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Preliminary Clinical Experience with a Novel Optical–Ultrasound Imaging Device on Various Skin Lesions

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Key Takeaways:

- 53 skin lesions tested: melanoma, BCC, seborrheic keratosis, dermatofibroma, naevus, dermatitis, and psoriasis
- Simultaneous capture of optical and US images of skin lesions in vivo
- Over 90% detectability for major skin structures
- Image quality and lesion characterization were consistent with those from a reference ultrasound device and published data
- Three independent evaluators confirmed the diagnostic relevance of the device's imaging output
- Potential utility for clinical diagnostics and preoperative planning

Conclusion: OG-HFUS can give valuable information of various skin lesions (incl. skin neoplasms and inflammations)

A Selection of Publications Based on Research using *Dermus* Technologies

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British Journal of Dermatology 2025

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Dermoscopy-guided high-frequency ultrasound for preoperative assessment of basal cell carcinoma lateral margins: A pilot study

Mehdi Boostani, Ximena Wortsman, Giovanni Pellacani, Carmen Cantisani, Mariano Suppa, Anita Mohos, Mohamad Goldust, Pawel Pietkiewicz, András Bánvölgyi, Péter Holló, Norbert M Wikonkál, Kamran Avanaki, Gyorgy Paragh, Kende Lőrincz, Norbert Kiss

Key Takeaways:

- 61 lateral margins from 20 BCCs (in 18 patients) were analyzed
- Diagnostic performance of DG-HFUS for detecting BCC within 2 mm of the margin:
 - o Sensitivity: 94.4% (95% CI: 72.7–99.9)
 - o Specificity: 93.0% (95% CI: 80.9–98.5)
 - o Positive Predictive Value: 85.0% (95% CI: 65.4–94.4)
 - o Negative Predictive Value: 97.6% (95% CI: 85.6–99.6)
 - o Overall Diagnostic Accuracy: 93.4% (95% CI: 84.1–98.2)

Conclusion: OG-HFUS can aid BCC lateral margin refinement for preoperative planning.



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Optically Guided High-Frequency Ultrasound to Differentiate High-Risk Basal Cell Carcinoma Subtypes: A Single-Centre Prospective Study

Szabolcs Bozsányi, Mehdi Boostani, Klára Farkas, Phyllida Hamilton-Meikle, Noémi Nóra Varga, Boglárka Szabó, Flóra Vasanits, Enikő Kuroli, Fanni Adél Meznerics, Kende Lőrincz, Péter Holló, András Bánvölgyi, Norbert M. Wikonkál, Gyorgy Paragh and Norbert Kiss

Key Takeaways:

- 78 BCCs from 75 patients imaged using 33 MHz OG-HFUS
- **OG-HFUS** vs dermoscopy:
 - o Sensitivity: **82.4%** / 40.1%
 - o Specificity: **91.3%** / 73.1%
 - o Positive Predictive Value: **94.7%** / 30.2%
 - o Negative Predictive Value: **78.6%** / 76.8%

Conclusion: OG-HFUS can aid BCC subtype differentiation, and help in treatment choice (surgery or noninvasive options).



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Optically Guided High-Frequency Ultrasound Shows Superior Efficacy for Preoperative Estimation of Breslow Thickness in Comparison with Multispectral Imaging: A Single-Center Prospective Validation Study

Noémi Nóra Varga, Mehdi Boostani, Klára Farkas, András Bánvölgyi, Kende Lőrincz, Máté Posta, Ilze Lihacova, Alexey Lihachev, Márta Medvecz, Péter Holló, György Paragh, Norbert M. Wikonkál, Szabolcs Bozsányi, and Norbert Kiss

Key Takeaways:

- 101 patients with histologically confirmed primary melanoma assessed
- **OG-HFUS** vs MSI-based algorithm:
 - o Sensitivity: **91.8%** / 62.6%
 - o Specificity: **96.0%** / 81.3%
 - o **Almost perfect agreement** / moderate agreement with histology ($\kappa = 0.858$, CI: **0.763–0.952**) / ($\kappa = 0.440$, CI: 0.298–0.583)

Conclusion: OG-HFUS has a good potential for estimation of Breslow thickness quickly and noninvasively.



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Nonthermal atmospheric pressure plasma (NTAPP) effectively eliminates skin tumors in a mouse model of UV-induced carcinogenesis with a short-term treatment regimen

Szabolcs Bozsányi, Ruby Acquah, Rhea Carmel Glen Rodrigues, Erin C. Tracy, Sean P. Murphy, Gregory Fridman, Wendy J. Huss, Peter C. Friedman, Gyorgy Paragh

Key Takeaways:

- One-week protocol: significant reduction in UV-induced skin tumors
- Mean tumor area: 5.65 mm² to 1.74 mm² after treatment (p = 0.0016)
- Data tracked with Optically guided high-frequency ultrasound:
 - o Treated tumors: mean thickness 0.86 mm to 0.04 mm (p = 0.0006).
 - o Control tumors showed no significant change (p = 0.55).

Conclusion: HFUS enabled non-invasive, quantifiable monitoring of tumor regression, supporting its role in early skin cancer treatment evaluation.