

Rapport of Diabetes Mellitus and Heart Failure through Exosomes

Prem Kumar Govindappa*

Department of Biomedical Engineering, Schools of Medicine and Engineering, University of Alabama at Birmingham, USA

***Corresponding Author:** Prem Kumar Govindappa, Department of Biomedical Engineering, Schools of Medicine and Engineering, University of Alabama at Birmingham, USA.

Received: October 24, 2018; **Published:** November 01, 2018

Diabetes mellitus is a disorder of carbohydrate metabolism characterized by impaired ability of the body to produce or respond to insulin and thus maintain normal levels of glucose in the blood. Diabetes is a leading cause of morbidity (as per American Diabetes Association- 11.2% Asian Indians) and mortality with its negative impel on large blood vessels (macrovascular disease: coronary heart disease and peripheral arterial disease) and small blood vessels (microvascular disease: retinal and renal vascular disease), as well as nerves (Peripheral neuropathy or Autonomic neuropathy) [1].

Diabetes also associated with other complex diseases HIV (Human Immunodeficiency Virus), hyperthyroidism, hypothyroidism, or a buildup of iron (hemosiderosis) or protein (amyloidosis). All these complex disorders propel to augment heart failure with dysfunction in heart muscle (cardiomyopathy), high blood pressure (hypertension), coronary artery disease, abnormal heart rhythms (heart arrhythmias) and congenital heart defects [1,2]. More than 75% of mortalities among diabetic persons occurs from cardiovascular disease [3]. However, the association between diabetes and cardiovascular diseases are in obscure.

Exosomes are extra cellular membrane containing Nano-vehicles (EVs) released by most cell types, have attracted a large amount of research interest over the past decade. In healthy conditions, Exosomes mediate cell-to-cell interaction (immune cells to cardiac cells) and play an important role in maintaining physiological conditions. Interestingly, Diabetic milieu persistently alters macrophage exosomes contents (miRNA/mRNA, Protein, Lipid molecules etc) and its cellular cross talk (phagocytosis, invagination, receptor mechanism etc) functions with cardiac cells (cardiomyocytes, fibroblast, endothelial and peri-vascular cells) [4].

These altered exosomes by encapsulating mRNA stabilizing protein (HuR/HuA, HuB, HuC, HuD) and destabilizing protein (AUF1, TTP, KSRP) modifies target transcripts of inflammatory, fibrosis and other pathophysiological process, thus leads to adverse cardiac remodeling and dysfunction [5]. Even though the function of RNA stabilizing protein and exosomes cross talk has been widely studied in cancer biology, its role in cardiovascular pathologies is just evolving. Thus, understanding rapport of diabetes and Heart disease conditions is very vital and challenging.

Bibliography

1. American Diabetes Association. "Diagnosis and Classification of Diabetes Mellitus". *Diabetes Care* 32 (2009): S62-S69.
2. Deborah EM., *et al.* "Mitochondrial Cardiomyopathy, Pathophysiology, Diagnosis, and Management". *Texas Heart Institute Journal* 40.4 (2013): 385-394.
3. Geiss LS., *et al.* "Mortality in non-insulin dependent diabetes". In: Harris M, editor. *Diabetes in America*. 2nd edition Bethesda: *National Institutes of Health* (1995): 233-255.
4. Jun YX., *et al.* "Exosomes: A Rising Star in Failing Hearts". *Frontiers in Physiology* 8 (2017): 494.
5. Sahana SB., *et al.* "RNA stabilizing proteins as molecular targets in cardiovascular pathologies". *Trends in Cardiovascular Medicine* 25.8 (2015): 676-683.

Volume 2 Issue 12 December 2018

© All rights are reserved by Prem Kumar Govindappa.