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Title: Leukocyte mitochondrial DNA copy number is a potential non-invasive biomarker for psoriasis

Materah Salem Al-Wehaidah
Kuwait University, State of Kuwait

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Introduction & Objectives: Abnormalities in the mitochondria have been linked to psoriasis, a chronic immune-mediated inflammatory skin disease. The mitochondrial DNA (mtDNA) is present in thousands of copies per cell and altered mtDNA copy number (mtDNA-CN), a common indicator of mitochondrial function, has been proposed as a biomarker for several diseases including autoimmune diseases. In this case–control study, we investigated whether the mtDNA-CN is related to psoriasis, correlates with the disease duration and severity, and can serve as a disease biomarker.

Methods: Relative mtDNA-CN as compared with nuclear DNA was measured by a quantitative real-time polymerase chain reaction in peripheral blood buffy coat samples from 56 patients with psoriasis and 44 healthy controls. The receiver operating characteristic (ROC) curve analysis was performed to evaluate the value of mtDNA-CN as a biomarker.

Results: We found that the mtDNA CN was significantly decreased in patients with psoriasis compared to healthy controls (93.6±5.3 vs. 205±71; P=0.04). Sub group analyses with stratification of patients based on disease duration under or over 10 years and disease severity indicated that the mtDNA-CN was significantly lower in patients with longer disease duration (74±4.3 in disease duration >10 years vs. 79±8.3 in disease duration <10 years, P=0.009), and higher disease severity (72±4.3 in moderate-to-severe index vs. 88.3 ± 6 in mild index, P=0.017). Moreover, the mtDNA-CN was negatively correlated with the disease duration and disease severity (r = -0.36, P=0.006; r = -0.41, P=0.003 respectively). The ROC analysis of mtDNA-CN showed an area under the curve (AUC) of 0.84 (95% confidence interval: 0.69-0.98; P=0.002) for differentiating patients from healthy controls.

Conclusions: Our study suggests that low mtDNA-CN may be an early abnormality in psoriasis and associates with the disease progression. Our study also suggests that mtDNA CN may be a novel blood-based biomarker for the early detection of psoriasis.

Biography

Materah Salem Al- Wehaidah working at Kuwait University at the Faculty of Allied Health, am interested in studying mitochondrial genome in different diseases. I focused on skin disease especially psoriasis as this disease increased the prevalence here in Kuwait in the last years. In my last publication, I sequenced the mitochondrial DNA from psoriasis patients by using the NGS technique, and several mutations were revealed, which may be related to disease pathogenesis.