

Volume 143, Number 5S, Supplement 1, May 2023

www.jidonline.org

Supplement to the Journal of Investigative Dermatology

JID

JOURNAL OF INVESTIGATIVE DERMATOLOGY

ISID 2023

1st International Societies for Investigative Dermatology Meeting

Meeting Dates May 10 (Wed.) – 13 (Sat.), 2023

Venue Keio Plaza Hotel Tokyo 2-2-1 Nishi-Shinjuku, Shinjuku-Ku, Tokyo,
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SUBMISSION

ISID0542 - Optically guided high-frequency ultrasound can distinguish basal cell carcinomas with aggressive histological subtypes

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<https://doi.org/10.26226/m.641999e996661e001462cd97>

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Gene set enrichment analysis identifies biological networks associated with skin aging in a large Japanese population: Data from the Nagahama cohort

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Skin aging is driven by both intrinsic and extrinsic factors, such as chronic UV exposure, pollution and smoking. We conducted a genome wide association study (GWAS) on 1049 Japanese women from the Nagahama cohort and identified new biological mechanisms of four major outcomes in skin aging, namely photoaging, solar lentigines, wrinkles, and sagging. Gene Set Enrichment Analysis using KEGG database was applied on the genetic data. The significance of the associations was assessed using the False Discovery Rate (FDR). Only one pathway, the “Huntington’s disease pathway”, reached the 0.05 FDR threshold. This pathway was associated with the wrinkle phenotype. Among the four outcomes, fifteen reached also the FDR 0.25, such as “melanogenesis” pathway for the lentigines. This analysis highlighted also relevant pathways with a nominal p-value below 0.05 that we already highlighted in Caucasian population GWAS study such as “Arginine and Proline metabolism pathway” for lentigines or “mTOR signaling pathway” for sagging that tends to be also significant for wrinkle pathway. Overall, our results suggest that some biological mechanisms are common for skin aging outcomes such as “mTOR pathway”, a well-known aged-associated mechanism but specific pathways were also identified for each skin aging sign. These data contribute to our knowledge of skin aging in Japanese population.



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Optically guided high-frequency ultrasound can distinguish basal cell carcinomas with aggressive histological subtypes

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Basal cell carcinoma (BCC) risk is mostly defined by tumor location, size, and histological subtype (HST). Location and size are evident at the time of diagnosis but establishing HST currently relies on invasive biopsy. Superficial and nodular BCCs behave more indolently, while infiltrative, micronodular, and morpheaform BCCs are aggressive and show greater subclinical extension and recurrence risk. Thus, BCC HST drives treatment decision-making. Low-risk BCCs can be effectively treated with local destructive or topical therapies, while high-risk require surgical removal. We aimed to assess whether *in vivo* optically guided high-frequency ultrasound (OG-HFUS) imaging can identify BCCs with aggressive HST and thus may aid early treatment planning. We performed a clinical and a dermoscopic examination of BCCs followed by 33 MHz OG-HFUS imaging, surgical excision, and histological examination. 52 patients with BCC were enrolled, with a mean age of 72.6±10.9 years. Histology established 13 lesions as aggressive HST (infiltrative or micronodular subtype) and 39 as low-risk HST (superficial or nodular subtype). With OG-HFUS, aggressive BCC HSTs could be distinguished from low-risk HST based on their irregular shape ($p<0.0001$), ill-defined margins ($p<0.0001$), and non-homogeneous internal echoes ($p=0.004$) upon statistical analysis with Fisher’s exact test. Using on novel scoring system based on these criteria, OG-HFUS differentiated aggressive HSTs from low-risk with higher sensitivity (84.6%) and specificity (92.3%) than macroscopic and dermoscopic evaluation (sensitivity: 31.9%, specificity: 75.5%). Based on our results, OG-HFUS can distinguish aggressive BCC subtypes from low-risk HSTs using easily identifiable morphological parameters and may support early therapeutic decision-making.

