Neoadjuvant chemotherapy in breast cancer patients induces expression of tumor suppressor miR-34a

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Circulating microRNAs (miRNAs) are extensively studied in cancer as biomarkers but little is known about the influence of anti-cancer drugs on their expression. In this presentation, we describe the modifications of circulating miRNAs profile under neoadjuvant chemotherapy (NAC) for breast cancer.

Methods and results

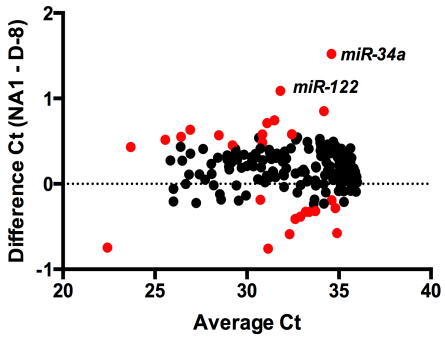

Figure 1. Bland-Altman plot of the variations of circulating miRNAs at the end of the NAC. Expression of 188 circulating miRNAs was determined by RT-qPCR in 25 patients before and after NAC. Relative expression is normalized to the 50 most expressed miRNAs.

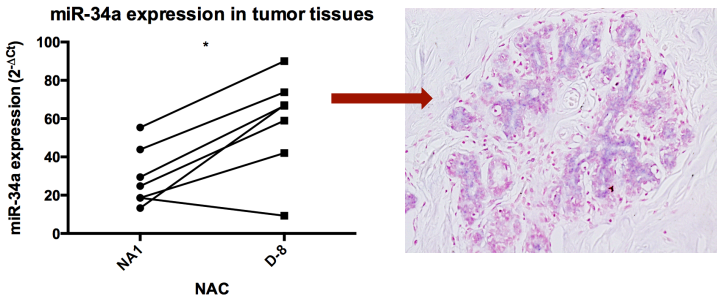

Figure 2. Expression of miR-34a was determined by RT-qPCR and in-situ hybridization in the tumor tissue of 7 patients with partial pathological response (pPR) to NAC. Relative expression is normalized to RNU 44, RNU 48 and cel-miR-39.

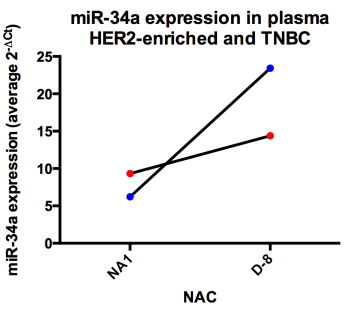

Figure 3. Comparisons of circulating miR-34a in NAC treated patients with pathological complete response (pCR, *n* = 5, in red) and pPR (*n* = 6, in blue).

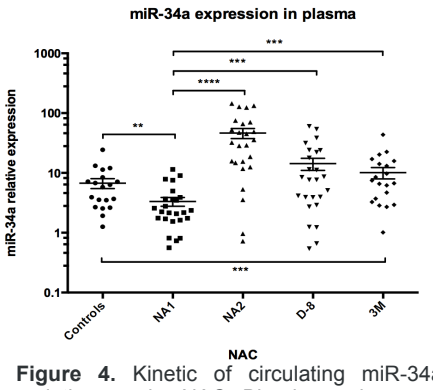

Figure 4. Kinetic of circulating miR-34a variations under NAC. Blood samples were withdrawn before therapies (NA1), after 1 or 2 cycles of anthracycline (NA2), 1 week before surgery (D-8) and 3 months after surgery (3M). Data are expressed as mean ± SEM.

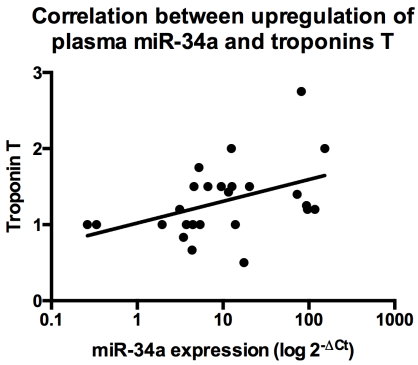

Figure 5. Pearson and Spearman correlation between between fold-change (NA1 *vs.* NA2) of miR-34a and troponins T ($p < 0.05$, $r = 0.4673$, $n = 25$) in plasma of patients with NAC.

Conclusions

NAC induces expression of miR-34a in plasma and tumor tissue, which could be a predictive marker of response to NAC in aggressive tumors. Moreover, chemo-induced miR-34a may be involved in anti-tumor effect and cardiotoxicity of chemotherapy agents.

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