



**Figure S1.** Pearson correlation heatmap of selected osteoporotic fracture-related miRNAs and study covariates. Abbreviations: PTH, parathyroid hormone; CTx, beta-C-terminal telopeptide; P1NP, procollagen type 1 N-terminal propeptide.

**Table S1.** The pre-specified panel of selected miRNAs and target genes related to osteoporosis and primary hyperparathyroidism.

MiScript Primer Assay (Catalog #Qiagen)	Description	Gene Symbol	Predicted Target Genes	miRNA Sequence
MIMAT00000 74	mature miRNA	hsa-miR-19b-3p	AR, IGF1, MAPK1, THBS1	5' UGUGCAAAUCCAUGCAAAACUGA
MIMAT00000 76	mature miRNA	hsa-miR-21-5p	ABCB1, IL1B, LRP6, MAPK1 BMP2K, CALCR, CNR1,	5' UAGCUUAUCAGACUGAUGUUGA
MIMAT00000 78	mature miRNA	hsa-miR-23a-3p	ITGA1, LRP5, PTK2B, RUNX2, STAT1, VDR	5' AUCACAUUGCCAGGGAUUUCC
MIMAT00044 96	mature miRNA	hsa-miR-23a-5p	ALPL, PLOD1	5' GGGGUUCCUGGGGAUGGGAUUU
MIMAT00044 97	mature miRNA	hsa-miR-24-2-5p	-	5' UGCCUACUGAGCUGAAACACAG
MIMAT00000 80	mature miRNA	hsa-miR-24-3p	CALCR, IGF1, IL1A, IL1B, MTHFR, PTHLH, SOST, TNF, ADM, CDC73, MEN1, NOS3, SDHAF2 ANKH, BMP2, BMP2K,	5' UGGCUCAGUUCAGCAGGAACAG
MIMAT00000 93	mature miRNA	hsa-miR-93-5p	CD47, CTSK, ESR1, ESR2, ICAM1, PTHLH, TGFB1, PTH	5' CAAAGUGCUGUUCGUGCAGGUAG
MIMAT00000 98	mature miRNA	hsa-miR-100-5p	ESR1, IGF1R	5' AACCCGUAGAUCCGAACUUGUG
MIMAT00004 21	mature miRNA	hsa-miR-122-5p	CA10, IGF1R, MAPK1, RUNX2, TGFB1, VDR	5' UGGAGUGUGACAAUGGUGUUUG
MIMAT00004 22	mature miRNA	hsa-miR-124-3p	AR, BMP2K, COL1A1,	5' UAAGGCACGCGGUGAAUGCC

			FGFBP1, IL6, LRP6, MAPK1, PLOD1, RUNX2, TGFB1, VDR, VKORC1 ANKH, CD44, IGF1R, VDR, <i>SLC26A6</i>	
MIMAT00004 23	mature miRNA	hsa-miR- 125b-5p	CNR1, ESR1, IGF1, KIT, RUNX2	5' UCCCUGAGACCCUAACUUGUGA
MIMAT00002 43	mature miRNA	hsa-miR- 148-3p	CNR1, DKK1, ESR1, IGF1R, KIT, RUNX2	5' UCAGUGCACUACAGAACUUUGU
MIMAT00004 38	mature miRNA	hsa-miR- 152-3p	PLOD1	5' UCAAGAGCAAUAACGAAAAAUGU
MIMAT00007 65	mature miRNA	hsa-miR- 335-5p	KIT, RUNX2	5' UUUGUUCGUUCGGCUCGCGUGA
MIMAT00007 28	mature miRNA	hsa-miR-375	CALCR, <b>COL1A1</b> , SPARC, STAT1, THBS1, VDR	5' CCUCCCACACCCAAGGCUUGCA
MIMAT00047 80	mature miRNA	hsa-miR- 532-3p		

Predicted target genes related to osteoporosis are shown in plain text and predicted target genes related to primary hyperparathyroidism are shown in *italics*. Predicted target genes related to both osteoporosis and primary hyperparathyroidism are shown in **bold**.

**Table S2.** Univariable regression ( $\beta$  coefficient) for the association of log-transformed preoperative miRNAs ( $-\Delta\text{Ct}$ ) and lumbar spine (LS) and femoral neck (FN) bone mineral density (BMD) percent change from baseline (%), 1 year after parathyroidectomy, in PHPT patients.

BMD Percent Change from Baseline (%)	Lumbar Spine		Femur Neck	
	$\beta$ Coefficient	<i>p</i> -Value	$\beta$ Coefficient	<i>p</i> -Value
hsa-miR-19b-3p	0.07	0.929	-0.43	0.786
hsa-miR-21-5p	0.82	0.392	1.16	0.565
hsa-miR-23a-3p	0.55	0.509	0.47	0.788
hsa-miR-23a-5p	2.09	0.147	2.86	0.356
hsa-miR-24-2-5p	0.47	0.495	0.25	0.865
hsa-miR-24-3p	0.43	0.555	0.08	0.961
hsa-miR-93-5p	0.39	0.639	0.5	0.771
hsa-miR-100-5p	0.85	0.326	0.07	0.968
hsa-miR-122-5p	-0.83	0.289	-1.82	0.262
hsa-miR-124-3p	3.22	0.057	0.87	0.821
hsa-miR-125b-5p	1.29	0.289	1.73	0.503
hsa-miR-148-3p	0.58	0.52	0.73	0.701
hsa-miR-152-3p	0.84	0.436	1.52	0.497
hsa-miR-335-5p	1.35	0.192	2.36	0.28
hsa-miR-375	0.24	0.764	-0.66	0.685
hsa-miR-532-3p	0.59	0.545	1.59	0.429

