9th IPCE Conference
Pisa, Italy (2026)

IFSCC CONGRESS 35TH
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IFSCC WINNER 2025
Johann Wiechers Award

Dynamics of Facial Shape: Unraveling the Non-Genetic Factors and Developing Face-Shaping Skincare Ingredients through Gravity-Responsive 3D Facial Imaging

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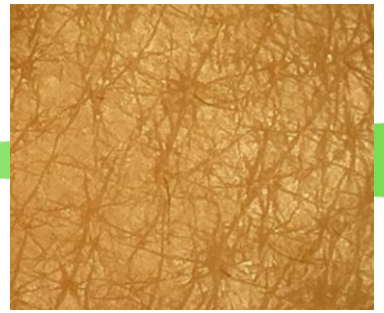
Targets of skincare efficacy enlarged

Skincare targets

Skin texture



Pores

Wrinkles

Spot

Face-shape

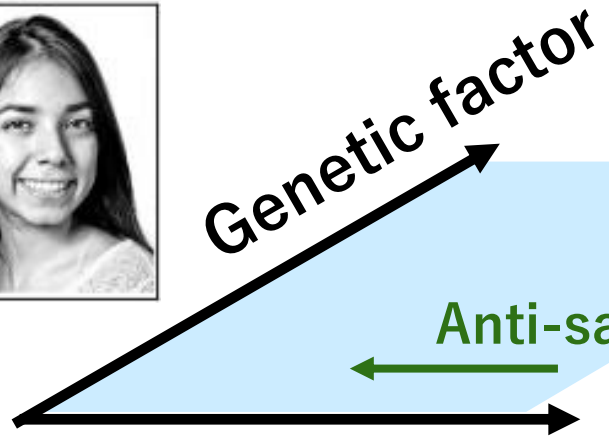
Not extended to facial shape

Creating a new category of face-shaping skincare

Current dynamics of facial shape

Unrelated “look-alike” [1]

From 39 to 54-year-old [2]



Aging factor and anti-sagging

-Traditional target and many skincare proposed

-Hard to approach deep structures by skincare

Little is known about the 3rd factor of facial shape

Hypothesis

Skin interstitial fluid [3]

[1] Joshi, Ricky S. et al. Cell Reports, 2022. [2] Mally, P. et al. Aesthet Surg J, 2014. [3] F. Flament, et al. Int. J. Cosmet. Sci., 2015

Face responses to Gravity

Gravity [4]

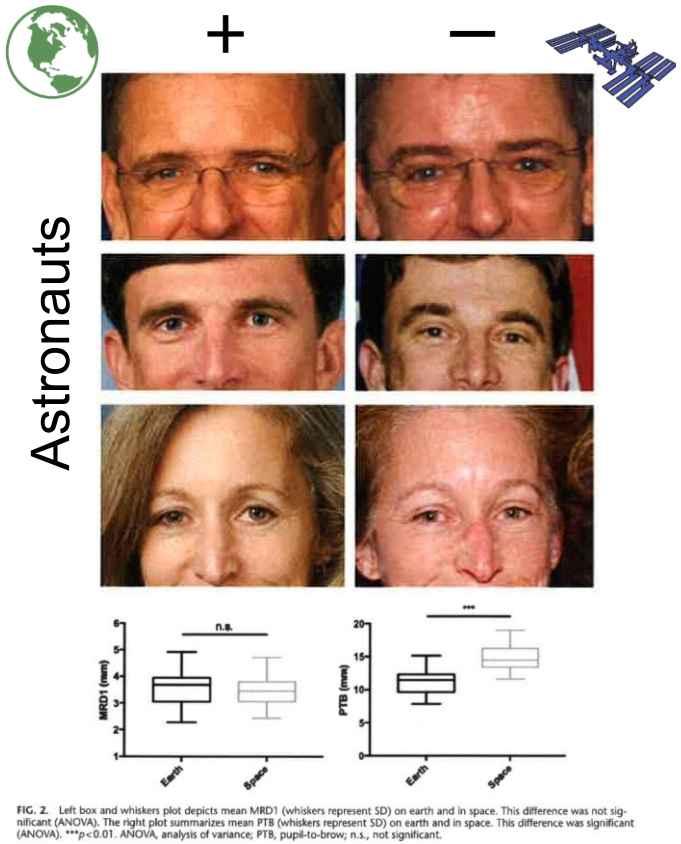
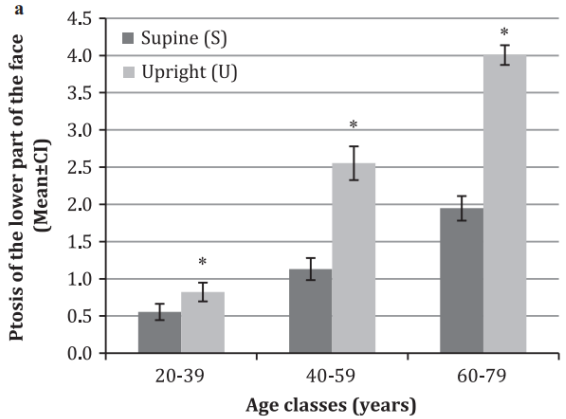


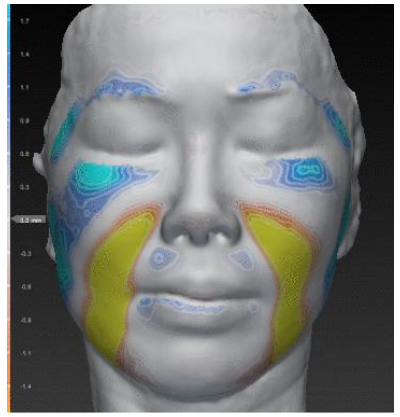
FIG. 2. Left box and whiskers plot depicts mean MRD1 (whiskers represent SD) on earth and in space. This difference was not significant (ANOVA). The right plot summarizes mean PTB (whiskers represent SD) on earth and in space. This difference was significant (ANOVA). ***$p<0.01$. ANOVA, analysis of variance; PTB, pupil-to-brow; n.s., not significant.

Gravity intervention [3]



Gravity intervention

Vectra



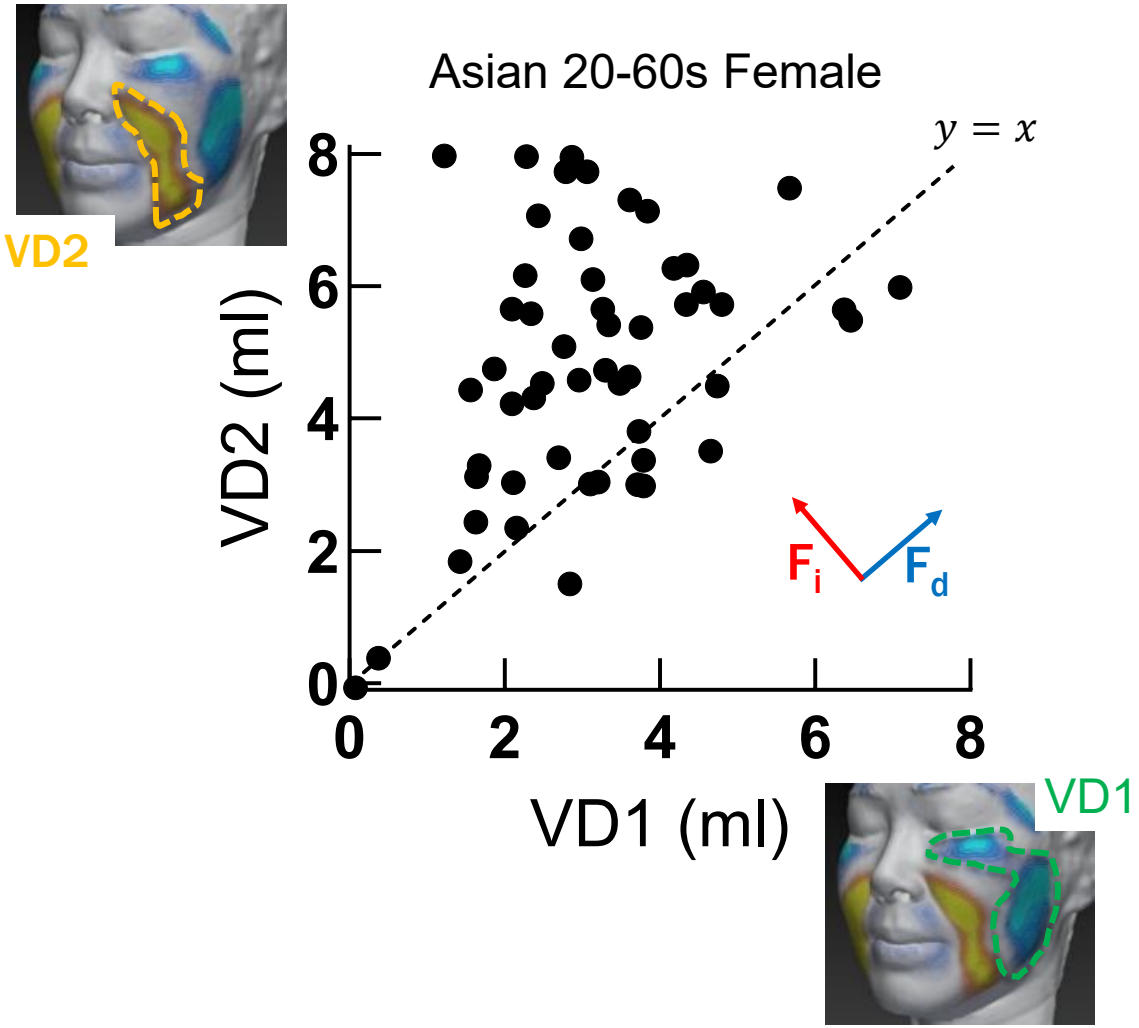
Our method

High resolution 3D facial imaging

[4] J.N. Karlin et. al. Ophtha. Plast. Re. Surg. 2021

[3] F. Flament et. al, Int J Cosmet Sci, 2015

Two factors of facial shape (F_d / F_i)



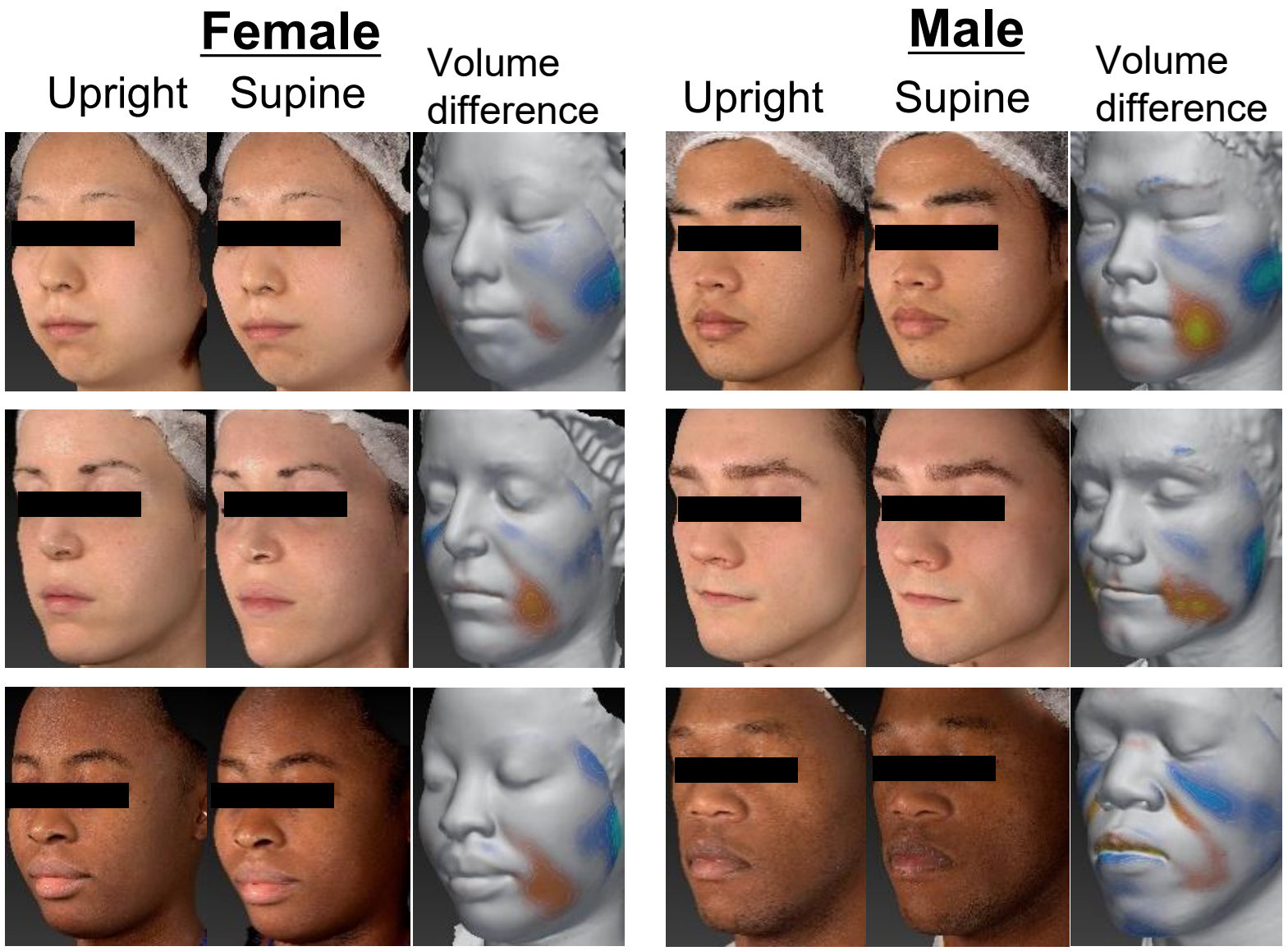
Gravity-responsive volume differences (VD1/VD2) → **Eq. (1)** → Two factors of facial shape (F_d / F_i)

$$\begin{pmatrix} F_d \\ F_i \end{pmatrix} = \begin{pmatrix} \cos\frac{\pi}{4} & \sin\frac{\pi}{4} \\ -\sin\frac{\pi}{4} & \cos\frac{\pi}{4} \end{pmatrix} \begin{pmatrix} VD1 \\ VD2 \end{pmatrix} \quad (1)$$

Gravity-Responsive 3D measurement

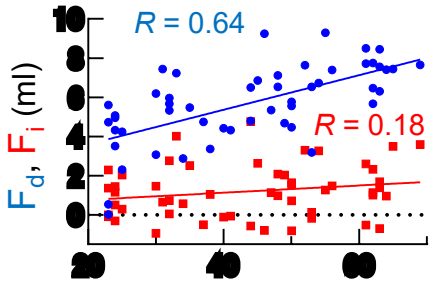
Characterization in universal volunteer study

total N= 310



Correlation of F_d and F_i with Age and Sagging

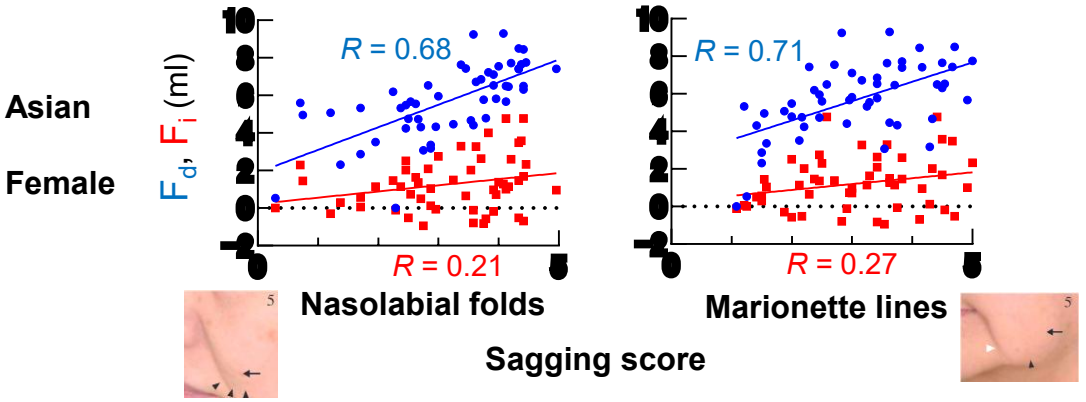
Asian 20-60s Female



R Age	Age			
	Female		Male	
	Fd	Fi	Fd	Fi
Asian	0.64	0.18	0.51	0.21
Caucasian	0.36	0.13	0.51	0.07
African	0.41	0.06	0.52	0.04

Darker green indicates higher R

Asian 20-60s Female



R score	Nasolabial folds				Marionette lines			
	Female		Male		Female		Male	
	Fd	Fi	Fd	Fi	Fd	Fi	Fd	Fi
Asian	0.68	0.21	0.42	0.23	0.71	0.27	0.69	0.29
Caucasian	0.54	0.27	0.51	0.03	0.56	0.23	0.60	0.10
African	0.39	0.05	0.39	-0.25	0.48	0.19	0.42	-0.22

Darker green indicates higher R

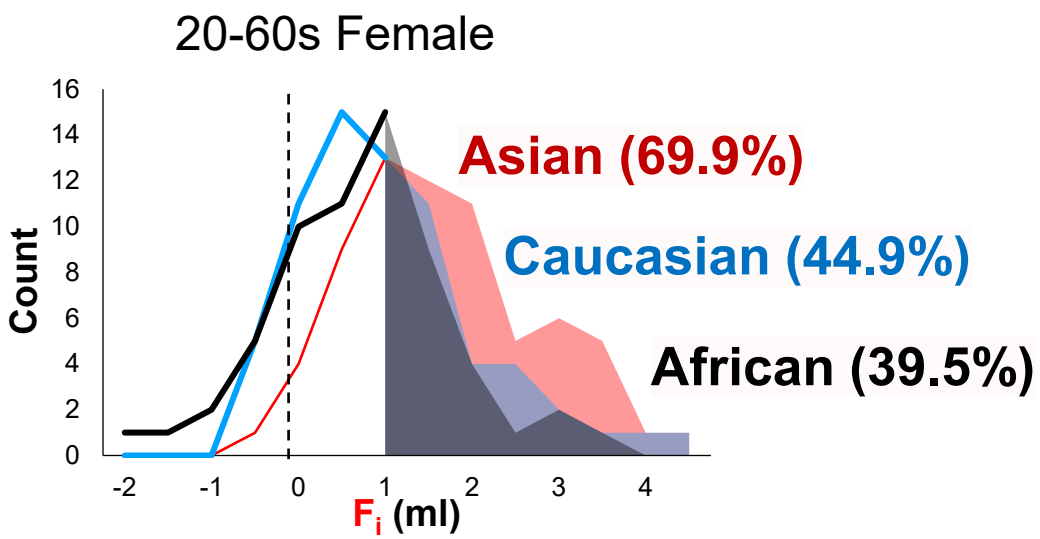
F_d : age-dependent

F_i : age-**in**dependent

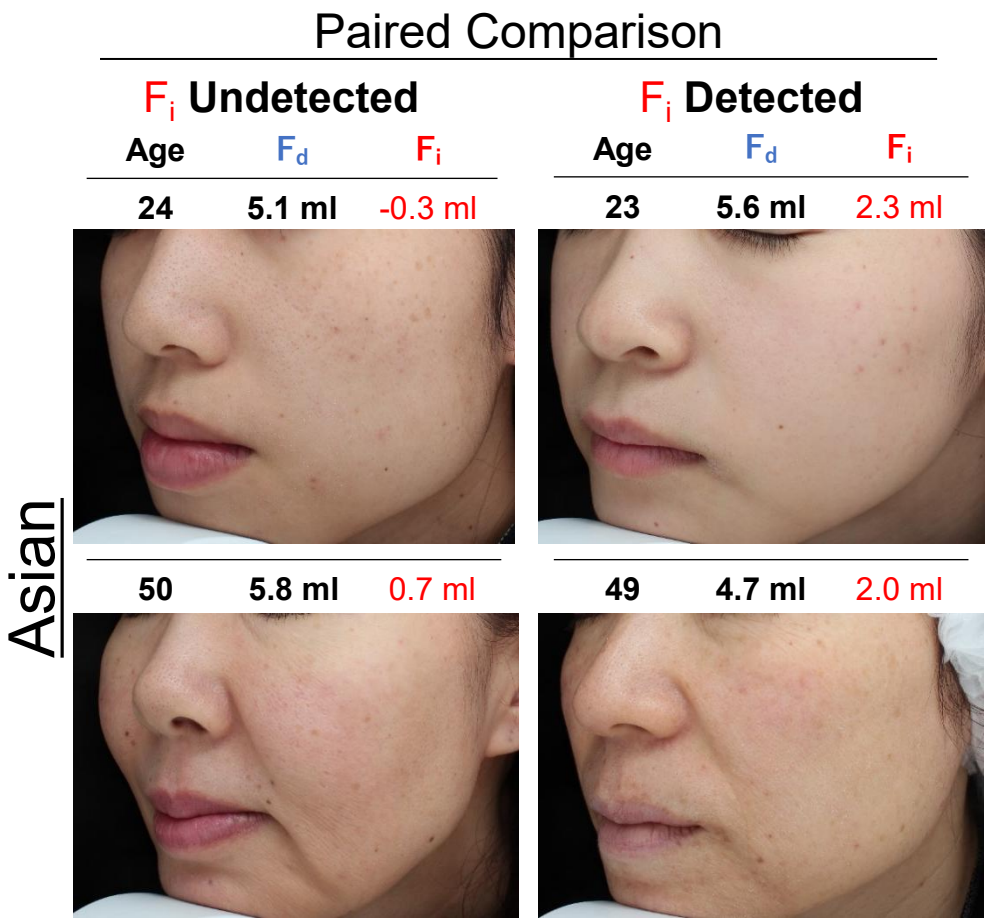
F_d represents sagging

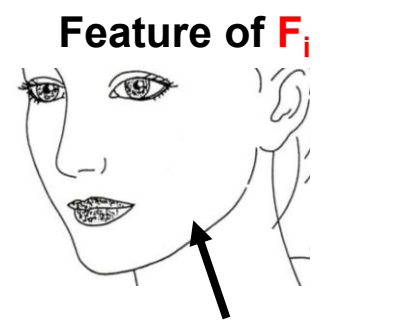
What is F_i ?

Age-independent known factor F_i



F_i detected in major population





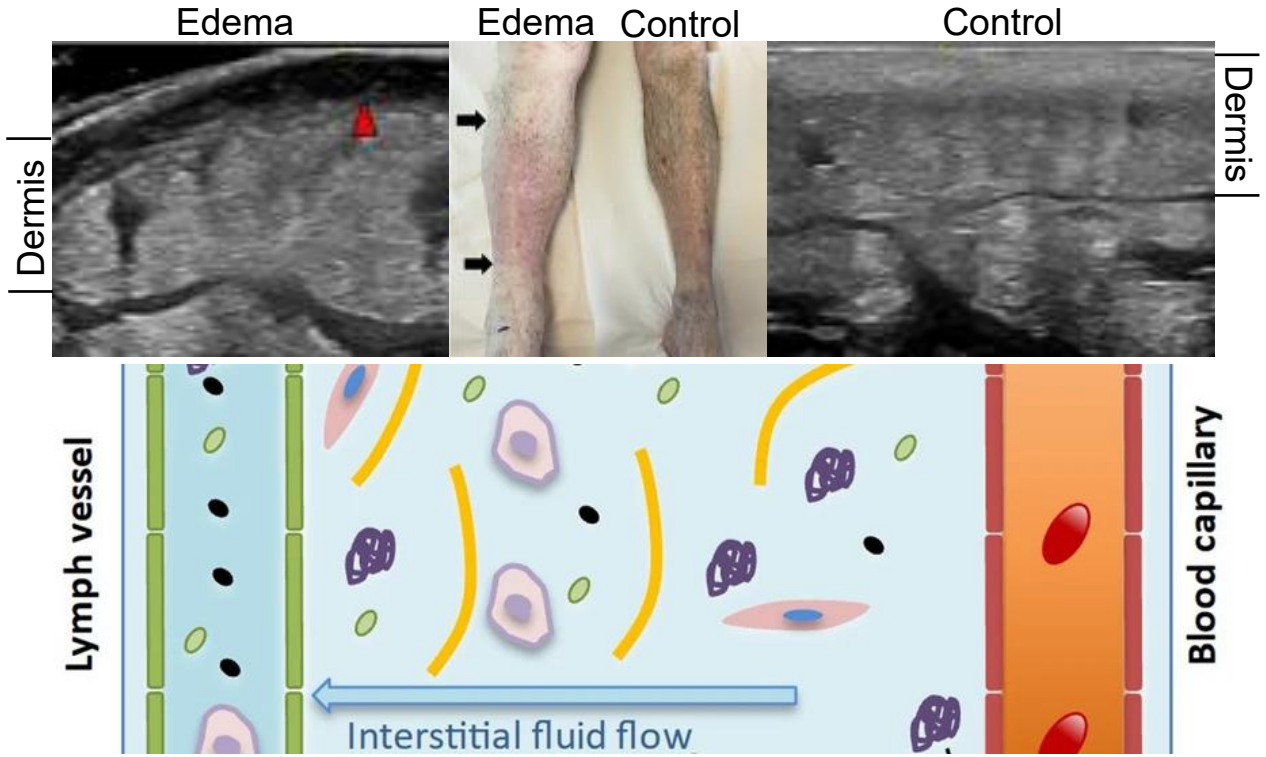
Hypothesis

F_i = Dermal interstitial fluid

Our hypothesis about F_i

Hypothesis

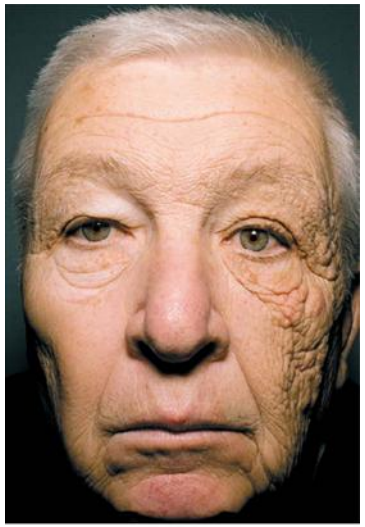
F_i = Dermal interstitial fluid



Vincenzo R., et al. J. Ultrasound, 2022. ,Sharmin M., et al. Sci. Rep.2023

Difficult to address facial edema

w/o Photoaging



N. Engl. J. Med. 366,16 (2012)

A case of hemi-facial lymphedema

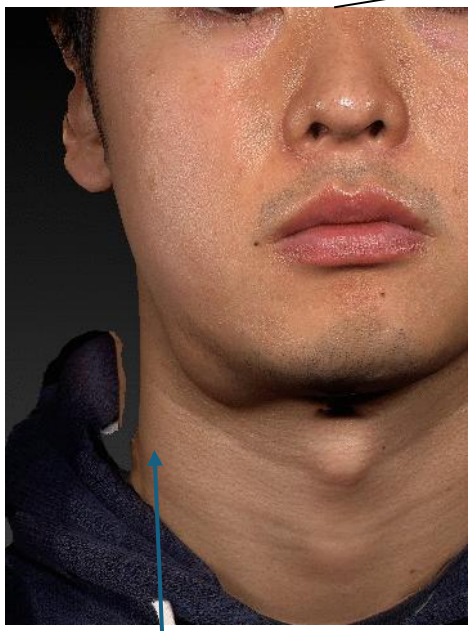
Day 0
Surgery

Day 2~
Hemi-facial edema

Day 80~
No edema

GR-3D

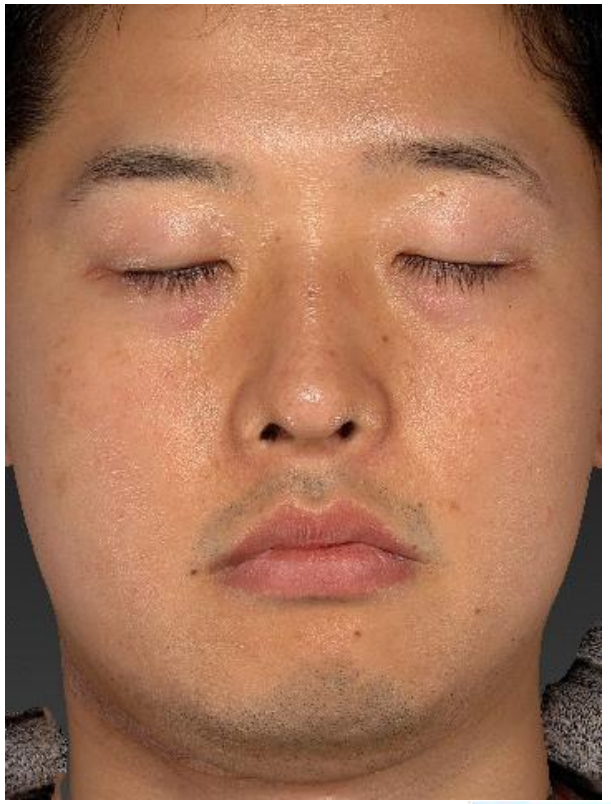
Day 6 ----------> Day 126



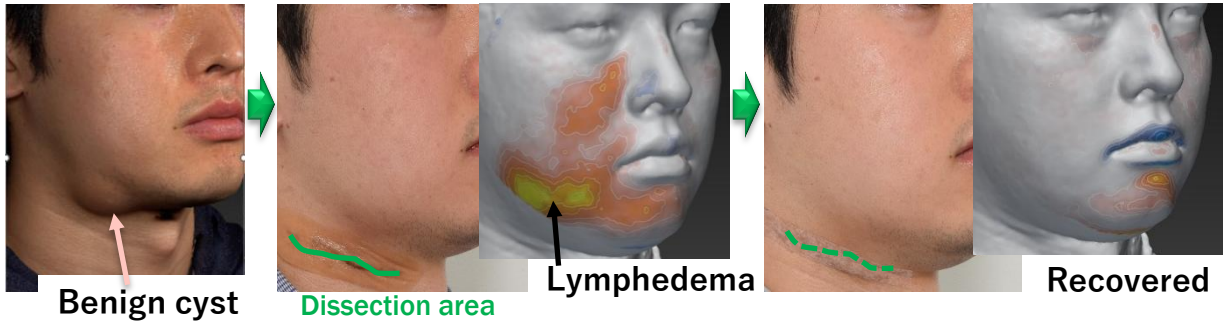
Benign cyst

Neck dissection surgery

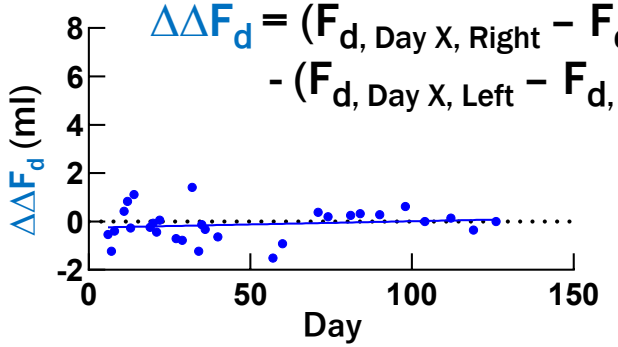
Swelling



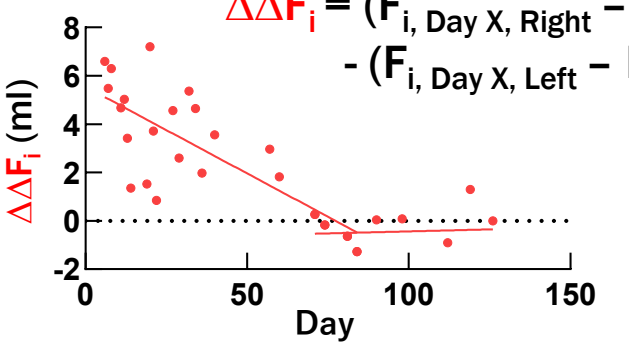
GR-3D measurement of Hemi-facial lymphedema



$$\Delta\Delta F_d = (F_{d,\ Day\ X,\ Right} - F_{d,\ Day\ 126\ ,\ Right}) - (F_{d,\ Day\ X,\ Left} - F_{d,\ Day\ 126\ ,\ Left})$$



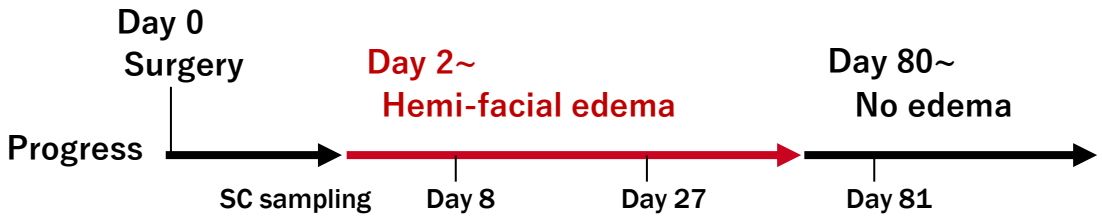
$$\Delta\Delta F_i = (F_{i,\ Day\ X,\ Right} - F_{i,\ Day\ 126\ ,\ Right}) - (F_{i,\ Day\ X,\ Left} - F_{i,\ Day\ 126\ ,\ Left})$$



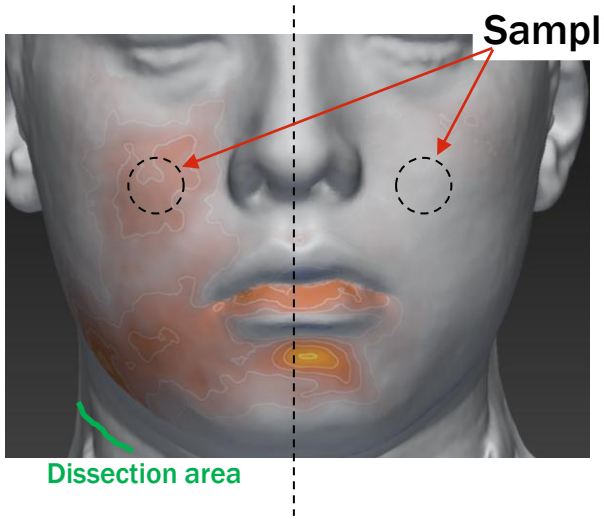
Only F_i decreased in recovery process of the edema

F_i = Edema (Excessive interstitial fluid)

SC proteomics of Hemi-facial lymphedema



Stratum corneum (SC) from the lymphedema and control sides



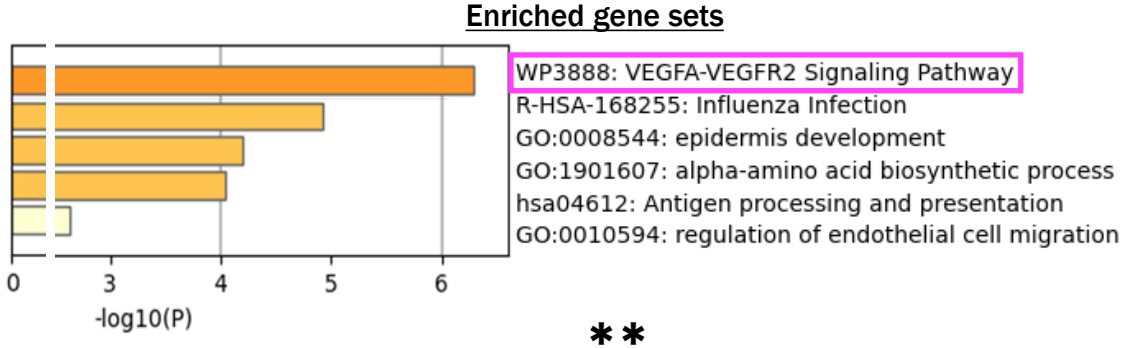
Sampling ⇒ SC proteomics

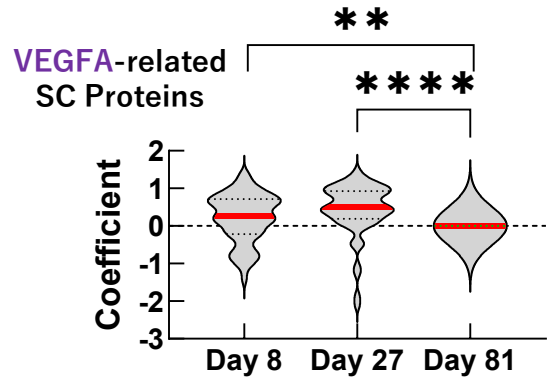
1698 proteins detected

⇓ q-value < 0.05

48 proteins ⇒ GO analysis

VEGFA: Inflammatory cytokine

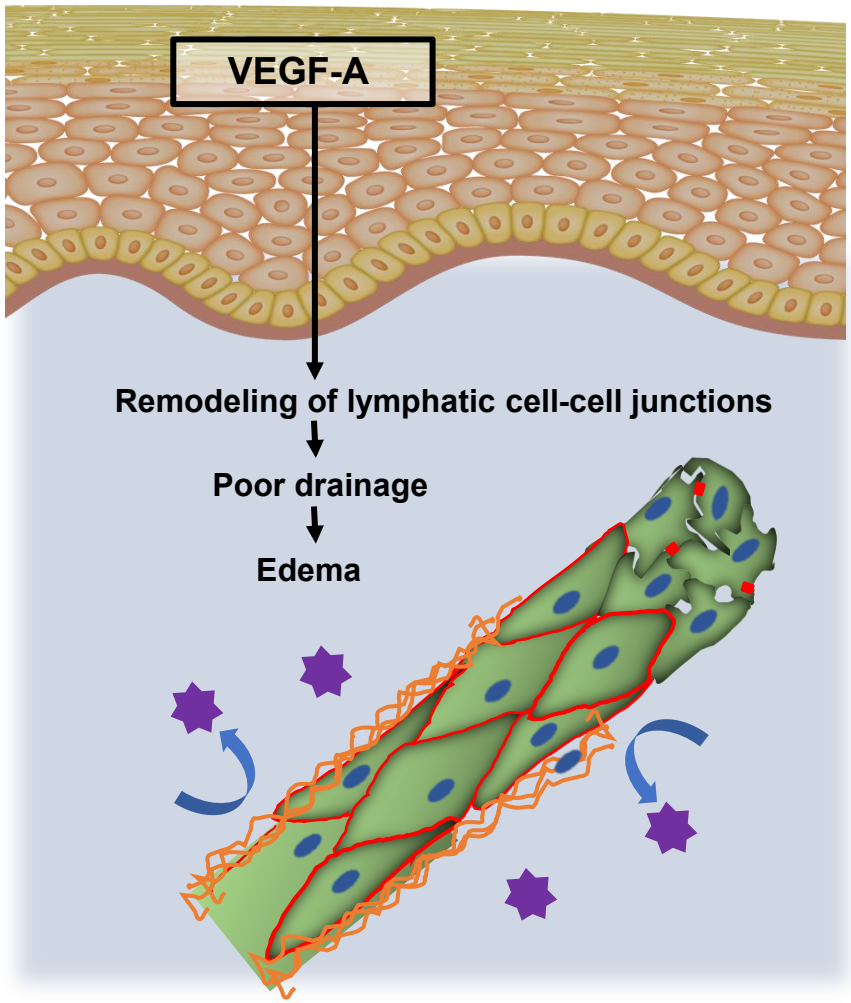


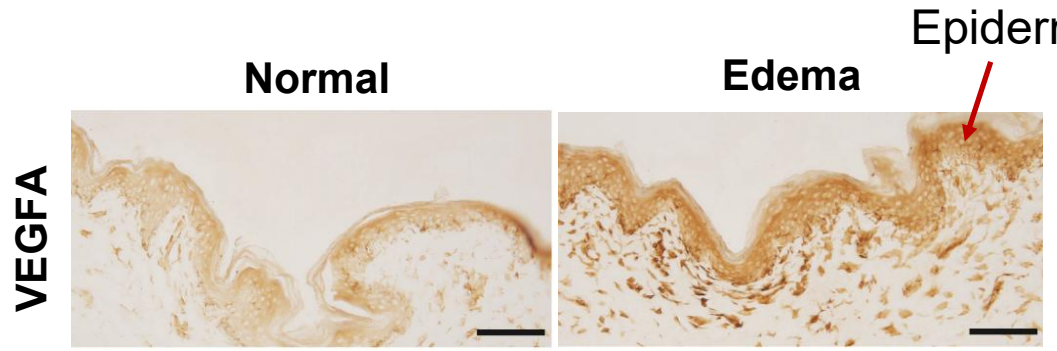


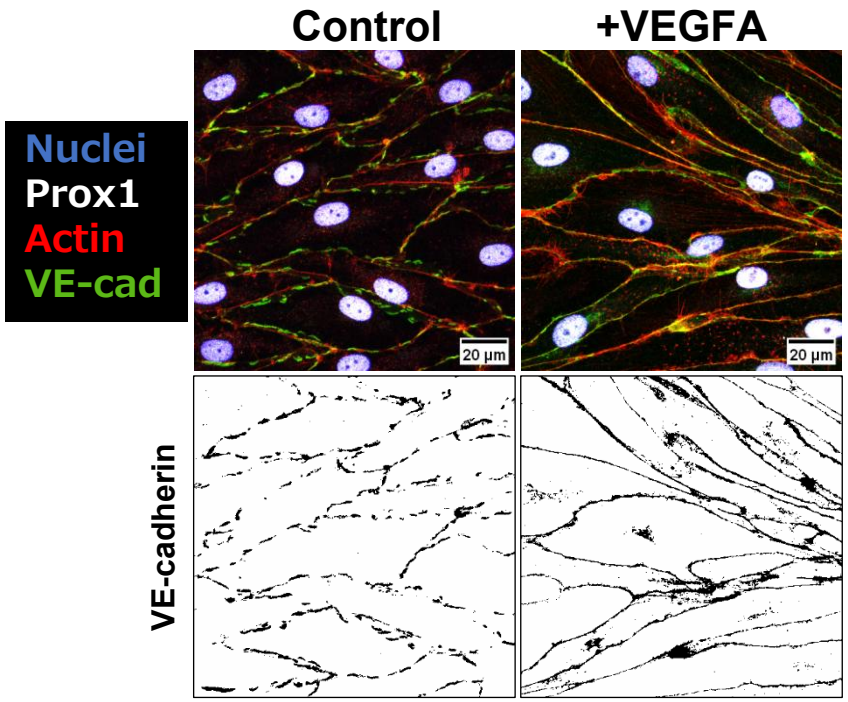
＊＊ : p<0.01, ＊＊＊＊: p<0.0001 , Kruskal-Wallis H test

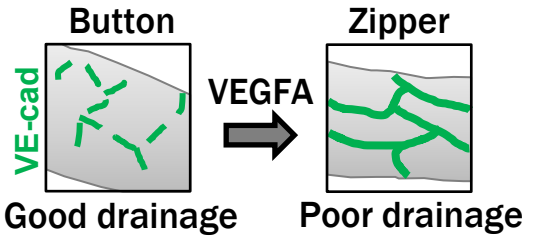
Facial edema associated with VEGFA

Molecular mechanism of Edema with VEGFA

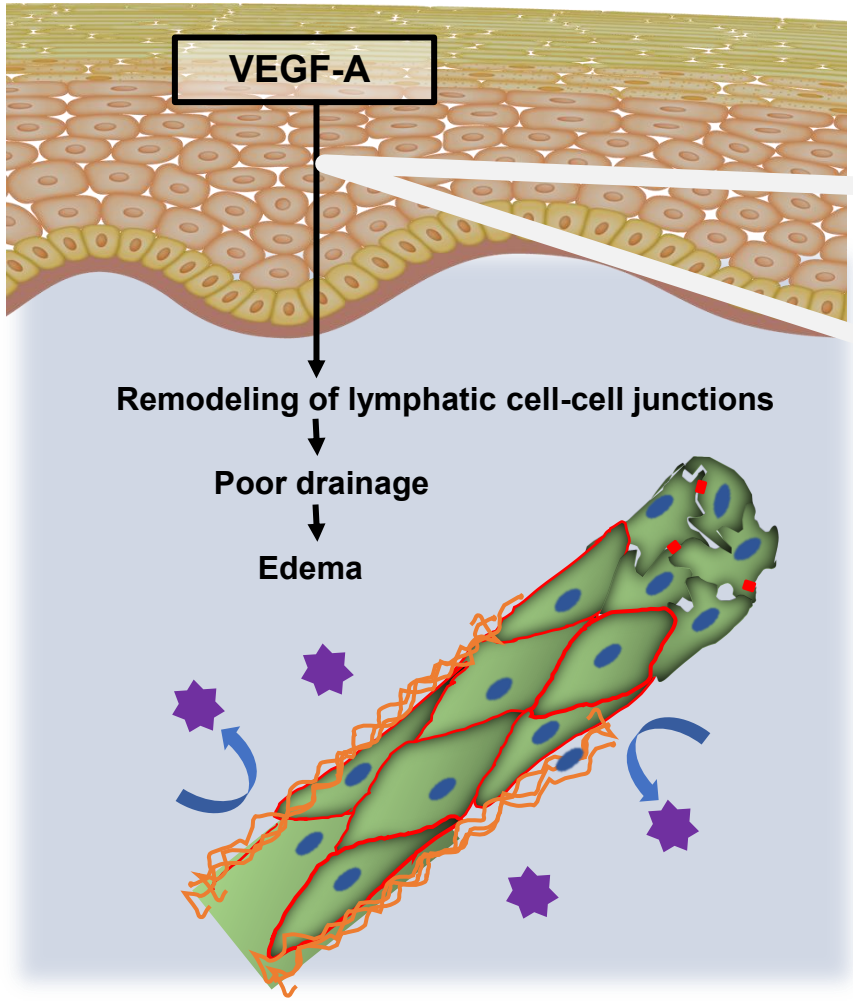






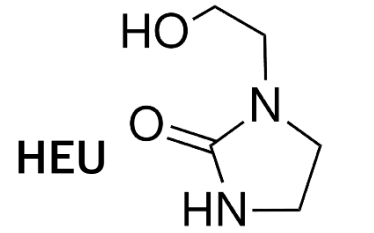


Ingredient for anti-VEGFA inflammation

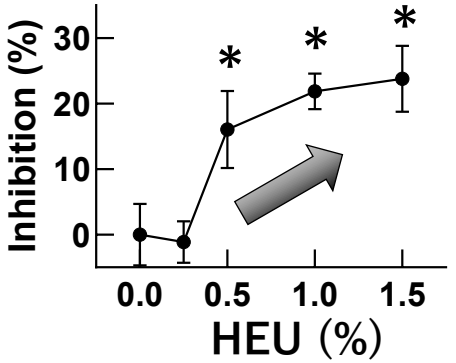


Mechanism of VEGFA activation

Pro-uPA
uPAR
Ingredient
uPA
VEGFA → Cleaved VEGFA
Epidermal inflammation



1-(Hydroxyethyl)ethyleneurea

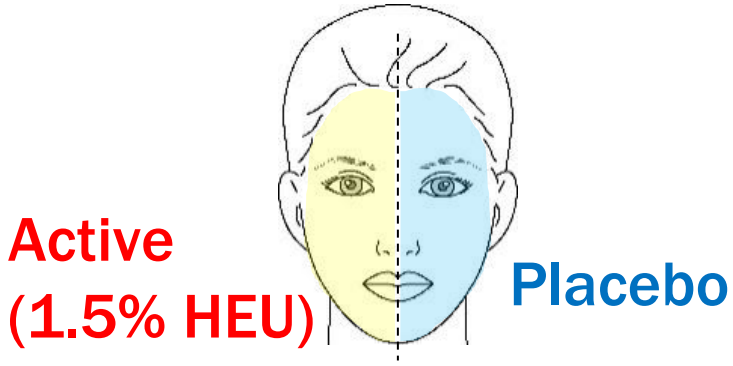


Specific inhibitor for uPA–uPAR binding

Clinical test with specific inhibitor HEI

Randomized, placebo-controlled trial w/o HEU

N=40, 30-60s females



randomly assigned to R/L

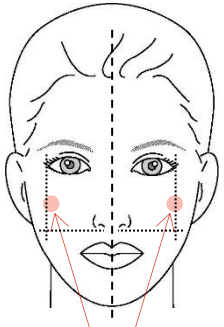
Ingredients	Active	Placebo
HEU	1.5%	0%
Dipropylene Glycol	5%	Placebo /Active same
1,3-Butylene Glycol	5%	
Carbomer	0.13%	
Potassium hydroxide	0.04%	
EDTA	0.02%	
Chlorphenesin	0.2%	
Phenoxy Ethanol	0.5%	
Deionized Water	To 100%	

6W application of Active/Placebo lotion

No adverse events observed

Clinical test with specific inhibitor HEI

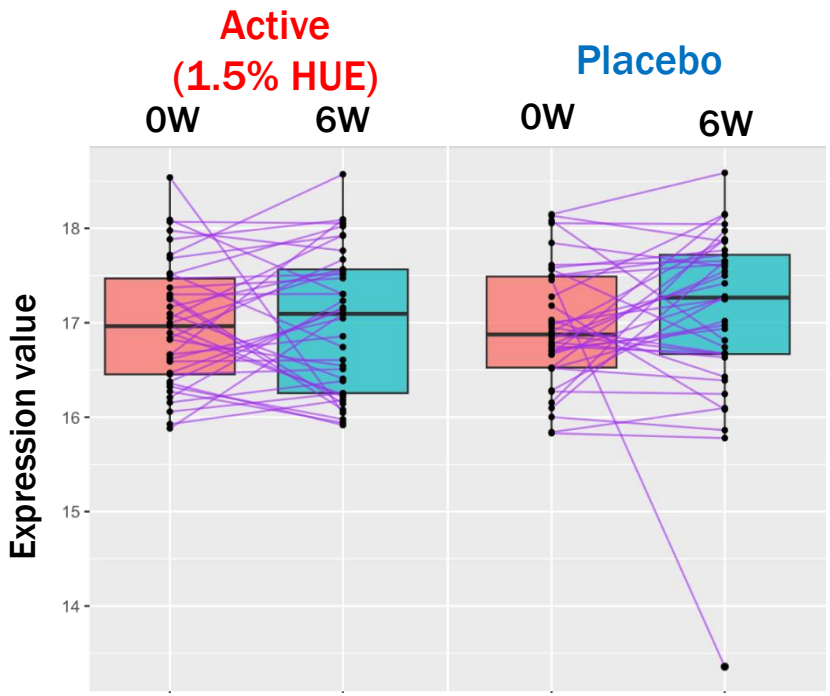
SC Proteomics



SC sampling

>2000 proteins
detected from SC samples

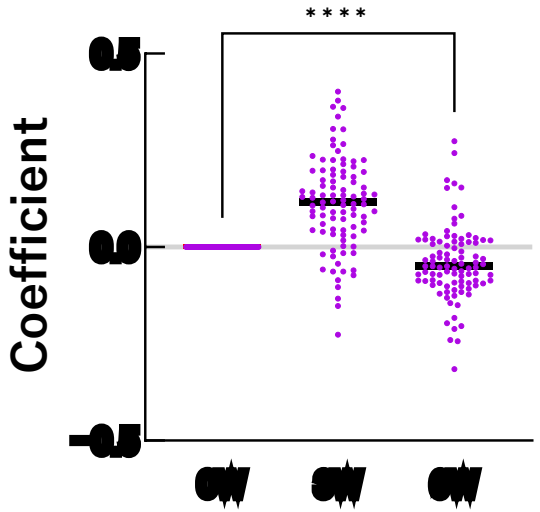
VEGFA-related
SC Proteins



linear mixed effect modeling

Protein	Coefficient (0w to 6w)	pval
ARPC5L	**-0.071**	0.59

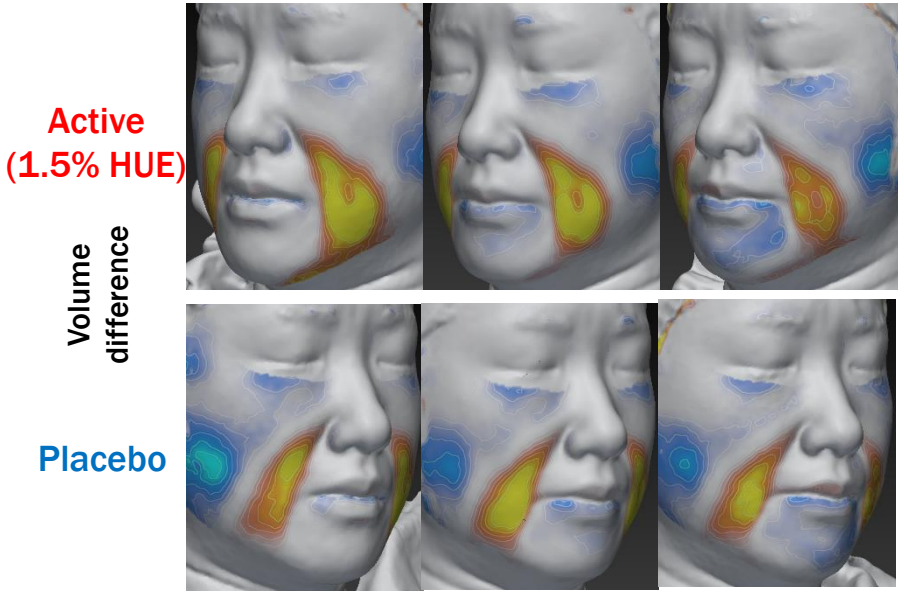
VEGFA/VEGFR2 Signaling Proteins

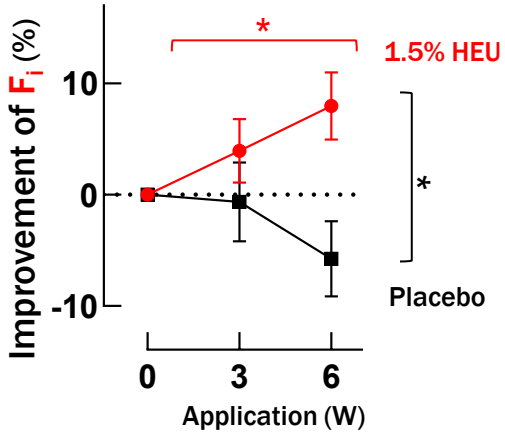


Anti-inflammatory effect of HEU

Clinical test with specific inhibitor HEI

Randomized, placebo-controlled trial w/o HEU





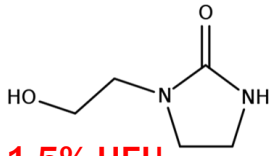
Anti-edema effect of HEU

Clinical test with specific inhibitor HEI

Representative case

54-year-old woman

Active side



1.5% HEU

Placebo side

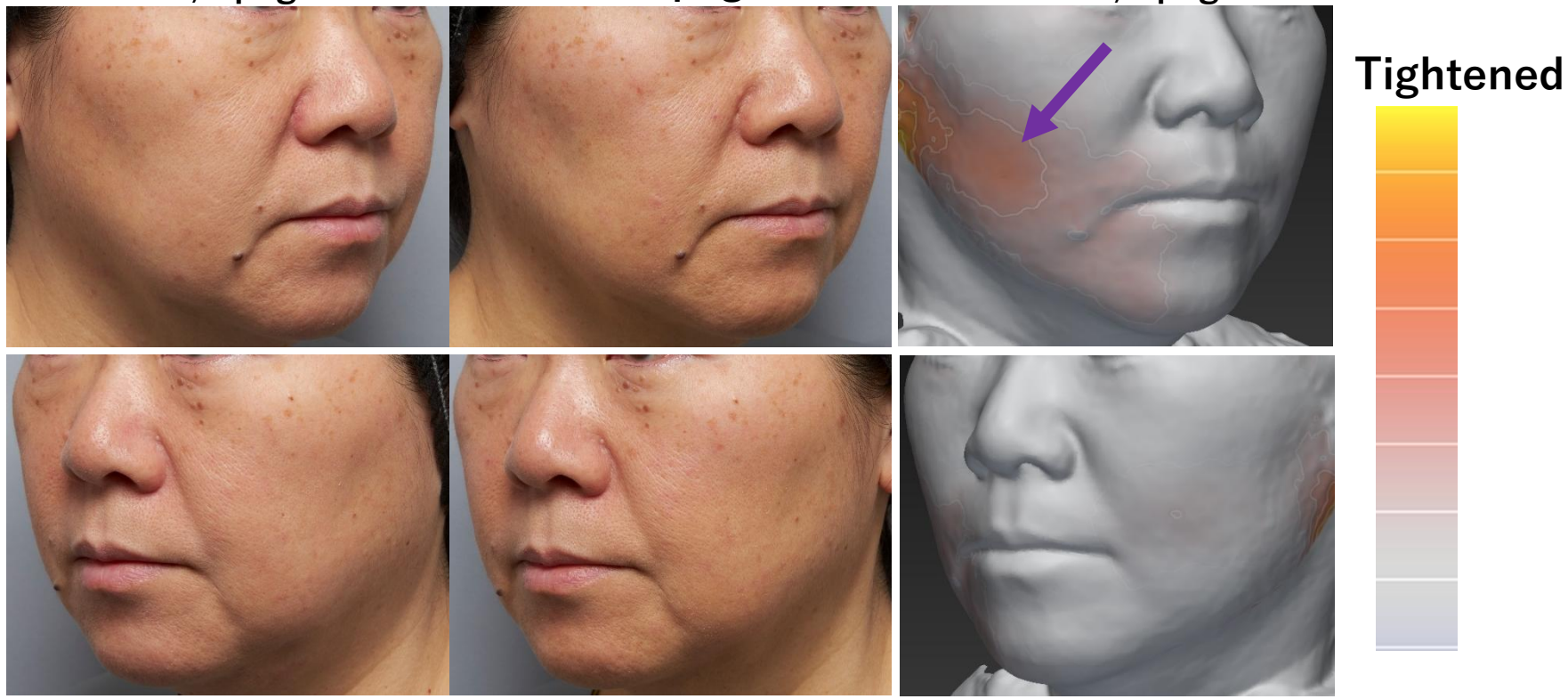
Face photograph

Morphological change

0W, Upright

6W, Upright

0W-6W, Upright



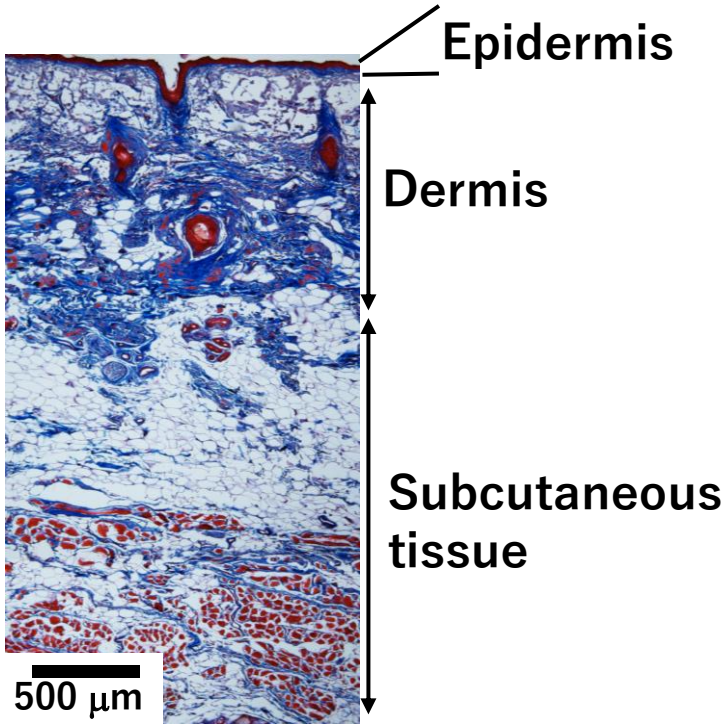
Tightened

A skincare ingredient that enhances facial shape

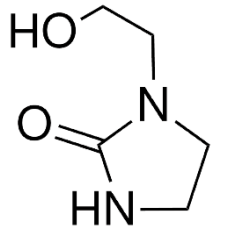
Advantage for face-shaping skincare

Facial shape

Causal relationship between epidermal inflammation and facial edema via dermal lymphatic function



Novel face-tightening skincare ingredient



Challenge lied in how to approach this deep structure, as the innate skin barrier function.

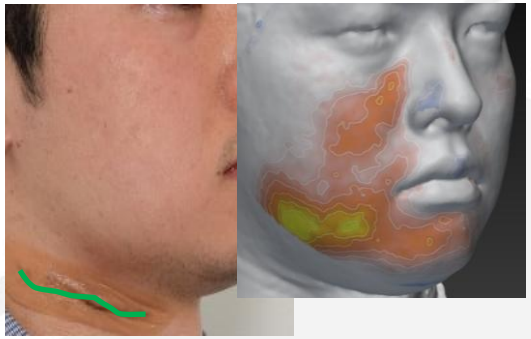
Conclusion

Current dynamics

Unrelated “look-alike” [1]

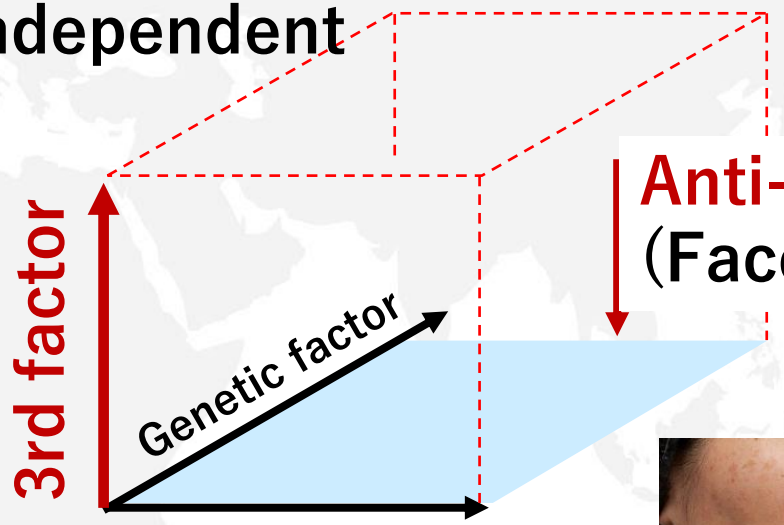
From 39 to 54-year-old [2]

New dynamics

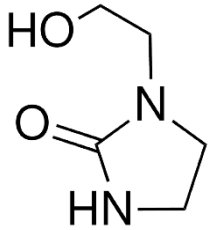


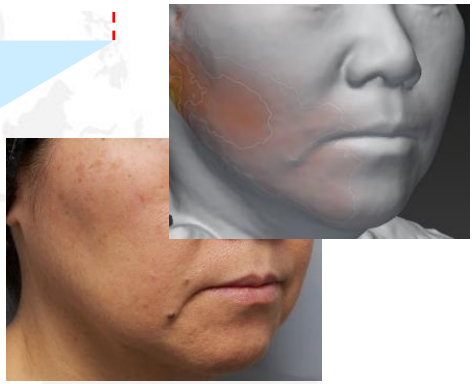
Edema
(Excessive interstitial fluid)

Age-independent



Anti-edema
(Face-tightening)





Face-shaping category of skincare