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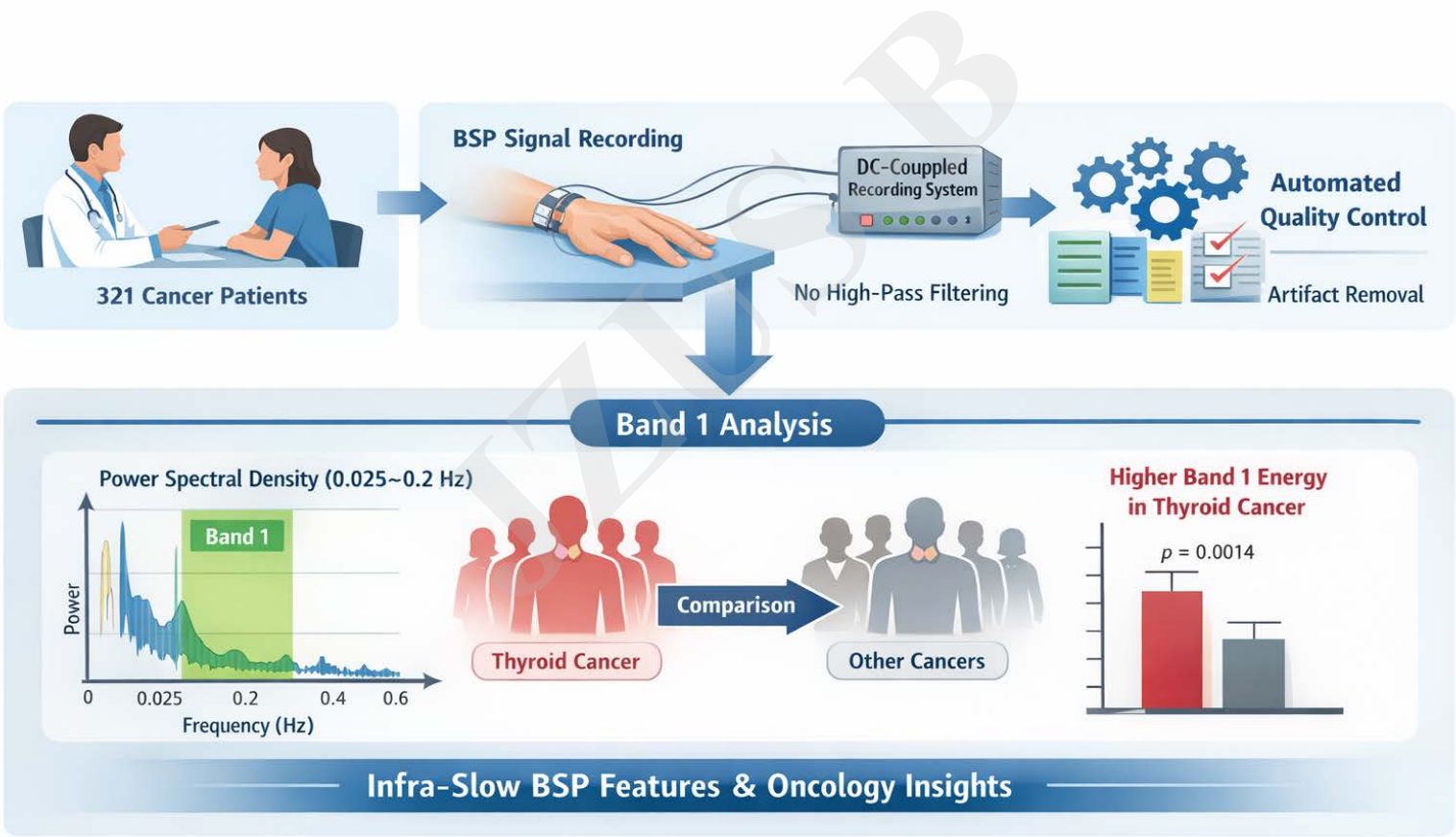
Infra-slow body-surface potentials show a group-level association with thyroid cancer

Key words: Infra-slow potentials; Body-surface potential; Thyroid cancer; Electrodermal signal ; Machine learning

Research Summary

In this study, we investigated whether infra-slow body-surface potentials (BSPs) carry reproducib
group-level information related to thyroid cancer.



Innovation points

Highlights the potential of infra-slow body-surface potentials as a non-invasive electrophysiological marker in cancer research.

Use of a DC-coupled recording system without high-pass filtering to preserve infra-slow signal components.

Automated artifact detection and strict quality-control procedures ensure reliability of low-frequency features.

Demonstrates that systemic physiological states associated with thyroid cancer can be reflected in infra-slow electrical signals measured far from the tumor location.

Innovation points

Band 1 energy (0.025–0.2 Hz) shows a significant difference between thyroid cancer patients (n=81) and other cancer patients (n=235).

Mean ± SD
13.32 ± 17.15 vs 10.12 ± 21.52

Median [IQR]
9.23 [5.02–15.22] vs 6.23 [3.01–11.00]

Statistical test
Mann–Whitney U test: p = 0.0014

The effect remains robust under stricter artifact removal settings and sensitivity analyses.