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Inter-generational and Intra-familial relationship of facial skin aging

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INTRODUCTION

Facial signs of chronological aging represent a serious concern of women wishing for sustainable beauty and youth. Most people believe and agree that key facial features are passed down from parents to children, and this belief was proven genetically. However, the generational relationship on skin aging features and progression has not been investigated. We had hypothesized that common facial skin profiles lead to similar developing of spots or wrinkles. This clinical investigation elucidates the familial effect on skin conditions of two-generation pedigrees, i.e., mothers and daughters.

OBJECTIVE

The objective of this study is to understand the familial relationship between mothers and daughters in terms of skin conditions and aging symptoms (wrinkle, hyperpigmented spots).

METHODS

This was a single visit measurement of skin condition of a population of related females. The subjects were 114 Japanese mother:daughter pairs from the Kobe region (mean age 62.9 and 36.3 respectively). Skin color (L*, a*, b*), hydration, firmness, sebum, melanin index and hyperpigmented spots, wrinkles were measured quantitatively on the face using non-invasive technical / objective methods (TABLE 1). Measurements were conducted on cleansed skin in controlled indoor conditions (temperature: 25 +/- 2 degrees centigrade, relative humidity: 50 +/- 10%). The skin data were compared by using Pearson correlation between mothers and daughters.

TABLE 1 Methods

Skin Attributes	Instrument	Manufacturer
Melanin Index	SIA scope	Astron Clinica
Skin Color	Spectro-photometer	Gretag-Macbeth
Hydration	Corneometer	Courage + Khazaka Electric
Sebum	Sebumeter	Courage + Khazaka Electric
Firmness	Venustron	Axiom
Spots, Wrinkles	REAL	P&G developed imaging system

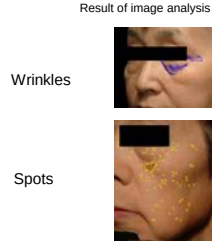


Fig.1 Quantification of facial skin aging symptoms by computerized image analysis.

RESULTS

Melanin production in basal skin region is highly genetically regulated

• Melanin index showed high correlation between familial pairs (Fig.2).

• Melanogenesis, a fundamental biological activity that determines basal skin tone, is highly intrinsic even within a homogeneous ethnic group, such as Japanese.

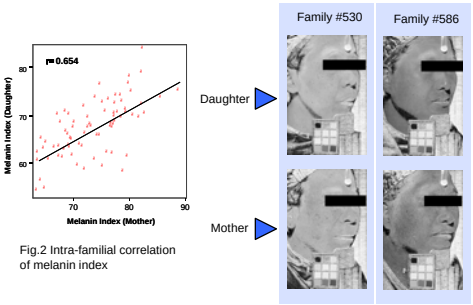


Fig.2 Intra-familial correlation of melanin index

Environmental factors have a larger influence on visible / tangible skin beauty parameters than familial transmission.

• Visible skin tone (L*, a*, b) showed lower correlation between familial pairs than melanin index.

• Moderate to weak (r between 0.2 and 0.4) but significant correlation was found in various other skin parameters.

• The low correlation indicates that while these skin parameters are also under some control of genetics there is a larger influence from environmental factors, similar to height or body mass index (BMI).

TABLE 2 Intra-familial correlation of skin parameters

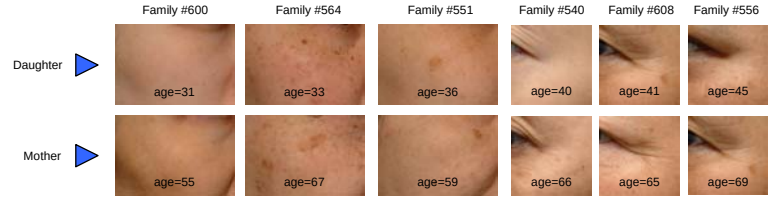
	Correlation r	Sig. P
Height (benchmark attribute)	0.33	<0.01
Skin Yellowness (b*)	0.33	<0.01
Hydration	0.32	<0.01
Skin Fairness (L*)	0.28	<0.01
Skin Redness (a*)	0.27	<0.01
Firmness	0.26	<0.01
BMI (benchmark attribute)	0.24	0.01
Area of spots on cheeks	0.23	0.01
Sebum Excretion Rate	0.22	0.02
Area of wrinkles around eyes	0.19	0.04

Morphological (Qualitative) similarity of spot and wrinkle formation

• Similarities of spots and wrinkles between familial members were found not only in quantity but also in quality (e.g., distribution, shape).

• Morphological similarity suggests genetic influence lies behind the spot/wrinkle generation process, in particular in what kind of spots/wrinkle appears rather than the number.

Fig. 3 Qualitative comparison of visible spot and wrinkle appearance between mother and daughter



non-remarkable light shade spots exist

many spots are distributed around the cheek

One large spot exists

The pattern of wrinkle (e.g., extending angle, location of wrinkling) is quite similar among familial members. Texture of the skin is also similar.

CONCLUSIONS

- Correlation was found between two familial generations for various skin parameters.
- Melanin index (more biological parameter) showed higher correlation while other visible skin features (skin beauty parameters) showed lower correlation.
- While skin color is controlled by melanin, actual visible skin tone correlation was weak. This would suggest that environmental factors have a high influence in beauty skin properties.
- The study results suggest that the quality of spots and wrinkles may be regulated by genetics but the quantity is determined by environmental factors.
- Observing parent(s) would be a good way to know what kind of skin aging problems are likely to happen to oneself. With this knowledge, taking prevention steps is the best way to sustain beauty and youthful appearance.