

Difference in miRNA expression between depressed patients and healthy controls and their association with bone health – an experimental study

Introduction

- Depression is a risk factor for osteoporosis and mechanisms behind the influence of depression on bone health are not fully comprehended^{4,5}
- Molecular changes play a role in the pathways of stress-related disorders such as depression⁴
- miRNAs are non-coding parts of RNA that influence gene expression and used as biomarkers for several diseases^{1,3}
- Aim: determine the five most altered miRNAs in people affected by depression and their association with bone health**

Methods

- A subsample of depressed patients were selected out of a previous study ($n=220$) and additionally $n=14$ healthy controls were recruited in Potsdam, Germany
- 10mL blood per person was drawn into EDTA blood tubes

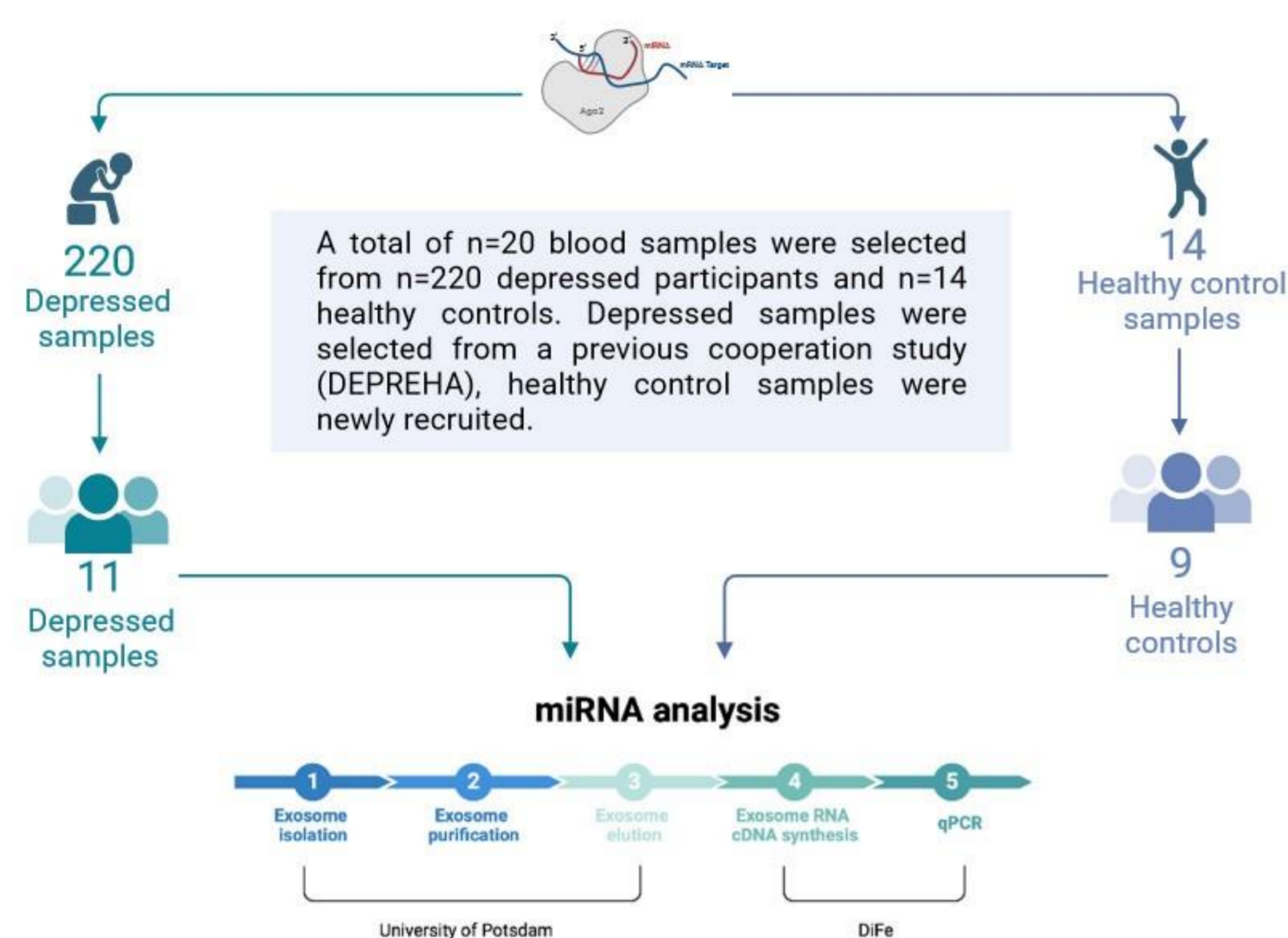


Figure 1. Sample selection and the procedure for miRNA analysis

- miRNA expression was analysed through extracellular vesicle isolation and qPCR analysis, and analysed with qPCR analysis software
- Associations of the five most altered miRNAs with bone health were examined through the miRNA TissueAtlas2.0 from the Saarland University, Germany

Results

- Data of $n=20$ participants: 11 depressed ($M=47\pm 11y$; 64% female) and 9 healthy controls ($M=32\pm 11y$; 56% female) were analysed (Figure 1)
- 380 miRNAs were analysed: 3 were significantly up- and 16 downregulated in the depressed sample compared to the controls (2-fold regulation change; adjusted p -value <0.05 ; Figure 2)
- The five miRNAs with the highest alteration and significance in expression in depressed patients were **miR-106a, miR-24,**

miR-20b, miR-223 and miR-23a, respectively

- All five miRNAs mentioned above were down-regulated.
- miR-106a, miR-20b, miR-223 show exceptionally high expressions in bone tissue compared to other tissues, and play roles in osteogenesis, and osteoclast differentiation, respectively^{2,6,7}

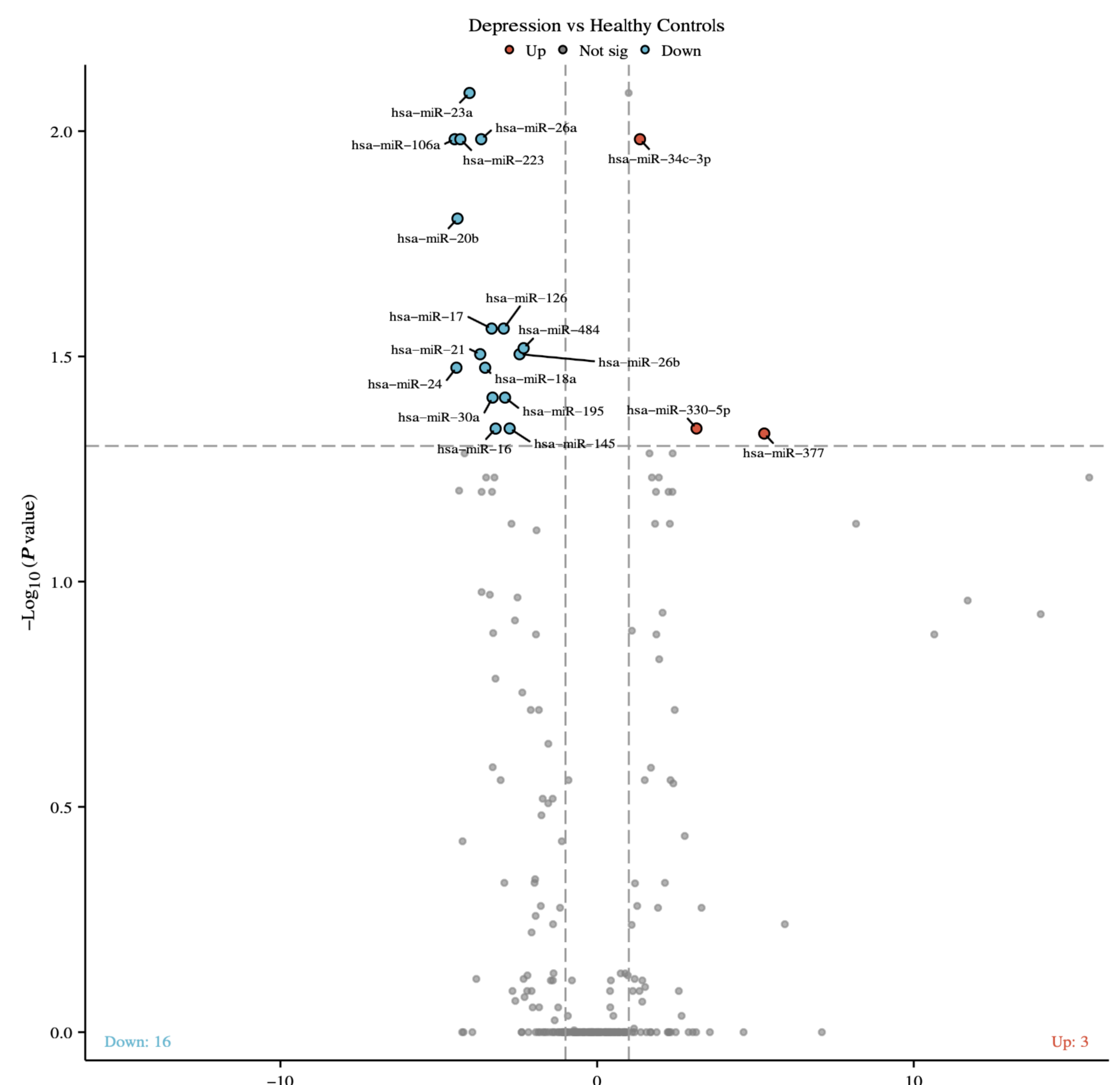


Figure 2. miRNAs with the biggest differences (2-fold regulation change; adjusted p -value <0.05) between the depressed and healthy sample

Discussion

- Various miRNAs show an altered expression in depressed patients and simultaneously play a role in bone metabolism.
- These miRNAs could potentially be used as biomarkers for the influence of depression on bone
- Future analyses should investigate the association of altered miRNAs due to stress-related disorders with bone health in more detail and within a bigger sample to confirm or deny the current findings

Literature

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