Feasibility of using microRNAs in early detection of recurrence in colon cancer

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Introduction

Colorectal cancer is one of the most common malignancies in the western world and the second most common cause of cancer related death. Recurrence after curative intended surgery is associated with high mortality. MicroRNA is a type of noncoding RNA that is approximately 22 nucleotides long. Recent studies have shown that circulating microRNAs can be used as potential diagnostic biomarkers in colon cancer.

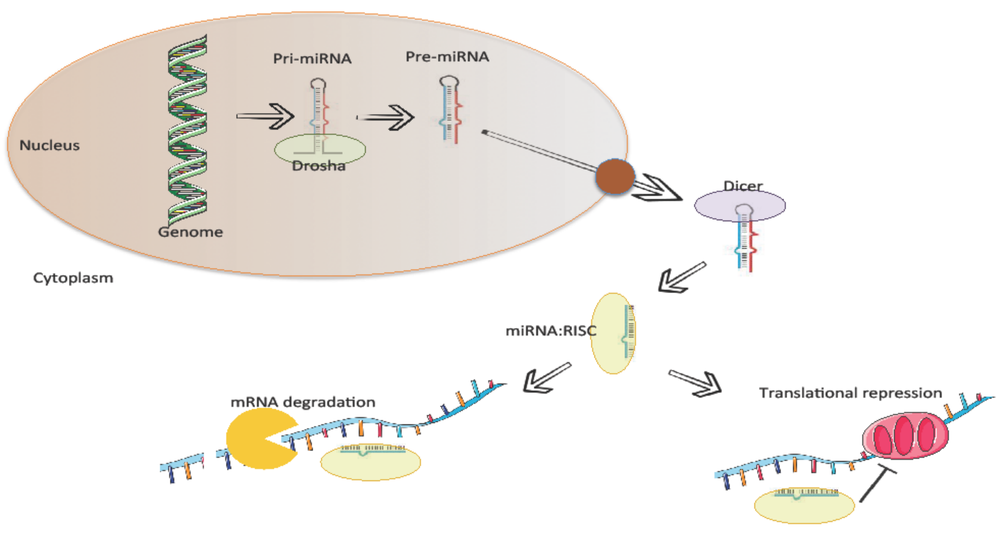


Fig 1: MicroRNAs are involved in post-transcriptional gene regulation.

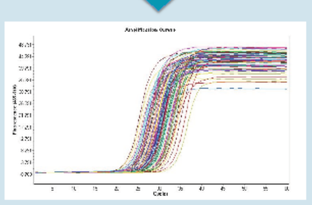
Aim

To investigate microRNAs possible application in detecting recurrence in colon cancer patients.

Methods

Blood samples from colon cancer patients drawn prior to surgery and at routine follow-up. Patients with and without relapse were compared.

RNA was extracted from plasma with Qiagen miRNeasy Serum/Plasma kit from samples prior to and after surgery and at the time of relapse or at three year follow-up.



A panel of 18 microRNAs (compiled after an initial pilot study) were investigated using RT-qPCR with LNA-primers from Exiqon. miR-23a was used as reference gene.

Statistics: The expressions was compared with repeated measures ANOVA. Adjustment for multiple t-testing were done using the Benjamini-Hochberg correction.

Results

Patients included: 25 patients were included (relapse: n=11 and non-relapse: n=14).

Deregulated microRNAs: Of the 18 microRNAs investigated, 4 significantly changed expression in plasma over time in the recurrence group, when comparing before and after surgery and at the time of recurrence. These microRNAs did not significantly change expression in the non-recurrence group.

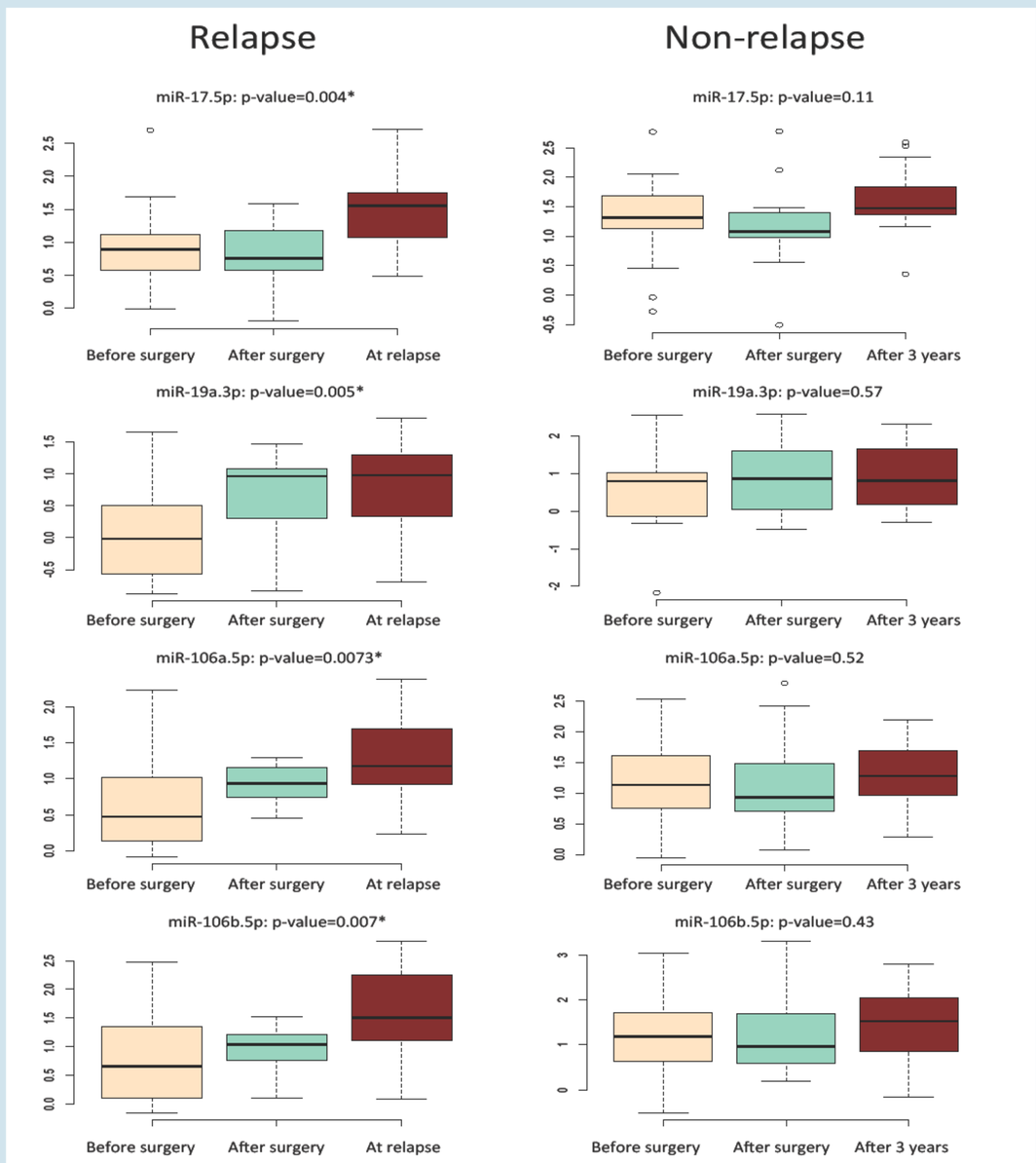


Fig 2: Boxplots showing expression of 4 microRNAs prior to and after surgery and at recurrence or 3 year follow up. P-values calculated with repeated measures ANOVA on normalized Ct-values (reference gene miR-23a). *: Significant with Benjamini-Hochberg correction for multiple t-testing.

Conclusion

We show that several microRNAs change expression in plasma with time, in patients with recurrence. It is possible that microRNAs in the future could complement other biomarkers, in the routine follow-up of colon cancer patients after surgery.

Acknowledgements

This work was supported by Region Zealand Research grant.

WCGC 2015
190--P
Basic Colon Cancer
Jesper Olsen
DOI: 10.3252/pso.eu.17wcgc.2015
Poster presented at: 12TH WORLD CONGRESS ON Gastrointestinal CANCER 1–4 JULY 2015 BARCELONA, SPAIN
PosterSessionOnline.com