

Nanomedicine for the Management of Diabetes: Promises and Challenges

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DOI: 10.5185/vpoam.2022.10363



Abstract

Diabetes Mellitus (DM) is the most common metabolic disorder worldwide and in Qatar it's considered one of the high priority research areas with conventional therapies struggling to properly manage it. As the medical research field progresses its becoming more and more clear that the scientific world is moving towards developing targeted and controlled therapies. This can be approached by implementing advanced made in the nanomedicine field. Nanomedicine has so many attractive properties that can be utilized in better managing and diagnosing DM. With the possibility of using metal nanoparticles and benefiting from the natural properties, they have. DM and cardiovascular diseases (CVDs) both have dysfunctional endothelial cells, which is a link that can be used to develop a nano-prototype that cannot only provide a controlled anti-diabetic drug release but can also aid in restoring the normal endothelial cell function. The nanoparticle we are interested in has been proven to have endothelial protective criteria's and was previously studied for the purpose of delivering and better managing the pulmonary arterial hypertension disease. Currently we are aiming to use this nanoparticle to our benefit and to load it with the anti-diabetic drug, metformin, to have a nano prototype with dual therapeutic benefit for DM and CVDs. The most interesting advantage about nanomedicine is the fact that one prototype synthesized for one disease can be translated to benefit other diseases and our prototype is an excellent example of that. This prototype once proven to benefit DM and to restore the endothelial cells function can be then tested in *in vivo* DM models and tested for its ability to not only restore normal glucose level but to also restore normal endothelial cell function. This will hugely benefit Qatar for two main reasons; firstly, Qatar is currently focusing in establishing a functional and well-recognized research platform build by Qatar based scientists, second this prototype will be used to treat two of the highest prevalence diseases and high priority in Qatar and rest of the world which are DM and CVDs.

Citation of Video Article

Vid. Proc. Adv. Mater., Volume 3, Article ID 2210363 (2022)

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