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Assessing FGF-23 Gene Expression in Anemic Chronic Kidney Disease: A Biomarker Perspective

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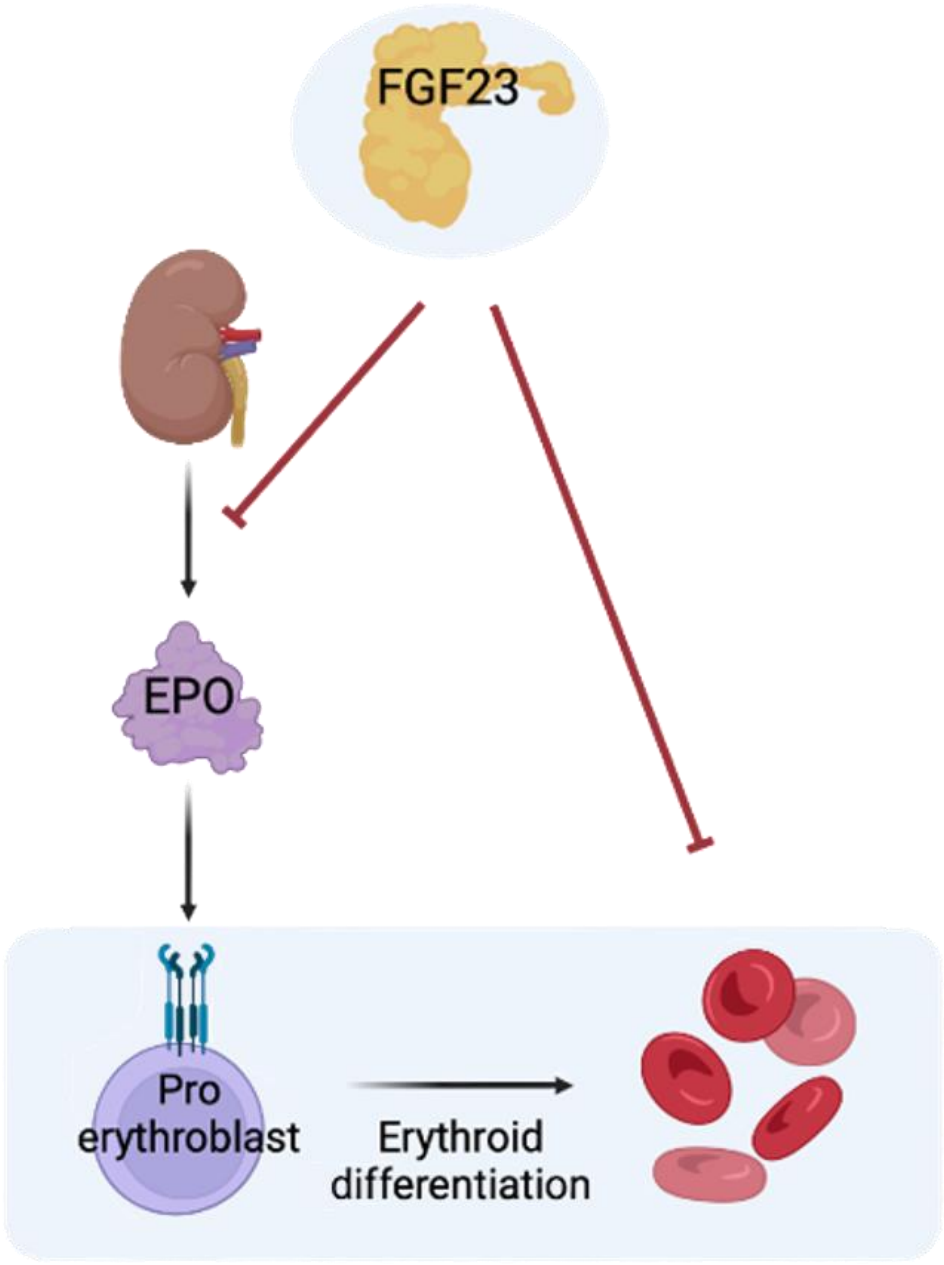
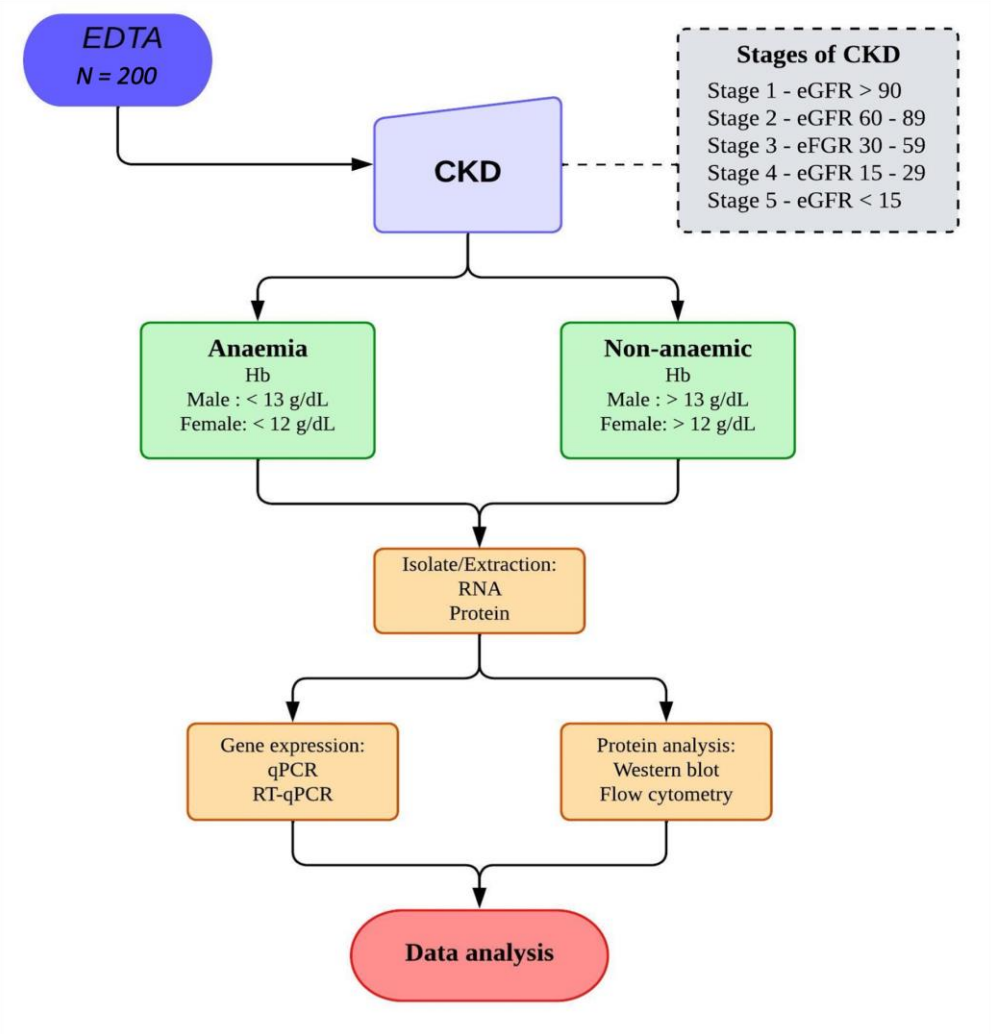
Objectives : Chronic Kidney Disease (CKD), affecting around 15.48% of Malaysia's population in 2018, poses a significant public health challenge marked by reduced glomerular filtration rate and anemia-related complications. This anemia typically starts as CKD progresses, worsening patient outcomes. Elevated FGF-23 levels, associated with phosphate regulation and erythropoietin suppression, are examined across various CKD stages. The study aims to correlate FGF-23 levels with anemia incidence, highlighting the need for early detection and effective management of CKD and its complications to improve patient outcomes. This research could contribute significantly to CKD and anemia management strategies.
Methods : The methodology involves collecting 200 blood samples from hemodialysis patients at KPJ Selangor Specialist Hospital. Kidney function tests and hemoglobin concentration assessments categorize patients according to CKD stages and determine anemia presence. To observe the gene expression of FGF-23 in association with anemia in CKD patients, RNA extraction is performed followed by RT-PCR and qPCR analysis.
Results : The study's findings highlight a notable increase in FGF-23 gene expression among CKD patients with anemia. This was evidenced by the qPCR analysis, which showed a two-fold increase in FGF-23 gene expression correlating with anemia in these patients. Additionally, RT-PCR expression analysis confirmed the upregulation of FGF-23 in anemic CKD patients. These combined results from both qPCR and RT-PCR analyses reinforce the hypothesis that FGF-23 plays a significant role in anemia linked with CKD. The elevated expression levels of FGF-23, as revealed by these molecular techniques, support its potential as a biomarker for anemia in CKD patients.
Conclusions : This research could provide new insights into anemia management in CKD, potentially leading to novel therapeutic strategies targeting FGF-23, and enhancing understanding of iron metabolism's role in erythropoiesis in CKD patients.

FGF23 Gene Expression.png



FGF23 Gene Expression.png


EDTA
N = 200
CKD
Stages of CKD
Stage 1 - eGFR > 90
Stage 2 - eGFR 60 - 89
Stage 3 - eFGR 30 - 59
Stage 4 - eGFR 15 - 29
Stage 5 - eGFR < 15
Anaemia
Hb
Male : < 13 g/dL
Female: < 12 g/dL
Non-anaemic
Hb
Male : > 13 g/dL
Female: > 12 g/dL
Isolate/Extraction:
RNA
Protein
Gene expression:
qPCR
RT-qPCR
Protein analysis:
Western blot
Flow cytometry
Data analysis