

**Supplementary material for  
Ingwersen *et al.*: Natalizumab restores impaired miRNA expression profile  
in multiple sclerosis and reveals a critical role for miR-20b**

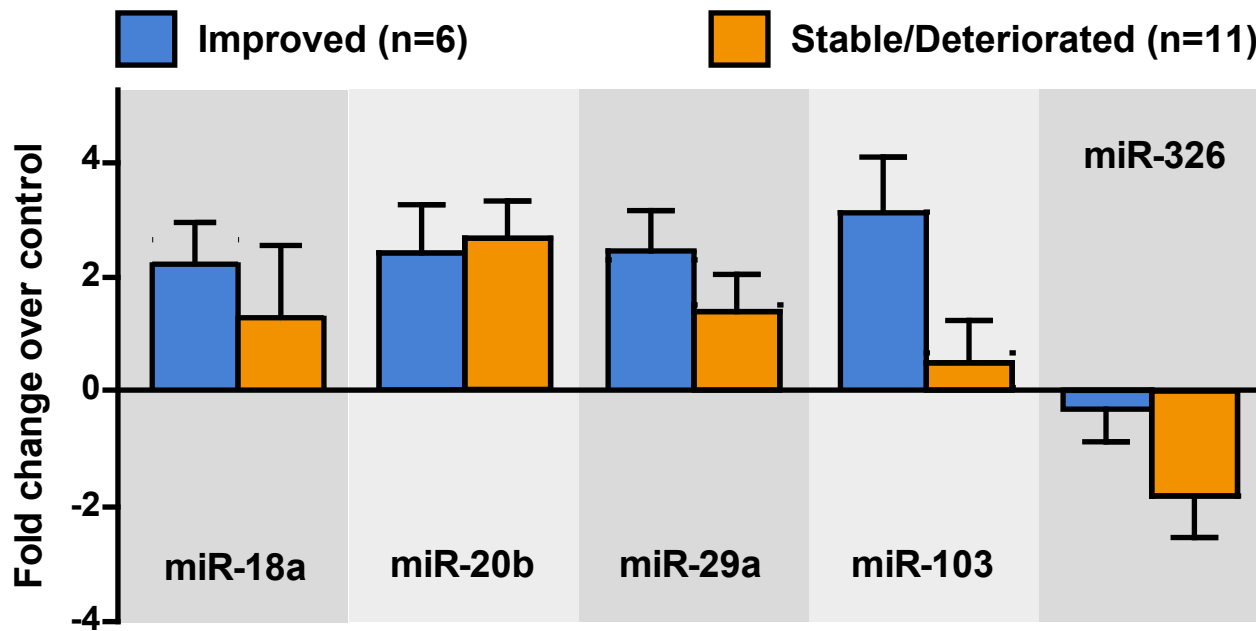
**Supplementary methods**

**MicroRNA microarray: further details**

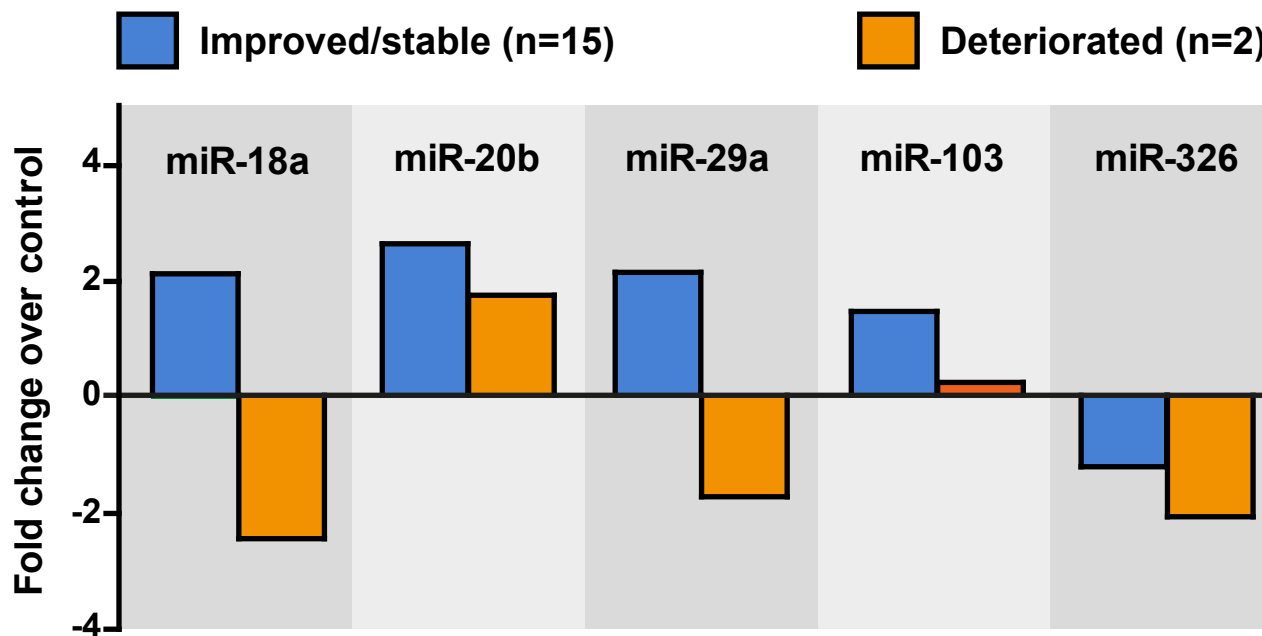
Following hybridization for 16 hours at 42°C, the biochip was washed automatically and subjected to signal detection with the GRTA. The resulting detection pictures were evaluated with Geniom Wizard software. For each array, the median signal intensity was extracted from the raw data file, such that for each miRNA, seven intensity values were calculated corresponding to each replicate copy of the miRBase on the array. Following background correction, the seven replicate intensity values of each miRNA were summarized according to their median value. To normalize the data across different arrays, quantile normalization was applied, and all further analyses were carried out using the normalized and background-subtracted intensity values.

# Supplementary Figure 1

## A

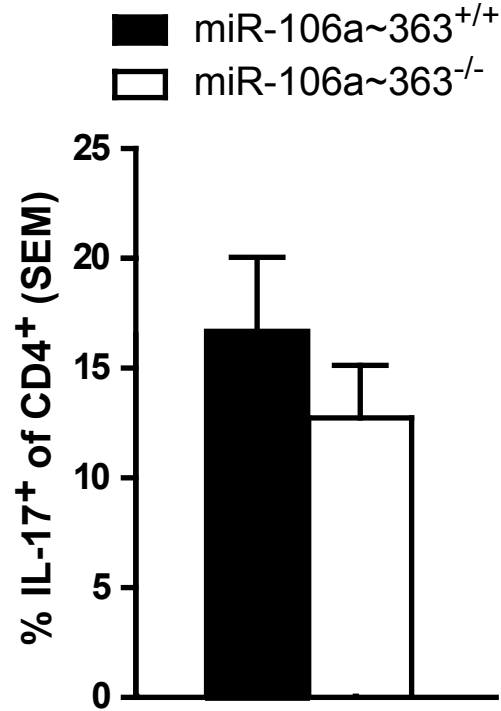


## B



Disease response analysis. Shown are ratios of quantitative PCR expression levels of selected miRNAs from patients before (baseline) and during natalizumab therapy. A) Comparison of patients that improved in EDSS (n=6) and that were stable or deteriorated (n=11). B) Comparison of patients that improved or were stable (n=15) and that deteriorated (n=2). See also supplementary table 1.

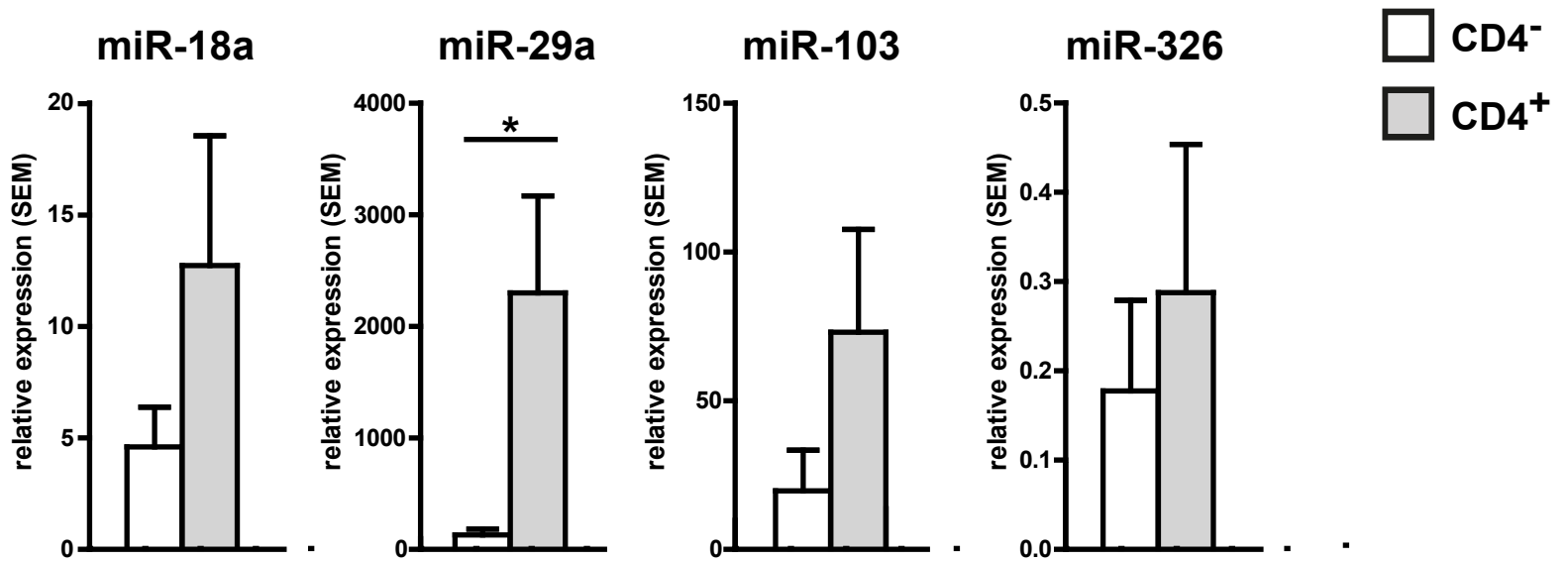
## Supplementary Figure 2



Magnetic bead isolated mouse CD4<sup>+</sup> cells were incubated with anti-CD3-antibody (1µg/ml), IL-6 (20ng/ml) and TGF-beta (2ng/ml) for 4 days in the presence of irradiated APC. Analysis was performed using BD Leukocyte Activation Cocktail, intracellular staining using BD Cytofix/Cytoperm buffers (Becton Dickinson) and subsequent FACS analysis. Pooled data from 4 experiments (each n=5/per group).

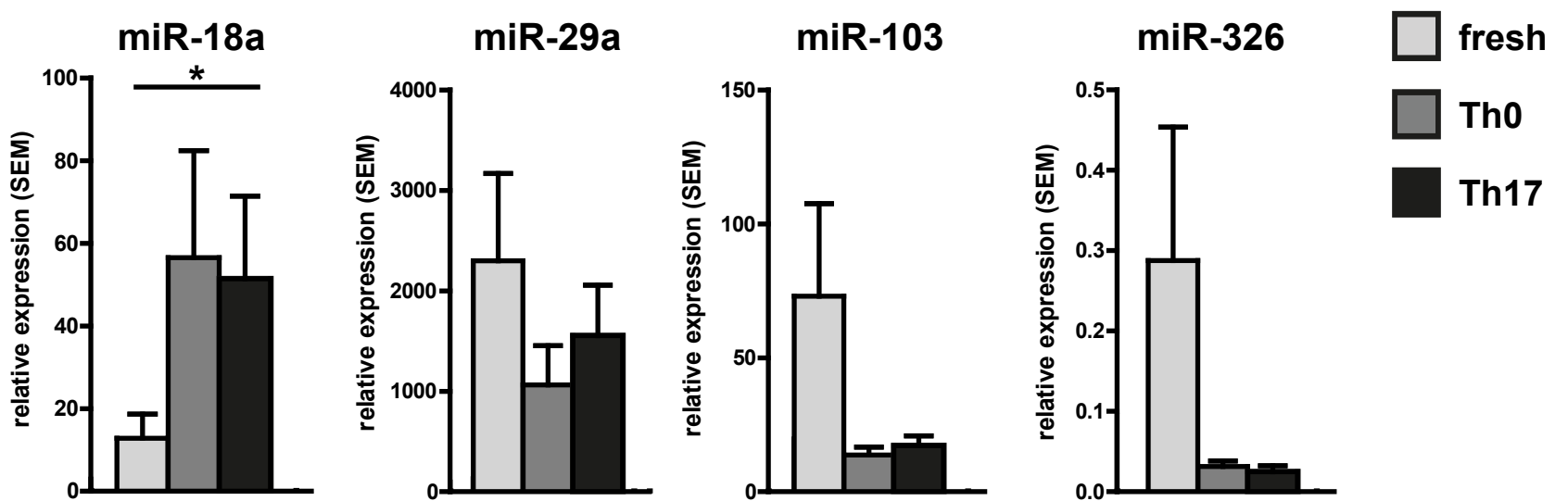
## Supplementary Figure 3

### A



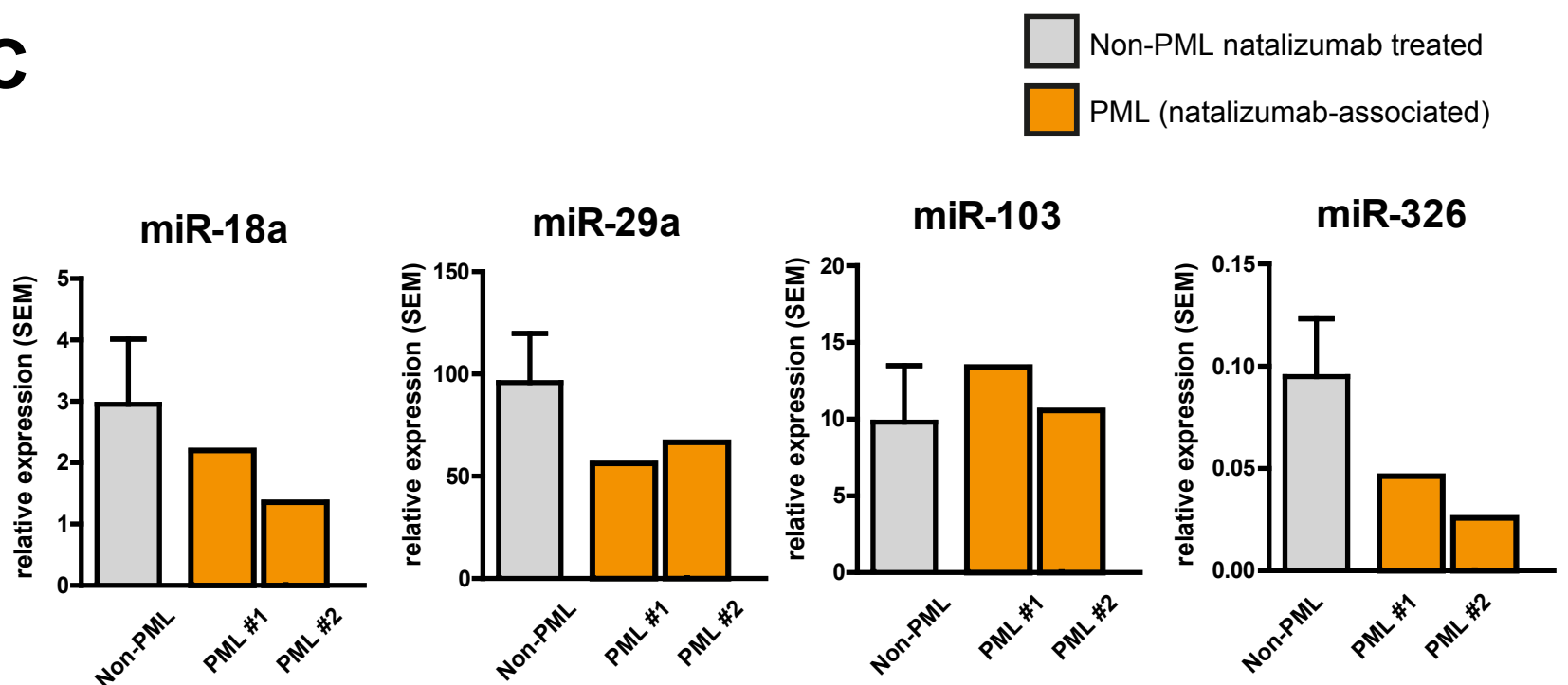
PBMC were isolated using a ficoll gradient and CD4<sup>+</sup> T cells were sorted with magnetic beads (n=9). miRNA expression was measured in CD4<sup>+</sup> cells and CD4<sup>-</sup> PBMC by qPCR. Significance was calculated using *t* test.

### B



PBMC were isolated using a ficoll gradient and CD4<sup>+</sup> T cells were sorted with magnetic beads (n=9). miRNA expression was measured in freshly isolated CD4<sup>+</sup> cells ("fresh"), CD4<sup>+</sup> cells that were activated by plate-bound anti-CD3-antibody and soluble anti-CD28-antibody without further cytokines, (termed "Th0") and with IL-1 (10ng/ml), IL-6 (10ng/ml), IL23 (10ng/ml) and TGB-beta (5ng/ml), termed "Th17") by qPCR. Significance was calculated using *t* test.

### C



miRNA levels in PBMC from natalizumab treated patients (n=9, left bar) were compared to two PBMC samples from patients with natalizumab-associated PML (each patient one bar). Due to small sample size statistical tests were not performed.

**Supplementary Table 1:****Demographical and clinical data for the longitudinal study population.**

Patient No	Disease Type	Age	Gender	Disease duration (months)	EDSS before Nat	EDSS after Nat	Relapses during Nat	Duration of Nat Treatment (months)
1	RRMS	33	F	62	1	1	0	17
2	RRMS	31	F	120	1	1	0	16
3	RRMS	36	F	81	2	2	0	14
4	RRMS	46	M	84	3.5	2.5	0	20
5	RRMS	34	F	192	2	1.5	0	20
6	RRMS	50	F	33	1	1	0	14
7	RRMS	30	M	120	2.5	4	1	20
8	RRMS	42	M	21	3	3	0	16
9	RRMS	45	F	78	3	3	3	18
10	RRMS	30	M	23	2	2	0	18
11	RRMS	49	F	312	3.5	3.5	0	17
12	RRMS	33	F	132	2	2	0	17
13	RRMS	29	F	108	2	1	0	12
14	RRMS	41	F	36	2	0	0	22
15	RRMS	26	F	24	2	1	0	12
16	RRMS	31	F	72	6.5	6.5	0	12
17	RRMS	31	F	24	2.5	1	0	21

RRMS: relapsing-remitting multiple sclerosis; EDSS: expanded disability status score; Nat: natalizumab treatment.

**Supplementary Table 2:**

**Data from the miRNA microarray of MS baseline samples vs. healthy control samples:**

**Downregulated miRNAs with p values < 0.05 (corrected p value, limma pval) were sorted by p value.**

miRNA	Healthy controls median (log2)	MS prior to treatment median (log2)	Absolute fold change median [MS vs. healthy control] (log2)	ttest rawp	ttest adjp	limma rawp	limma adjp
miR-18a	11.24	9.20	-2.04	1.28E-03	1.85E-02	1.88E-09	7.99E-07
miR-18b	9.06	7.33	-1.73	2.40E-03	2.58E-02	6.63E-09	1.45E-06
miR-378	8.47	7.10	-1.37	1.07E-03	1.76E-02	1.56E-08	2.64E-06
miR-98	5.58	3.46	-2.12	1.86E-02	8.07E-02	6.90E-08	6.51E-06
miR-320a	14.01	12.49	-1.52	1.65E-05	3.00E-03	1.49E-07	1.20E-05
let-7c	9.35	5.69	-3.66	1.30E-02	6.51E-02	2.08E-07	1.47E-05
let-7i	10.12	6.05	-4.07	5.80E-03	4.20E-02	3.84E-07	2.33E-05
miR-144	11.95	9.66	-2.29	3.94E-05	3.00E-03	4.45E-07	2.52E-05
miR-337-3p	5.37	4.16	-1.21	1.50E-03	1.98E-02	5.66E-07	3.00E-05
let-7b	10.56	7.99	-2.57	1.15E-02	6.27E-02	7.94E-07	3.96E-05
miR-144*	9.71	8.28	-1.43	1.89E-04	6.98E-03	1.31E-06	5.05E-05
miR-101	9.66	8.06	-1.6	1.13E-03	1.76E-02	1.63E-06	6.00E-05
miR-9	4.85	3.57	-1.28	1.16E-03	1.76E-02	1.71E-06	6.04E-05
let-7f	9.70	6.39	-3.31	7.28E-03	4.77E-02	2.15E-06	7.28E-05
miR-221	7.17	5.92	-1.25	2.78E-03	2.84E-02	2.24E-06	7.31E-05
miR-106b	14.10	12.85	-1.25	3.05E-05	3.00E-03	3.36E-06	1.02E-04
miR-30e	8.35	6.52	-1.83	1.97E-02	8.31E-02	3.68E-06	1.08E-04
miR-210	10.01	8.68	-1.33	2.29E-03	2.53E-02	3.90E-06	1.10E-04
miR-758	5.94	4.41	-1.53	2.97E-02	1.06E-01	6.28E-06	1.72E-04
miR-24	11.61	9.96	-1.65	1.16E-03	1.76E-02	7.64E-06	2.02E-04
miR-454	8.13	6.87	-1.26	4.10E-03	3.45E-02	7.95E-06	2.04E-04

miR-320d	9.82	8.29	-1.53	4.24E-05	3.00E-03	9.24E-06	2.24E-04
miR-30a	8.73	6.94	-1.79	3.99E-03	3.42E-02	1.19E-05	2.80E-04
let-7d	11.62	10.12	-1.5	6.37E-03	4.39E-02	1.36E-05	3.11E-04
miR-429	6.33	5.07	-1.26	3.78E-04	1.09E-02	1.47E-05	3.12E-04
let-7g	9.20	5.92	-3.28	1.17E-02	6.32E-02	1.60E-05	3.21E-04
miR-302d	4.55	3.73	-0.82	3.20E-04	1.05E-02	3.77E-05	6.40E-04
miR-29c	8.86	7.31	-1.55	1.06E-02	6.05E-02	3.99E-05	6.51E-04
miR-320b	11.63	10.31	-1.32	3.66E-03	3.33E-02	4.83E-05	7.06E-04
miR-26a-2*	4.42	3.46	-0.96	4.79E-04	1.23E-02	5.05E-05	7.25E-04
miR-582-3p	6.92	6.03	-0.89	7.50E-05	4.79E-03	5.26E-05	7.31E-04
miR-323-3p	5.91	4.77	-1.14	5.92E-03	4.20E-02	5.98E-05	8.19E-04
miR-744	10.01	9.01	-1	8.46E-04	1.66E-02	6.11E-05	8.23E-04
miR-720	12.30	10.87	-1.43	6.00E-03	4.20E-02	6.32E-05	8.31E-04
miR-652	10.68	9.65	-1.03	1.34E-02	6.55E-02	6.37E-05	8.31E-04
miR-20b	12.46	11.27	-1.19	2.18E-03	2.53E-02	8.01E-05	1.01E-03
miR-17*	9.92	9.14	-0.78	1.13E-03	1.76E-02	8.97E-05	1.12E-03
miR-532-5p	8.61	7.22	-1.39	7.01E-03	4.64E-02	9.39E-05	1.15E-03
miR-25	12.85	11.33	-1.52	1.22E-02	6.44E-02	9.87E-05	1.20E-03
miR-374a	8.51	7.15	-1.36	1.92E-03	2.29E-02	1.05E-04	1.25E-03
miR-148b	9.67	8.67	-1	1.15E-04	6.07E-03	1.13E-04	1.29E-03
miR-146a	7.68	6.77	-0.91	6.92E-03	4.62E-02	1.10E-04	1.29E-03
miR-29b	8.51	7.66	-0.85	1.34E-03	1.85E-02	1.28E-04	1.42E-03
miR-423-5p	11.84	10.81	-1.03	1.87E-03	2.27E-02	1.39E-04	1.54E-03
miR-30e*	6.17	5.08	-1.09	9.18E-03	5.41E-02	1.52E-04	1.63E-03
miR-92a	13.70	12.76	-0.94	3.88E-02	1.23E-01	1.60E-04	1.70E-03
miR-1288	6.87	5.95	-0.92	6.85E-04	1.46E-02	1.65E-04	1.73E-03
miR-1290	4.64	3.67	-0.97	1.31E-03	1.85E-02	2.01E-04	2.00E-03
miR-19a	10.95	9.99	-0.96	6.61E-03	4.47E-02	2.34E-04	2.28E-03

miR-142-5p	9.70	8.18	-1.52	1.33E-02	6.55E-02	2.94E-04	2.74E-03
miR-185	14.96	13.56	-1.4	1.58E-02	7.27E-02	4.20E-04	3.64E-03
let-7e	7.53	5.89	-1.64	2.30E-02	9.25E-02	4.92E-04	4.22E-03
miR-335*	4.69	3.56	-1.13	1.41E-01	2.81E-01	5.93E-04	4.93E-03
miR-151-5p	12.41	11.34	-1.07	3.40E-02	1.15E-01	6.24E-04	5.04E-03
miR-331-5p	5.64	4.82	-0.82	4.44E-01	6.01E-01	6.33E-04	5.04E-03
miR-93	12.47	11.51	-0.96	1.10E-02	6.10E-02	7.15E-04	5.56E-03
miR-106a	13.45	12.29	-1.16	2.37E-03	2.58E-02	7.51E-04	5.69E-03
miR-126	11.56	10.03	-1.53	1.10E-02	6.10E-02	8.49E-04	6.20E-03
miR-340	7.89	6.86	-1.03	1.35E-03	1.85E-02	8.42E-04	6.20E-03
miR-320c	9.48	8.57	-0.91	1.26E-02	6.51E-02	1.02E-03	7.30E-03
miR-1908	10.40	8.59	-1.81	4.48E-03	3.58E-02	1.10E-03	7.68E-03
miR-21	9.87	8.45	-1.42	1.98E-02	8.32E-02	1.13E-03	7.81E-03
miR-130a	10.23	9.25	-0.98	5.12E-02	1.50E-01	1.40E-03	9.40E-03
miR-655	5.93	5.09	-0.84	3.46E-03	3.23E-02	1.47E-03	9.75E-03
miR-205	6.20	5.47	-0.73	1.29E-02	6.51E-02	1.60E-03	1.05E-02
miR-29a*	4.65	3.59	-1.06	1.77E-01	3.31E-01	1.62E-03	1.05E-02
miR-484	12.84	11.67	-1.17	5.44E-02	1.54E-01	1.66E-03	1.06E-02
miR-20a	12.89	11.83	-1.06	5.72E-03	4.20E-02	1.69E-03	1.08E-02
miR-29b-2*	6.02	5.13	-0.89	1.86E-02	8.07E-02	1.75E-03	1.10E-02
miR-223	10.50	8.81	-1.69	1.53E-01	2.98E-01	1.78E-03	1.11E-02
miR-103	13.09	12.29	-0.8	2.70E-02	9.95E-02	1.79E-03	1.11E-02
miR-215	8.65	7.46	-1.19	4.42E-02	1.36E-01	2.40E-03	1.44E-02
miR-30c-1*	6.31	5.26	-1.05	4.62E-03	3.66E-02	2.44E-03	1.45E-02
miR-1243	6.35	5.61	-0.74	1.10E-02	6.10E-02	2.71E-03	1.56E-02
miR-196b	4.11	3.02	-1.09	9.00E-01	9.48E-01	2.82E-03	1.60E-02
miR-548n	5.57	4.71	-0.86	1.29E-02	6.51E-02	3.60E-03	1.97E-02
miR-125b	9.34	8.17	-1.17	3.08E-01	4.74E-01	3.72E-03	2.02E-02



miR-181a	9.71	8.49	-1.22	1.51E-02	7.16E-02	4.16E-03	2.19E-02
miR-29a	9.38	8.34	-1.04	3.28E-02	1.12E-01	4.59E-03	2.37E-02
let-7a	10.24	8.57	-1.67	1.29E-02	6.51E-02	4.73E-03	2.40E-02
miR-409-3p	5.69	4.46	-1.23	3.49E-01	5.09E-01	4.94E-03	2.47E-02
miR-502-5p	5.03	3.72	-1.31	1.09E-01	2.44E-01	5.61E-03	2.73E-02
miR-374b	8.99	8.19	-0.8	2.96E-02	1.06E-01	5.68E-03	2.74E-02
miR-146a*	6.95	6.06	-0.89	9.57E-03	5.56E-02	5.82E-03	2.77E-02
miR-643	6.35	5.52	-0.83	9.51E-04	1.75E-02	6.68E-03	3.06E-02
miR-23b	11.65	10.50	-1.15	2.06E-01	3.62E-01	7.00E-03	3.13E-02
miR-199b-3p	7.37	6.54	-0.83	2.73E-03	2.84E-02	7.53E-03	3.34E-02
miR-149*	9.49	8.31	-1.18	1.72E-02	7.76E-02	9.41E-03	3.83E-02
miR-22	12.71	11.85	-0.86	5.38E-02	1.53E-01	9.75E-03	3.92E-02
miR-632	5.29	4.40	-0.89	2.14E-01	3.69E-01	9.99E-03	4.00E-02
miR-19b	13.48	12.31	-1.17	1.24E-01	2.61E-01	1.01E-02	4.01E-02
miR-664	7.73	6.77	-0.96	1.99E-01	3.56E-01	1.02E-02	4.02E-02
miR-135a*	4.80	3.93	-0.87	3.98E-02	1.26E-01	1.30E-02	4.91E-02

**Supplementary Table 3**

Data from the miRNA microarray of MS baseline samples vs. healthy control samples:

Upregulated miRNAs with p values < 0.05 (corrected p value, limma pval) were sorted by p value.

miRNA	Healthy controls median (log2)	MS prior to treatment median (log2)	Absolute fold change median [MS vs. healthy control] (log2)	ttest rawp	ttest adjp	limma rawp	limma adjp
miR-1914	5.02	6.74	1.72	2.50E-07	1.06E-04	4.90E-10	4.15E-07
miR-485-5p	5.40	6.74	1.34	3.21E-08	2.73E-05	6.85E-09	1.45E-06
miR-608	5.98	8.39	2.41	4.24E-05	3.00E-03	2.05E-08	2.89E-06
miR-185*	4.40	6.73	2.33	9.54E-03	5.56E-02	6.67E-08	6.51E-06
miR-1183	6.57	8.33	1.76	1.48E-04	6.76E-03	6.46E-08	6.51E-06
miR-30b*	4.50	6.31	1.81	9.66E-05	5.46E-03	1.55E-07	1.20E-05
miR-323-5p	5.28	6.82	1.54	2.23E-04	7.87E-03	2.28E-07	1.49E-05
miR-224	4.71	6.47	1.76	5.75E-04	1.43E-02	8.50E-07	4.00E-05
miR-623	5.54	6.97	1.43	5.25E-06	1.49E-03	9.80E-07	4.37E-05
miR-1250	5.31	6.81	1.50	1.72E-04	6.93E-03	1.14E-06	4.81E-05
miR-551b	5.57	7.28	1.71	2.26E-05	3.00E-03	1.27E-06	5.05E-05
miR-1268	8.35	10.07	1.72	3.86E-04	1.09E-02	3.36E-06	1.02E-04
miR-577	4.81	6.08	1.27	1.80E-04	6.95E-03	9.11E-06	2.24E-04
miR-595	6.97	8.37	1.40	1.09E-03	1.76E-02	1.40E-05	3.12E-04
miR-651	3.96	5.40	1.44	1.02E-03	1.76E-02	1.47E-05	3.12E-04
miR-613	4.09	5.69	1.60	6.42E-03	4.39E-02	1.68E-05	3.21E-04
miR-644	4.47	5.75	1.28	1.32E-03	1.85E-02	1.58E-05	3.21E-04
miR-1265	4.38	5.46	1.08	1.32E-02	6.55E-02	1.67E-05	3.21E-04
miR-551a	5.75	6.77	1.02	4.20E-05	3.00E-03	1.71E-05	3.21E-04
miR-139-3p	6.24	7.31	1.07	3.29E-05	3.00E-03	1.94E-05	3.58E-04
miR-146b-3p	5.42	6.67	1.25	2.32E-04	7.88E-03	2.30E-05	4.15E-04

miR-1204	4.43	6.00	1.57	1.60E-03	2.07E-02	3.00E-05	5.30E-04
miR-371-5p	5.25	6.32	1.07	6.17E-04	1.46E-02	3.10E-05	5.36E-04
miR-1306	4.85	6.03	1.18	2.25E-03	2.53E-02	3.99E-05	6.51E-04
miR-99b	7.18	8.11	0.93	4.09E-04	1.09E-02	4.42E-05	6.95E-04
miR-92a-2*	4.26	5.51	1.25	3.22E-03	3.13E-02	4.76E-05	7.06E-04
miR-1299	4.71	5.65	0.94	8.60E-04	1.66E-02	4.74E-05	7.06E-04
miR-1255a	5.80	6.72	0.92	1.29E-04	6.45E-03	4.75E-05	7.06E-04
miR-611	6.43	7.39	0.96	1.52E-04	6.76E-03	7.77E-05	9.98E-04
miR-1538	6.20	7.26	1.06	1.69E-03	2.13E-02	1.13E-04	1.29E-03
miR-361-3p	7.18	8.34	1.16	7.39E-04	1.53E-02	1.20E-04	1.36E-03
miR-641	5.94	6.76	0.82	7.91E-05	4.79E-03	1.50E-04	1.63E-03
miR-1246	4.07	5.03	0.96	8.27E-03	5.11E-02	1.67E-04	1.73E-03
miR-888*	5.39	6.51	1.12	1.13E-03	1.76E-02	1.88E-04	1.92E-03
miR-1185	4.76	5.55	0.79	4.18E-03	3.45E-02	1.94E-04	1.96E-03
miR-95	4.90	5.75	0.85	2.06E-03	2.42E-02	2.10E-04	2.07E-03
miR-99a*	5.24	6.27	1.03	1.39E-02	6.75E-02	2.69E-04	2.58E-03
miR-626	5.24	6.24	1.00	1.64E-04	6.93E-03	2.70E-04	2.58E-03
miR-770-5p	5.64	6.58	0.94	6.88E-04	1.46E-02	2.80E-04	2.64E-03
miR-195*	5.88	6.75	0.87	1.31E-03	1.85E-02	3.26E-04	2.94E-03
miR-766	8.58	9.31	0.73	4.90E-03	3.81E-02	3.42E-04	3.05E-03
miR-593	4.23	4.94	0.71	4.26E-03	3.48E-02	3.73E-04	3.30E-03
miR-1294	4.29	5.16	0.87	1.25E-02	6.51E-02	4.19E-04	3.64E-03
miR-105	5.53	6.68	1.15	6.75E-04	1.46E-02	5.09E-04	4.32E-03
miR-184	4.69	5.81	1.12	3.58E-04	1.09E-02	5.67E-04	4.76E-03
miR-1273	6.67	7.62	0.95	6.35E-04	1.46E-02	6.08E-04	5.00E-03
miR-140-5p	4.71	5.58	0.87	4.19E-03	3.45E-02	6.16E-04	5.02E-03
miR-432	4.08	5.04	0.96	5.88E-03	4.20E-02	6.36E-04	5.04E-03
miR-657	6.04	6.81	0.77	7.99E-04	1.61E-02	6.48E-04	5.08E-03

miR-212	5.82	6.87	1.05	1.15E-03	1.76E-02	7.24E-04	5.58E-03
miR-876-3p	4.32	5.02	0.70	1.54E-02	7.18E-02	8.22E-04	6.12E-03
miR-548c-5p	4.59	5.55	0.96	5.26E-03	3.98E-02	9.68E-04	7.01E-03
miR-369-5p	5.12	5.92	0.80	3.97E-03	3.42E-02	1.13E-03	7.81E-03
miR-1182	4.64	5.75	1.11	6.65E-03	4.47E-02	1.63E-03	1.05E-02
miR-134	5.69	6.59	0.90	5.15E-03	3.93E-02	1.74E-03	1.10E-02
miR-516a-3p	4.77	5.80	1.03	3.69E-03	3.33E-02	1.86E-03	1.14E-02
miR-1269	5.63	6.35	0.72	7.31E-03	4.77E-02	2.06E-03	1.26E-02
miR-628-5p	6.08	7.09	1.01	4.10E-04	1.09E-02	2.13E-03	1.29E-02
miR-135b*	5.82	6.63	0.81	1.77E-03	2.18E-02	2.55E-03	1.49E-02
miR-1295	6.97	7.74	0.77	8.80E-04	1.66E-02	2.75E-03	1.56E-02
miR-1249	5.90	7.19	1.29	1.87E-02	8.07E-02	3.94E-03	2.10E-02
miR-521	5.56	6.37	0.81	1.53E-02	7.16E-02	3.97E-03	2.10E-02
miR-612	6.32	7.18	0.86	8.22E-03	5.11E-02	5.93E-03	2.80E-02
miR-610	5.54	6.30	0.76	3.32E-03	3.16E-02	6.18E-03	2.89E-02
miR-219-5p	5.42	6.16	0.74	3.27E-02	1.12E-01	6.95E-03	3.12E-02
miR-337-5p	5.64	6.34	0.70	7.97E-03	5.05E-02	6.91E-03	3.12E-02
miR-891a	6.83	7.66	0.83	3.21E-03	3.13E-02	8.28E-03	3.55E-02
let-7f-1*	4.69	5.50	0.81	1.53E-02	7.16E-02	8.80E-03	3.69E-02
miR-875-3p	5.58	6.34	0.76	4.76E-02	1.43E-01	9.15E-03	3.77E-02
miR-639	5.93	6.84	0.91	3.87E-02	1.23E-01	1.08E-02	4.18E-02

**Supplementary Table 4**

Data show computationally predicted targets of miR-20b (mirSVR scoring regression method by the [www.microRNA.org](http://www.microRNA.org) information resource)

mir SVR score: < -0.1		
<i>Gene</i>	<i>RefSeqID</i>	miR-20b
<i>Stat3</i>	<i>NM_139276</i>	143, 436
<i>Rorc (RORgT)</i>	<i>NM_005060</i>	702
<i>Vegfa</i>	<i>NM_001025366</i>	164
<i>Il1b</i>	<i>NM_000576</i>	0
<i>Il6</i>	<i>NM_000600</i>	0
<i>Ifng</i>	<i>NM_000619</i>	0
<i>Csf2 (GM-CSF)</i>	<i>NM_000758</i>	0

Position	Predicted
0	Not predicted

**Supplementary Table 5**

Data show analysis of promoters of miRNA targets with regard to regulation by  $\alpha 4\beta 1$ -receptor engagement investigated by the Transfac<sup>®</sup>-based P-Match tool ([www.gene-regulation.com](http://www.gene-regulation.com)) for transcription factor binding site search by combining patterns and weight matrices

MiR-18a (Chr13)			Mir-20b (ChrX)			Mir-29a (Chr7)			MiR-103 (Chr5)			MiR-326 (Chr11)		
Factor Name	Position	Strand	Factor Name	Position	Strand	Factor Name	Position	Strand	Factor Name	Position	Strand	Factor Name	Position	Strand
c-Rel	4461	(+)	c-Rel	4603	(+)	ARP-1	4690	(+)	c-Rel	2819	(+)	Coup-TF/HNF	4460	(-)
c-Rel	4452	(+)	c-Rel	4288	(-)	Elk-1	4566	(+)	Evi-1	4482	(-)	c-Rel	3001	(-)
c-Rel	1466	(-)	c-Rel	2627	(+)	Elk-1	453	(+)	Evi-1	2607	(+)	c-Rel	3000	(-)
Evi-1	4851	(+)	c-Rel	2626	(+)	Evi-1	4232	(-)	Evi-1	2604	(-)	c-Rel	1777	(-)
Evi-1	4795	(-)	E2F	3795	(+)	Evi-1	1955	(+)	Evi-1	1801	(+)	c-Rel	782	(-)
Evi-1	552	(-)	E2F	2719	(+)	Evi-1	338	(+)	Evi-1	1186	(-)	Evi-1	3577	(+)
Evi-1	217	(+)	E2F	2133	(-)	HLF	1912	(+)	HLF	4403	(+)	Evi-1	1901	(+)
NF-kB	4451	(+)	Evi-1	1093	(-)	Myogenin/NF-1	116	(-)	NKx2-5	2489	(-)	IRF-1/IRF-2	4200	(+)
NF-kB(p65)	4452	(+)	Evi-1	359	(-)	NF-kB	65	(-)	STATx	1768	(-)	NF-kB	3249	(-)
NKx2-5	4473	(-)	Evi-1	223	(-)	NKx2-5	3563	(-)				NF-kB	782	(-)
STATx	4464	(-)	NF-kB(p50)	2730	(+)	NKx2-5	1675	(-)				NF-kB(p50)	3001	(-)
STATx	1582	(-)	NKx2-5	4318	(-)							NF-kB(p65)	3001	(-)
			NKx2-5	282	(+)									

	NF-kB family
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