

Circulating miR-206, miR-181b, and miR-21 as promising biomarkers in hypothyroidism and their relationship to related hyperlipidemia and hepatic steatosis

Background: Thyroid hormones (THs) signaling has profound effects on many physiological processes. The regulation of THs signaling in various tissues involves the action of microRNAs (miRNAs) on thyroid deiodinases and receptors. THs regulate the expression of certain miRNAs and their target messenger RNAs (mRNAs) in various tissues and cells. The modulation of miRNA levels by THs affects their functions in processes such as liver lipid metabolism, skin physiology, and muscle and heart performance.

Aim: This research aimed to investigate miR-181b, miR-206, and miR-21 in the serum of patients with subclinical and overt hypothyroidism to determine their possible role in the diagnosis of the disease and their relationship to clinical disorders related to hypothyroidism.

Methods: This study included ninety participants, divided evenly into three groups as follows: patients with overt hypothyroidism diagnosed clinically, radiologically, and by investigation, subclinical hypothyroid patients, and healthy volunteers. The patients had a thorough medical history and underwent a clinical examination. Laboratory tests included plasma cholesterol, LDL, HDL, TGs, liver and renal function tests, CBC, fasting insulin, HOMA-IR, HbA1c, TSH, and free T4. The serum levels of miR-21, miR-206, and miR-181b were measured using qRT-PCR.

Results: miR-206 and miR-181b levels were higher in the subclinical group, followed by the hypothyroid and control groups. For miR-21, there was a significantly lower mean value in both the hypothyroid and subclinical groups than in the control group, with no difference between the two groups. Both miR-206 and miR-181b showed a significant negative association with albumin and free T4 levels and a significant direct association with GGT, ALT, AST, creatinine, uric acid, TGs, TC, LDL, TSH, thyroid volume, and CAP score. The same correlation pattern was observed for miR-181b, except that it was not significantly correlated with the TGs. For miR-21 levels, there was a significant positive correlation with albumin, free T4 level, and kPa score and a negative correlation with GGT, ALT, AST,

creatinine, uric acid, HOMA-IR, HbA1c, TC, LDL, TSH, and CAP score. Cases with F1 kPa score and S2 CAP scores had significantly higher averages for miR-206 and miR-181b, with a p-value of 0.05. Moreover, miR-21 levels were significantly lower in the S2 CAP score group.

Conclusion: These miRNAs (miR-206, miR-181b, and miR-21) may be used as diagnostic biomarkers for hypothyroidism. They may be used as therapeutic targets to control dyslipidemia and hepatic steatosis during hypothyroid disease.