reviewer for more than 4 reputed journals and grant.

haoboli@connect.hku.hk

Notes: