

# Bone-related Circulating MicroRNAs miR-29b-3p, miR-550a-3p, and miR-324-3p and their Association to Bone Microstructure and Histomorphometry

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**Introduction:** The assessment of bone quality and the prediction of fracture risk in idiopathic osteoporosis (IOP) are complex prospects as bone mineral density (BMD) and bone turnover markers (BTM) do not indicate fracture-risk. MicroRNAs (miRNAs) are promising new biomarkers for bone diseases, but the current understanding of the biological information contained in the variability of miRNAs is limited.

**Methods:** We investigated the association between serum-levels of 19 miRNA biomarkers of idiopathic osteoporosis to bone microstructure and bone histomorphometry based upon bone biopsies and  $\mu$ CT (9.3  $\mu$ m) scans from 36 patients.

**Results:** Four miRNAs were found to be correlated to bone microarchitecture and seven miRNAs to dynamic histomorphometry ( $p < 0.05$ ). Three miRNAs, namely, miR-29b-3p, miR-324-3p, and miR-550a-3p showed significant correlations to histomorphometric parameters of bone formation as well as microstructure parameters. miR-29b-3p and miR-324-p were found to be reduced in patients undergoing anti-resorptive therapy.

**Conclusion:** This is the first study to report that serum levels of bone-related miRNAs might be surrogates of dynamic histomorphometry and potentially reveal changes in bone microstructure. Although these findings enhance the potential value of circulating miRNAs as bone biomarkers, further experimental studies are required to qualify the clinical utility of miRNAs to reflect dynamic changes in bone formation and microstructure.

