

Amyloid Antagonists: The Future of Type 2 Diabetes as Well as Several Neurodegenerative Diseases Treatments

Mina T Kelleni*

Pharmacology Department, Faculty of Medicine, Minia University, Egypt

***Corresponding author:** Kelleni MT, Pharmacology department, Faculty of Medicine, Minia University, Minia, Egypt, Tel: +201200382422, E-mail: drthabetpharm@yahoo.com

Editorial

Volume 1 Issue 2

Received Date: June 08, 2016

Published Date: June 21, 2016

Short Communication

Type 2 diabetes (T2D) is a growing public health concern that accounts for approximately 90% of all the cases of diabetes. Besides insulin resistance, T2D is characterized by a deficit in beta-cell mass. Increasing evidence points to the cytotoxicity of islet amyloid polypeptide (IAPP) aggregates showing them not just an insignificant phenomenon derived from the disease progression but as agents which directly induce processes that impair the functionality and the viability of beta-cells eventually leading to the loss of beta-cell mass in T2D patients [1-4].

Amyloid deposits are also linked to many other neurodegenerative diseases such as Alzheimer's (AD), Parkinson's, and Huntington's. Inhibition of amyloid fibril formation using natural products e.g. polyphenols is one of the main therapeutic strategies to prevent the progression of these diseases [5]. A simple polyphenol, Gallic acid, one of the main components in plant tissues, especially in tea leaves, inhibited insulin amyloid fibril formation in vitro and phenolic compounds and hormones (cytokinins) found in coconut have been shown to assist in preventing the aggregation of amyloid-beta peptide, potentially inhibiting a key step in the pathogenesis of AD [5-6]. Further, prevention of IAPP formation by using IAPP inhibitory peptide, D-ANFLVH represented a potential treatment to increase beta-cell survival and function [4]. Additionally, both ascorbic acid and alpha-Tocopherol induced significant anti-inflammatory effects by decreasing the level of inflammatory factors such as serum amyloid A in T2D patients [7] and from extracts of 27 vegetables, spices and herbs that were screened for their functional ability to inhibit the aggregation IAPP into toxic amyloid aggregates; mint, peppermint, red bell pepper and thyme emerged as possessing the greatest anti-amyloid activity [8].

Potential amyloid antagonists include, among others, the aged garlic extract that was proposed to help preventing cardiovascular and cerebrovascular diseases and lowering the risk of dementia and AD [9] and the Korean red ginseng extract which was suggested to be beneficial for the prevention and/or treatment of neurodegenerative disorders including AD [10]. I strongly believe that keeping a close eye on amyloid and spending more time, effort and of course money in its research may eventually result in a new generation of treatments that will play a crucial role in the future of T2D and several neurodegenerative diseases management.

References

1. Rosas PC, Nagaraja GM, Kaur P, Panossian A, Wickman G, et al. (2016) Hsp72 (HSPA1A) Prevents Human Islet Amyloid Polypeptide Aggregation and Toxicity: A New Approach for Type 2 Diabetes Treatment 11(3): e0149409.
2. Caillon L, Hoffmann AR, Botz A, Khemtouri L (2016) Molecular Structure, Membrane Interactions, and Toxicity of the Islet Amyloid Polypeptide in Type 2 Diabetes Mellitus. Journal of diabetes research 2016: 5639875.
3. Chandra A (2015) Role of amyloid from a multiple sclerosis perspective: a literature review. Neuroimmunomodulation 22(6): 343-346.
4. Wijesekara N, Ahrens R, Wu L, Ha K, Liu Y, Wheeler MB et al. (2015) Islet amyloid inhibitors improve glucose homeostasis in a transgenic mouse model of type 2 diabetes. Diabetes, obesity & metabolism 17(10): 1003-1006.
5. Jayamani J, Shanmugam G (2014) Gallic acid, one of the components in many plant tissues, is a potential inhibitor for insulin amyloid fibril formation. European journal of medicinal chemistry 85: 352-358.

6. Fernando WM, Martins IJ, Goozee KG, Brennan CS, Jayasena V, Martins RN (2015) The role of dietary coconut for the prevention and treatment of Alzheimer's disease: potential mechanisms of action. *The British journal of nutrition*114(1): 1-14.
7. Jamal M, Rezazadeh M, Zeinali M, Ghaffari MA (2015) Effect of ascorbic acid and alpha-tocopherol supplementations on serum leptin, tumor necrosis factor alpha, and serum amyloid A levels in individuals with type 2 diabetes mellitus. *Avicenna journal of phytomedicine*5(6): 531-539.
8. Fuentes AL, Hennessy K, Pascual J, Pepe N, Wang I, et al. (2016) Identification of Plant Extracts that Inhibit the Formation of Diabetes-Linked IAPP Amyloid. *Journal of herbal medicine*6(1): 37-41.
9. Borek C (2006) Garlic reduces dementia and heart-disease risk. *The Journal of nutrition* 136(3 Suppl): 810S-812S.
10. Kim S, Lee Y, Cho J (2014) Korean red ginseng extract exhibits neuroprotective effects through inhibition of apoptotic cell death. *Biological & pharmaceutical bulletin*37(6): 938-946.