東北大学 学際科学フロンティア研究所 / 学際融合グローバル研究者育成東北イニシアティブ

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Beyond Density: Biomarkers for Dynamic Bone Diagnostics

*Language: English

Summary

Metabolic diseases, often lead to irreversible bone damage before diagnosis. Skeletal fragility becomes visible long after the underlying molecular systems have been stressed. Our research addresses a critical gap: Can we detect the earliest signals of skeletal metabolic disease long before structural changes occur?
Current diagnostics focus on structure (density) and a few circulating markers, only reporting damage that has already happened. This fails in metabolic diseases where fracture risk is high despite "normal" bone density. This gap suggests that we are not yet measuring the layers of biology where the earliest signals of disease reside.
My work treats bone as a dynamic metabolic sensor encoding early stress in its molecular language. By tracking how diet modulates the cellular proteome and governs RNA translation, we aim to uncover molecular ""early-warning signatures"" of fragility. Using advanced omics technologies, our vision is to shift diagnostics from static snapshots to dynamic, predictive biomarkers and establish a foundational molecular framework for understanding metabolic bone fragility.

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参加登録

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