

KABARAK LUNIVERSITY

SCHOOL OF MEDICINE AND HEALTH SCIENCES

DEPARTMENT OF CLINICAL MEDICINE

BIOCHEMISTRY II

UNIT CODE BCM 126

STUDENTS NAME BRIAN KARIGI

LECTURER NAME AR FLONA

DATE 10TH MARCH, 2024

CLM/M/0794/09/23

## DETERMINATION OF TRIGLYCERIDES AND CHOLESTROL IN SUCH

To assess the level of stream triglycerides cotulating in the blood

2 cholesterol

To measure the concentration. cholesterol of cholestura, socluding telal 161 (low Density Lipoprotein) cholesterol and HAL CHigh Density Lipspretem) cholesterol

Main aim of determining triglycerides and cholesterd it planes or sptuen is to cardiovascular health and tick Elevated levels of these lipids. are associated with an moesved isk of alheriosclerosis, heart disease and stroke.

Materials required

- a) Serum er plasma samples
- b) Cholesterol xeagents
- e) Tuglyceride xengent
- d) Calibrators

Pippeto tips- for accurate measurement and transfer of samples

Distilled water

9) Sphectrophotometer measures absorbance at specific wavelength to quantify ohlesterol and triglyceride levels.

Principle

Cholesterol determination

- Enzymatic method

lasetres enzymatic bydrolysis of cholesterol estars by cholesterol all ostarase to xelease free cholesterol

health by status and tisk factors for

metabolic disorder

The free cholesterol is then oxidized by cholesterol oxidase to produce hydrogen peroxide and cholest-4-en-3-one. Subsequently the hydrogen peroxide reacts with a chromogenic substrate in the presence of peroxidase to generate a colored product.

Intensity of the color formed is proportional to the concentration of cholesterol present in the sample and can be measured spectrophotometrically at a specific wavelength.

#### Triglyceride determination

Triglycerides are hydrolyzed by lipases to release glycerol and fatty acids. The

glycerol produced reacts with ALP and glycerol kinase

to form glycerol-3-phosphate which is then oxidized by glycerol-3-phosphate oxidase to generate hydrogen peroxide. Hydrogen peroxide reacts with a chromogenic substrate in the

presence of peroxidase to produce a colored product.

- The intensity of the color is directly proportional to the concentration of triglycerides in the sample and can be measured spectrophotometrically at a specific wavelength.

#### Procedure

Sample preparation where clear samples are transferred to clean tubes for analysis.

Prepare a series of calibrator solutions with known concentrations of cholesterol and triglycerides.

Prepare quality control samples with known concentrations of cholesterol and triglycerides to assess assay accuracy and precision.

- label tubes for each sample, calibrator and control

Add appropriate volumes of reagents, buffers and samples according to the assay protocol.

Instade Mank samples containing all coagorets second cores to correct for background absorbance

pod chalesterol, detricomation, enzymatic hydrolysis and audation reactions takes place to produce a colored product for triglyceride determination, enzymatic hydrolysis and oxida reactions produce glycerol which is then cxidised to generade

a colored product. Moosure the absortance of soch sample, calibrator, control and blank at appropriate wavelength uning a spectrophotometer Record the absorbance

neadings for each sample Lise standard cuire generated from the calibrador solutions to soterpelate the concentrations of cholesterol and triglycerides in the samples

Calculate Concontration of cholesterol and triglycerides in the samples based Curre equation on the absorbance xoadings and the dandard

- Evaluate accuracy and precision of the assay by compairing measured concentrations of the expected values quality control samples to their

Ensure the assay reculls foll within acceptable limits of ranalion.

Record concentrations of cholesterol and triglycerides is aach Sample. Results should be in unils (mg/dl)

Results

See attached

Discussion based مع المختطف ion

Need range Typically total cholesterol less than 200 mg/dL

Elevated total cholesterol levels may indicate increased risks

LDL Cholesterol level Normal range Less than 100 mg/dL is considered optimal for most individuals

Elevated LDL cholesterol and cardiovascular disease are a major risk factor for atherosclerosis

HDL cholesterol level Normal range HDL cholesterol was above 40 mg/dL (men) and 50 mg/dL (women) are considered desirable

Higher HDL cholesterol levels are linked with cardiovascular disease associated with reduced.

Triglyceride levels

Normal range Triglyceride levels below 150 mg/dL are considered normal

Elevated triglyceride levels are associated with increased risk of cardiovascular diseases, pancreatitis and metabolic syndrome (elevated levels 200 mg/dL and above)

Conclusion

الفرص مع الاعتصام

- cholesterol and triglyceride levels serve as important indicators of cardiovascular risks

Regular monitoring of cholesterol levels and triglycerides

allows health care providers to assess effectiveness of lipid.

lowering treatment Elevated triglyceride levels are key elements for metabolic Syndrome

## In conclusion

Measurement of cholesterol and triglycerides in serum is vital for assessing cardiovascular risk, diagnosing and monitoring lipid disorders, guiding treatment decisions, monitoring treatment efficacy, identifying metabolic abnormalities and preventing cardiovascular events

## References

a) Grundy, SM, Ahrens, EJ, & Salen, P (Eds.). (2013) Manual of lipid disorders: Reducing the risk of atherosclerosis. Lippincott Williams and Wilkins. Cardiovascular diseases

5) Rifai, N., Warnick, GR, & Dominiczak, M.H. (Eds.). (2019) Manual of Lipoprotein testing (3rd ed.). AACC Press.

National Institutes of Health. (2018), Laboratory Procedure manual

Cholesterol and HDL. National Heart, Lung and Blood

Institute <https://www.nih.gov/minilabprocedure-manuals>