AU Content in the MicroRNA Sequence Influences its Stability After Heat Treatment - DTU Orbit (09/10/2019)

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BACKGROUND: MicroRNAs (miRNAs) are short non-coding RNA molecules which regulate gene expression post-transcriptionally and are involved in a multitude of cellular processes. MiRNAs are known to be very stable compared to messenger RNAs (mRNAs), making them excellent candidates as biomarkers for disease. Recently, studies have suggested that miRNA stability in formalin fixed samples might dependend on their nucleotide composition.

OBJECTIVE: To explore the stability of a panel of miRNAs isolated from porcine blood and lung tissue after heat and enzyme treatment.

METHOD: Porcine RNA isolated from lung tissue and blood leukocytes were used for this study. RNA samples were exposed to heat treatment and RNAse A digestion. The levels of selected miRNAs were measured by means of qPCR before and after heat and enzyme treatment.

RESULTS: Fourteen miRNAs were successfully analysed, and they were found to degrade at differently after exposure to heat or RNAse A. MiRNAs with <60% of adenine (A) and uracil (U) in their sequence were found to be more stable.

CONCLUSION: This is the first study showing that different miRNAs isolated from lung tissue display unequal stability after heat treatment, probably based on their nucleotide composition, highlighting the importance of considering the miRNA sequence when investigating their value as biomarkers.

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