a simple and standardized kit qPCR analysis of circulating microRNAs for fracture risk analysis
Circulating microRNAs are a novel class of blood-borne biomarkers. They are secreted from virtually any cell in the human body and distributed to other cells via the circulation. Local pathophysiologic processes in tissues can be detected using circulating microRNAs, and used for diagnosis and treatment monitoring of age-associated diseases.

The osteomiR™ kit enables the simple and standardized analysis of specific circulating microRNAs in human serum and plasma, which reflect bone quality.

osteomiRs

- Are significantly regulated in patients with osteoporotic fractures
- Are BMD-independent risk factors for osteoporotic fracture
- Regulate bone formation and resorption via multiple pathways
- Are novel biomarkers for bone disease, which can easily be detected in serum and plasma
All-In-One kit:
the osteomiR™ kit includes all reagents for the following steps:

1. RNA extraction
2. cDNA synthesis
3. Preparation of PCR Mix
4. Real time PCR analysis
5. Data analysis: tailored software

Assay format

- Low sample volume: 200 µL human serum/plasma
- Fracture risk analysis utilizing the osteomiR™ signature: 11 osteomiR™ and 5 controls/sample
- Reduced hands-on time: primer coated 96-well plates
- High throughput: analysis of up to 48 samples (6 samples/plate, one kit includes 8 plates)
- Fast and simple data analysis: osteomiR™ software included to obtain a single fracture-risk score
All osteomiRs™ have carefully been selected based on a series of clinical studies in the context of

- Post-menopausal osteoporosis 1, 2, 4, 5
- Idiopathic male and female osteoporosis 5
- Type-2 diabetic osteopathy 4

The standardized kit results in a specific osteomiR™ signature utilizing 11 osteomiRs™ and 5 controls/sample.

The osteomiR™ software uses a proprietary algorithm to convert the individual microRNA data into a single fracture-risk score for the diagnosis of osteoporosis.

### List of osteomiRs™ included in the osteomiR™ kit

<table>
<thead>
<tr>
<th>microRNA</th>
<th>female postmenopausal OP</th>
<th>male/female idiopathic OP</th>
<th>female type-2 diab. OP</th>
<th>bone formation</th>
<th>bone resorption</th>
<th>tissue / cellular origin</th>
</tr>
</thead>
<tbody>
<tr>
<td>hsa-let-7b-5p</td>
<td>*</td>
<td>*</td>
<td>*</td>
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<td>ubiquitous</td>
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<tr>
<td>hsa-miR-127-3p</td>
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<td>hsa-miR-155-5p</td>
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<td>*</td>
<td></td>
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<td>hematopoietic cells</td>
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<td></td>
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<td>muscle and PBMCs</td>
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</table>

### Key publications

Features and Benefits of the osteomiR™ kit

- Simple and standardized microRNA analysis in serum/plasma
- Determination of fracture risk independent of BMD
- Can be shipped to every lab for rapid setup as validated assay
- Or alternatively, we measure for you: time- and cost-efficient service analysis

Cross-sectional studies:

- osteomiRs™ are significantly up- or down-regulated in serum of patients with osteoporosis defined by one or more fragility fracture (plots are based on data from Kocijan et al. JCEM, 2016)

Multivariate classification models:

Classification models, which consist of 2 or more osteomiRs, have great promise to become robust biomarkers of fracture-risk due to postmenopausal osteoporosis. Below, the diagnostic performances (area-under-the-curve from ROC analysis) of models containing 4 microRNAs compared to a negative control are shown (plot is based on data from Heilmeier et al. JBMR, 2016)

Legend

- AUC, Area under the curve from ROC analysis
- Experimental data, the classification performances of 4-microRNA models using the experimental data
- Permutation control, the classification performances of 4-microRNA models after randomizing (permuting) group labels in the experimental data
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microRNA Biomarkers of Bone Quality

Cross-sectional studies: Multivariate classification models:
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0.0 0.2 0.4 0.6 0.8 1.0

Experimental Data Permutation Control

0.0 0.2 0.4 0.6 0.8 1.0

* * *