4th International Conference on
Biomarkers and Clinical Research
March 10-11, 2025
Webinar

Circulating microRNA signatures as non-invasive biomarkers for early detection of pancreatic cancer

Emily Grace Thompson
Johns Hopkins University School of Medicine, USA

Background: Pancreatic cancer is often diagnosed at an advanced stage due to the lack of early and reliable biomarkers. This study investigates the potential of circulating microRNAs (miRNAs) as non-invasive diagnostic biomarkers for early-stage pancreatic cancer.

Method: Blood samples were collected from 50 patients with histologically confirmed early-stage pancreatic cancer and 50 healthy controls. Total RNA was extracted from plasma using the miRNeasy Serum/Plasma Kit. Expression profiles of 84 cancer-related miRNAs were screened using quantitative reverse transcription PCR (qRT-PCR) arrays.Differentially expressed miRNAs were identified using fold-change analysis and adjusted p-values. Selected candidates were validated in an independent cohort. Receiver Operating Characteristic (ROC) curves were used to assess diagnostic performance, and pathway analysis was conducted to determine biological relevance.

Results: Six miRNAs (miR-21, miR-155, miR-196a, miR-210, miR-34a, and miR-221) were significantly upregulated in patients compared to controls ($p < 0.01$). A combination of miR-21 and miR-196a yielded the highest diagnostic accuracy with an AUC of 0.92, sensitivity of 89%, and specificity of 85%. Bioinformatics analysis revealed these miRNAs regulate pathways involved in cell proliferation, apoptosis, and KRAS signaling — key mechanisms in pancreatic tumorigenesis..

Conclusions This study demonstrates that circulating miRNAs, particularly the miR-21/miR-196a panel, have high diagnostic potential as non-invasive biomarkers for early detection of pancreatic cancer. Further validation in larger multicenter cohorts and longitudinal studies could pave the way for clinical implementation.

Biography

Emily Grace Thompson is an expert in molecular oncology and biomarker discovery, with a Ph.D. in Biomedical Sciences from Harvard University. Her research focuses on the clinical application of liquid biopsies, including circulating tumor DNA and miRNAs, for early cancer detection and precision medicine.With over 60 peer-reviewed publications and numerous NIH-funded projects,Thompson leads cross-disciplinary teams in identifying novel diagnostic tools for gastrointestinal malignancies. She also mentors early-career scientists and actively contributes to biomarker guideline development committees in the U.S.

Received: February 24, 2025; **Accepted**: February 25, 2025; **Published**: March 11, 2025