PIGMENTATION

HYPERPIGMENTED SKIN IS MORE SENESCENT AND ASSOCIATED WITH AN OLDER TRANSCRIPTOMIC EXPRESSION PATTERN

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Introduction: Facial hyperpigmented spots are common issues across all ethnicities. Several types of hyperpigmented lesions are defined by appearance, age of onset or histological features. However, their underlying biology especially related to tissue senescence have not been reported.

Objective: Gain insights into the etiology of hyperpigmented lesions and senescence across 6 different facial hyperpigmented spot types; solar lentigo with elongated (SL-E) or flattened (SL-F) dermal-epidermal junction, seborrheic keratosis (SK), melasma, freckles and post-inflammatory hyperpigmentation from acne (acne-PIH).

Materials and Methods: 2mm biopsies of facial spot and adjacent non-spot tissue were collected from 77 Asian women, ages 20 -70. Laser Capture Microdissection was conducted to fractionate all biopsies into 3 compartments; suprabasal epidermis, basal epidermis and dermis. Gene chip data (AffyMetrix HG-U219 gene arrays) of each compartment were analyzed to predict the chronological age (GenEx Age) for spot and non-spot tissues using a signature of 400 consensus genes, the expression levels of which have been demonstrated to be universal indicators of epidermal or dermal aging independent of epithelial tissue source or body site (GenEx Age model). Additionally, a senescent marker CDKN2A expression was analyzed at transcriptome level and protein level by histology immunostaining.

Results: Compared to adjacent non-spot tissue, all types of spot tissue were predicted to age earlier by GenEx Age model. Interestingly, the aged compartment is different by type of spot; SL-F and melasma is more aged in supra, SL-E and SK in basal, while acne-PIH and Freckles in dermis. CDKN2A transcriptome was also higher in spot tissue regardless types, even acne-PIH which is often observed among young population.

Conclusions: Our results demonstrate that facial hyperpigmented spot tissues age earlier than surrounding normal-spot tissue, while modulated compartment or underlying mechanism may vary by type of spots. These insights will enable development of specific solutions to proactively address hyperpigmented spots.