Risk-fracture prediction in elderly people based on a microRNA panel

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Introduction:

This study evaluates the "OsteomiR" panel and the "OsteomiR" score in their ability to predict the risk-fracture in elderly people. The «OsteomiR» panel is a miRNA panel composed of 19 miRNAs previously described to be implicated in bone homeostasis where as the «OsteomiR » score is a fracture predictive score based on 10 out of the 19 miRNAs. MicroRNAs (miRNAs) are short non coding RNA sequences implicated in translational repression.

Material and Methods:

People selected for this study were implicated in a long term prospective study called the SarcophAge study. We selected 17 persons which developed a fracture within 3 years after entering the study. The control group is composed of 16 persons that did not fracture in the meantime. Serum was collected at the enrolment in the study. "OsteomiR" panel has been tested through qPCR technique (LighCycler 480 (Roche°)) and the "OsteomiR score" was calculated as design by TamiRNA°.

Results:

	Co (n= 16)	Fx (n= 17)
Demographics		
Sexe (F/M)	14/2	16/1
Age (years)	72,5 ± 5,2	73,8 ± 6,0
Cystatin C (mg/L)	1,1 ± 0,11	1,1 ± 0,18
Bone and muscle status		
Number of fractures	0	1,3 ± 0,6
Osteoporosis	1	1
Osteopenia	12	12
Belgian IOF-FRAX (%)	14,8 ± 9,9	15,0 ± 8,9

Table 1. Clinical characteritics of patients involved in the study

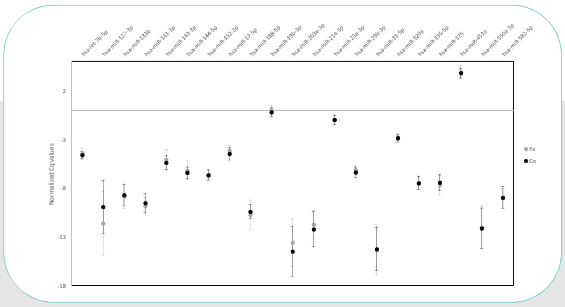


Fig 1. **Results of the « OsteomiR » panel:** Taken separately, none of the 19 miRNAs harbored a statistically significant difference.

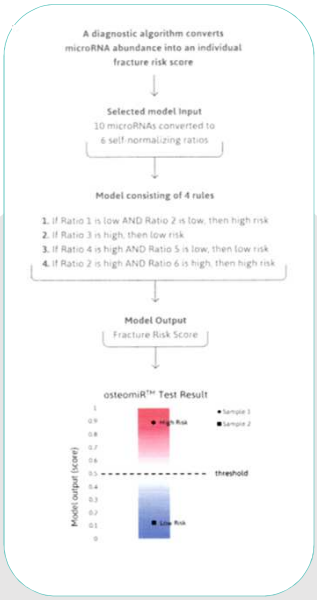


Fig 2. **« OsteomiR » score** is based on 10 miRNAs leading to 6 ratios that calculates a numeric value. Threshold was defined as mean between the two extreme values.

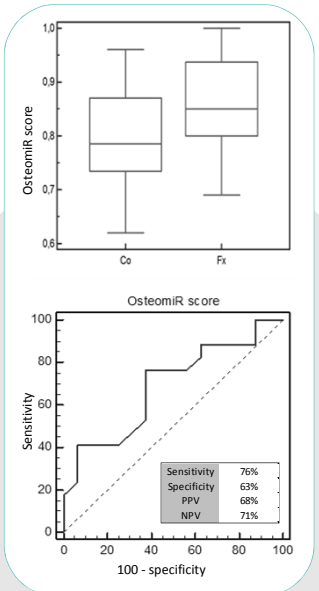


Fig 3. **« OsteomiR » score results and ROC curve:** OsteomiR score is in fracture group.

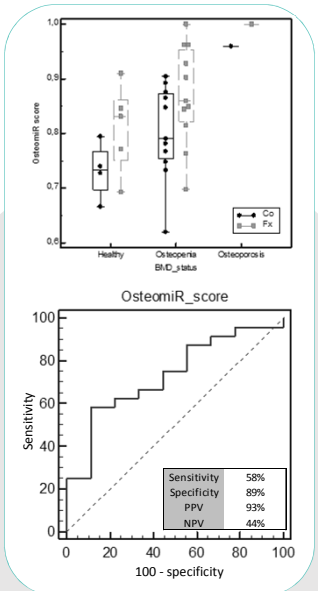
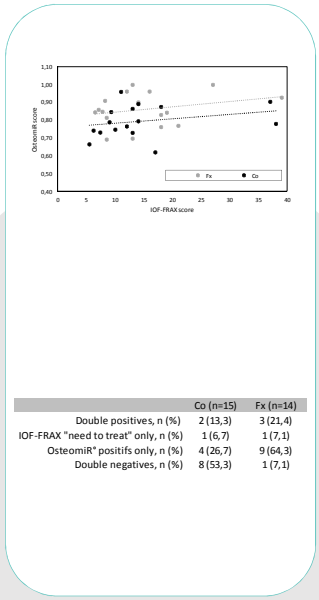


Fig 4. **« Osteomir » score when cohort is classified according BMD status:** OsteomiR score is linked to BMD status



	Co (n=15)	Fx (n=14)
Double positives, n (%)	2 (13,3)	3 (21,4)
IOF-FRAX "need to treat" only, n (%)	1 (6,7)	1 (7,1)
OsteomiR° positifs only, n (%)	4 (26,7)	9 (64,3)
Double negatives, n (%)	8 (53,3)	1 (7,1)

Fig 5. **« Osteomir » score compared to IOF-FRAX thresholds:** OsteomiR score predicts more fracture events

Conclusions:

This study shows promising data on the discriminatory potential of the OsteomiR° score and the existence of a miRNA-fracture-signature that reflects bone homeostasis impairment several years before the occurrence of a fracture. Further studies should be dedicated to define the place in the diagnostic scheme of the OsteomiR° score, alone or in combination with the IOF-FRAX algorithm