Letter to Editor

Vol. 6, No. 2, 79-80
https://doi.org/10.15280/jlm.2016.6.2.79

Journal of Lifestyle Medicine

Advanced Mitochondrial DNA Assay for Metabolic Syndrome

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To the Editor:

Dear Sir,

Recently, Kim et al. reported that reduced leukocyte mitochondrial DNA (mtDNA) copy number and increased mtDNA deletion ratios are independent predictors of new-onset metabolic syndrome (MetS) in a population-based longitudinal study [1]. Authors suggest that the risk of MetS development could be estimated by measuring mtDNA copy number and deletion ratio, baseline of which was measured with a quantitative polymerase chain reaction (qPCR) in leukocytes. The qPCR targets of the mitochondrial minor arc (mtMinArc), the mitochondrial major arc (mtMajArc), and the nuclear gene were in the D-loop, the NADH dehydrogenase subunit 4 (ND4), and the β2M, respectively. The mtDNA copy number per cell was calculated by mtMinArc/β2M. The deletion ratio of mtDNA was represented by (mtMinArc-mtMajArc)/mtMinArc.

The relative amount of mtDNA was estimated by a probe-based multiplex qPCR [2], or by a singleplex qPCR [3]. The disadvantages of the both methods are not accurate and they do not separate the amount of mtDNA and nuclear DNA.

Here, I suggest modified assay to obtain a plasmid construct for standard curve generation. Standard plasmid vector for triplex qPCR assay simultaneously amplifies the D-loop gene in the mtMinArc, the ND4 gene in the mtMajArc, and the β2M gene in the nuclear DNA (Fig. 1). Multiplexing the three targets not only offers higher throughput analyses but also minimizes extraneous variability.

Suggested assay underline that triplex qPCR assay using a new standard plasmid vector may provide a vital tool in both research and diagnostic settings for identifying and quantifying the mtDNA changes in disease condition such as MetS and aging.

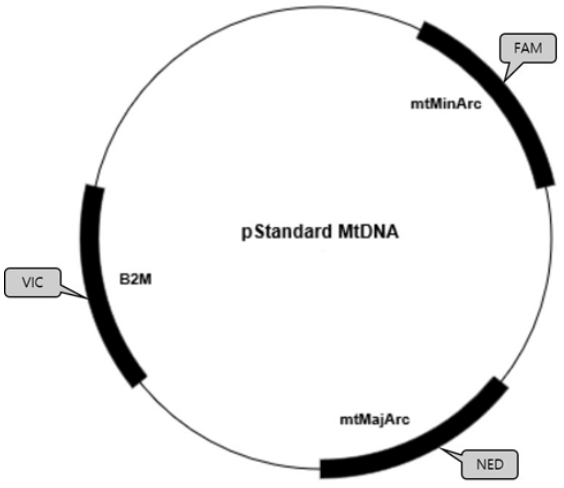

Fig. 1. A circular map of the new standard plasmid vector. The three targets: mtMinArc, mtMajArc, and the β2M gene in the nuclear DNA. The locations of TaqMan probes are depicted: FAM (recognizing D-loop), NED (recognizing ND4) and VIC (recognizing β2M).

Received: September 2, 2016, Accepted: September 5, 2016

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