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Indirubin-3'-oxime inhibits protein kinase R: Anti-apoptotic and antioxidant effect in rat cardiac myocytes

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Double-stranded RNA-dependent protein kinase (PKR) is a serine/threonine protein kinase activated by various stress signals and plays an important role in obesity, insulin sensitivity, glucose homeostasis. Indirubin-3'-oxime (I3O) is an effective inhibitor of cyclin-dependent kinases (CDKs) and glycogen synthase kinase 3-beta (GSK-3). However, the effects of I3O on PKR expression and related consequences in cultured rat cardiomyocytes have not been reported. The aim of the present study was to investigate whether I3O attenuates the effects of high glucose on PKR, oxidative stress and apoptosis in cultured rat cardiac myocytes. Q-PCR, western blotting, DAPI staining and DCFDA assay were done to measure protein/mRNA expression, apoptosis and reactive oxygen species levels respectively. High glucose treatment caused significant increase in PKR mRNA expression which was attenuated by co-treatment with Indirubin-3-oxime. High glucose treated cultured cardiomyocytes developed a significant increase in mRNA expression for JNK, caspase-3 and NF-KB, which were all attenuated by pretreatment with I3O. There was also a significant increase in reactive oxygen species generation as well as apoptosis in high glucose treated cultured cardiomyocytes, which was attenuated by pretreatment with Indirubin-3-oxime. In conclusion, I3O may have a preventive role against the deleterious effects of high glucose in the heart.

Biography

Mary Priyanka Udumula completed her Bachelor's in Pharmacy from Kakatiya University and also Master's in Pharmacology from the same university. She joined as DST inspire junior Research Fellow with inspire fellowship in Birla Institute of Technology-Pilani, Hyderabad campus.

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