SIRT1 Regulates Hyperglycemia-Induced Vascular Senescence

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Background: Vascular senescence reflects the limited ability of vascular cells to divide and proliferate and is accompanied by specific phenotypic changes in morphology, gene expression and function. In endothelial cells, these changes result in a phenotype that is pro-inflammatory, pro-atherosclerotic, and pro-thrombotic. Hyperglycemia-mediated oxidative stress elicits irreversible growth arrest in endothelial cells, which is referred as “stress-induced premature senescence.” Endothelial cell senescence has recently been postulated as an important cause of type-2 diabetes-associated vascular aging. High glucose-induced endothelial senescence exaggerates vascular inflammation and thrombosis in the vessels, promoting the development of diabetic-associated cardiovascular events. Sirtuin 1 (SIRT1) is highly expressed in vasculature and distinctively controls angiogenic signaling in endothelial cells. Recently, SIRT1 has been identified as an important regulator of endothelial cell senescence-like growth arrest and dysfunction. However, the mechanism underlying the high glucose induced endothelial cell senescence leading to vascular dysfunction is not fully understood.

Methods: Mouse microvessel endothelial cells were exposed to normal (11mM) and high glucose (40mM) for 72 hrs. The level of SIRT1, p21 and phospho-acetylation levels of Foxo1 proteins were measured by immunoblotting. To measure senescence, cells were fixed and stained for senescence-associated β-galactosidase activity. The percentage of β-galactosidase positively stained (blue color) cells was counted.

Results: Immunoblot analysis reveals that high glucose exposure caused a significant reduction of SIRT1 level along with altered phospho-acetylation levels of Foxo1 proteins. Furthermore, high glucose treatment increased the percentage of senescence-associated β-galactosidase activity in endothelial cells.

Conclusion: Collectively, these data suggest that high glucose induced depletion of SIRT1 plays a crucial role in diabetes-associated endothelial cell senescence and strengthens concept that activation of SIRT1 is an important target for pharma-therapy for diabetes-associated endothelial dysfunction and vascular aging. This abstract is part of project funded by: NPRP 08-165-3-054

The Prevalence of Hepatitis C Virus in Egypt: A Systematic Review

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Background: Hepatitis C virus (HCV) currently infects around 2% of the world’s population. Among all nations, HCV prevalence ranges from 0.01% in Scandinavia to 3% in North Africa, with one exception: Egypt. Egypt has the highest prevalence of HCV in the world, estimated nationally at 14.7%. Numerous HCV prevalence studies have published various estimates from different Egyptian communities, suggesting that Egypt, relative to the other nations of the world, might be experiencing an intense ongoing HCV transmission.

Objectives: To review all the evidence on the epidemiology of HCV transmission among different population groups in Egypt.

Methods: This was a systematic review following the PRISMA guidelines of all prevalence data on HCV infection in Egypt. Sources of data included PubMed, international organizations’ reports and databases, and country-level reports and databases. Measures were classified into different population categories according to risk of infection.

Results: Seventy-four studies have measured HCV prevalence in Egypt in populations at varying levels of risk. Among Egypt’s general population, HCV prevalence in pregnant women was 8.6%, and among blood donors it ranged between 9.0% and 23.2%. A nationally representative survey reported a prevalence of 14.7%. Among populations at high risk of infection, HCV prevalence was found to be as high as 58.3% in multi-transfused children, and 87.5% in adult dialysis patients. Among populations at intermediate risk, diabetic children had a prevalence of 3.1%, barbers a prevalence of 12.3%, health care workers a prevalence of 15.7%, and prisoners a prevalence of 31.4%. Common risk factors appear to be parenteral anti-schistosomal therapy, frequent transfusions, injections or surgical procedures.

Conclusion: Egypt has experienced, and possibly continues to experience, a large HCV epidemic. Prevention measures need to be implemented targeting HCV transmission routes such as better infection control practices in health and dental care facilities, hemodialysis centers, and reducing the excessive numbers of non-therapeutic injections.