Comparative analysis of the ABCB5 gene expression in perilesional vitiligo and normal skin biopsies

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Introduction & Objectives:
Vitiligo is the most common skin pigmented condition in humans. Its etiology is attributed to an autoimmune attack on the melanocytes which results in achromic lesions. There is a deregulated autoimmune attack against melanocytes, activation of free radicals and proinflammatory cytokines with a preference for certain skin areas. The principal ABCB5 isoform is a transmembrane transporter located in cytoplasmic membrane melanocytes that eliminates intracellular toxic metabolites; it also protects against chemotherapeutic agents in normal melanocytes and melanoma cells. It has been seen that ABCB5 is expressed in the mesenchymal stem cells of the dermis, in addition to having immunoregulatory properties co-expressed with the programmed death ligand PD-1, and as a regulator of pro-inflammatory chemokines produced by macrophages, neutrophil overstimulation, and promoter of Treg lymphocyte activity.

This work suggests that decreasing or altering the immunological regulation of mesenchymal cells can facilitate the immunological attack of CD8+ T lymphocytes in the epidermis, affecting the viability of melanocytes, resulting in skin depigmentation.

Materials & Methods:
This research aims to include 15 biopsy samples and 5 control samples. At present, we have gathered 5 biopsy samples from patients with non-segmental progressive vitiligo diagnosis through punch technique of 4mm from a public dermatology center, and 2 control samples that were donated from discarded materials at a private practice. Two probes were designed to detect messenger RNAs of the tyrosinase and ABCB5 genes in skin biopsies of patients and healthy controls, one for the tyrosinase messenger RNA (labeled with fluorescein) and other for ABCB5 messenger RNA (labeled with Cy5). Confocal microscopy was used to evaluate the emissions from these fluorophores. It’s planned to perform immunohistochemistry with antiABCB5 monoclonal antibodies to enhance the gene detection to afford quantitative and comparative results between the transition zone and controls.

Results:
A, B. Confocal microscopy view of normal skin sample, image of melanocytes displaying green fluorescence indicative of tyrosine (Tyr) presence within in the basal epidermis. C. The presence of red (Cy5) in the transitional zone of epidermis, some parts of the dermis and blood vessels, but it is absent in the intracellular space and melanocytes. D, E. Vitiligo-affected basal epidermis exhibits reduced fluorescence as compared to controls, F. suggesting diminished tyrosinase activity and the presence of Cy5 red fluorochrome in a few dermis cells. Additionally, fewer differences were observed between vitiligo perilesional skin and healthy skin expression of ABCB5, which warrants further quantification and comparison with the rest of the sample.
Conclusion:
Previous studies conducted in melanoma skin report an overexpression of the protein related to the cell capacity of detoxification and tumor differentiation, normal skin present much less expression compared to melanoma samples and at the moment, our observations allow us to think that ABCB5 expression in vitiligo skin is lightly minor than in normal skin, what can be related to its immunoregulatory role in mesenchymal cells and the depletion of the regulatory response of local inflammatory environment.

Keywords: Vitiligo, autoimmune diseases, ABCB5, immunoregulatory cells

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