Wenjie Wang, J Clin Exp Dermatol Res 2018, Volume 9
DOI: 10.4172/2155-9554-C1-068

Proteomic profiling of zinc-induced skin cell proliferation: Activation of β-catenin pathway

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Zinc is an essential micronutrient that plays important roles in protein structure, catalysis, and gene regulation. It is required for the homeostasis of human skin. However, the effect of zinc on skin cell proliferation and its underlying mechanisms remain elusive. We found that exposure to zinc for 30 minutes was sufficient to induce significant cell proliferation in human keratinocyte HaCaT and the fibroblast WS1 cells. To investigate the molecular changes underlying zinc-induced cell proliferation, we analyzed protein expression in the control and zinc-treated cells via iTRAQ protein profiling and identified 16 up-regulated and 64 down-regulated proteins between zinc-treated and the control HaCaT cells (fold-change>1.2). Through bio-informatics analysis, common motifs that associated with transcriptional factors or co-activators were identified, including β-catenin, YY1 and E2F1. Among them, the β-catenin pathway was further investigated. Zinc induced the nuclear translocation of β-catenin and increased β-catenin-responsive luciferase activity in skin cells. The growth advantage of zinc was abrogated by siRNA targeting β-catenin or XAV-939, an inhibitor of the β-catenin pathway. Moreover, zinc-induced resistance to H_2O_2 was significantly decreased by XAV-939. Taken together, our findings illustrate the molecular changes by zinc-induced proliferation and that β-catenin mediates the pro-proliferative role of zinc in skin cells.

Biography

Wenjie Wang is currently pursuing her PhD from Soochow University in 2014. She has published more than 8 papers in reputed journals.

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