

*Cerebrospinal Fluid
(CSF)
Analysis for total protein*



Biochemistry
Team



Teams

The Objectives

Not given 😞

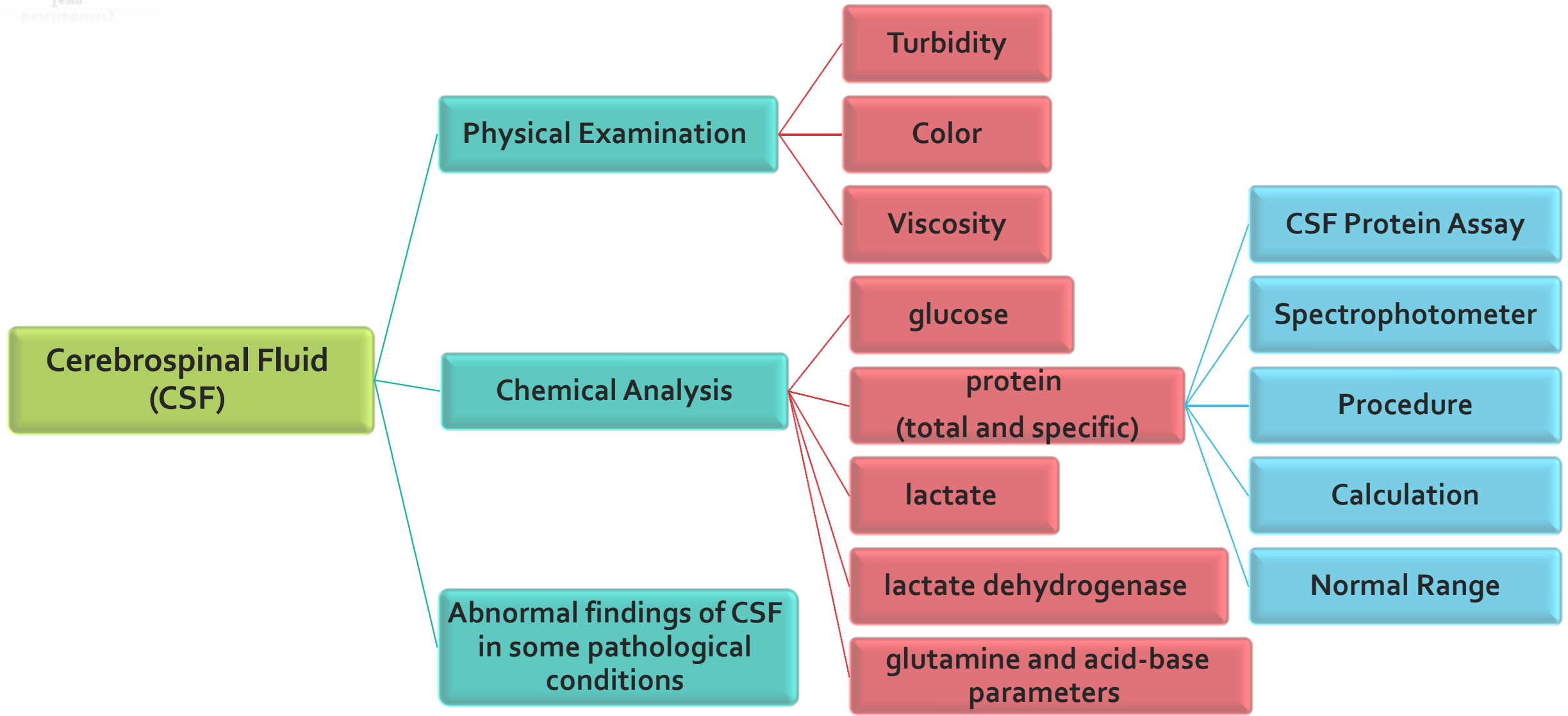
Red =
Important

Blue =
explain

Green =
addition
notes



Mind map



CSF sample

- The specimen should be delivered to the laboratory immediately after collection
- **Glucose and protein estimations should be performed as soon as possible after drawing the CSF specimen**
- If testing is to be delayed, the specimen should be frozen at -20°C .

Remember !!

- Before any analysis, the **fluid should be centrifuged** to avoid contamination by cellular elements
- CSF is the most precious biological material. Often, **only small volumes of CSF are available for analysis** due to difficulty in collection; hence handle this with care
- The specimen **may contain virulent organisms**, so strict safety precautions should be followed.



CSF Examination Report

Med432 Biochemistry Team

- **Physical examination:**
 - Volume
 - Color
 - Appearance
 - Viscosity
- **Chemical examination:**
 - CSF protein concentration (g/L)

Physical Examination

Physical Examination	Normal	Abnormal
Turbidity	Clear	Cloudy/ turbid- may indicate the presence of white, or red blood cells, microorganisms, or an increase in protein level
Color	Colorless	Yellow, orange-brown, or red- may indicate the presence blood
Viscosity	should have the same consistency as water	CSF may be seen in patients Thicker with certain types of cancers or infections (meningitis)

Routinely performed biochemical tests in CSF are:

1. glucose
2. protein (total and specific)
3. lactate
4. lactate dehydrogenase
5. glutamine and acid-base parameters

Abnormal findings of CSF in some pathological conditions

Very important

Parameter	Condition			
	Bacterial Meningitis	Tuberculous Meningitis	Viral Meningitis	Brain Tumor
Protein	↑ ↑	↑ ↑	Normal	↑
Glucose	↓ ↓	↓ ↓	Normal or slightly ↓	↓
Chlorides	↓ ↓	↓ ↓	Normal or ↓	Normal or ↓

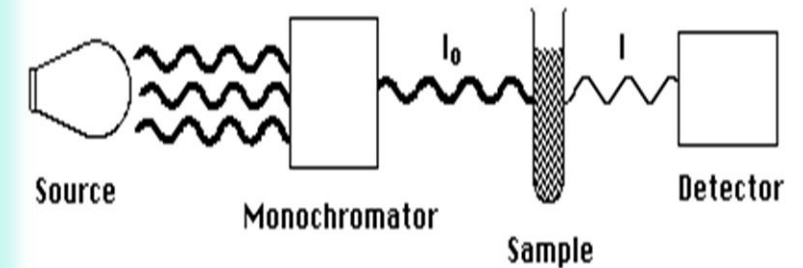
- Protein present in the CSF is detected by a kit based on Biuret method.
- Biuret reagent when interacts with the peptide bonds in the protein give a blue coloured product.
- The intensity of the color is proportional the amount of protein in CSF
- Color intensity is determined by measuring the absorbance by the colored solution at a wavelength of 546nm
- Absorbance is measured by an instrument, **spectrophotometer**



Spectrophotometer

Most of visible spectrophotometers are composed of:

- Light source which works with visible wavelengths (400-700 nm)
- Monochromator filter for choosing desired wavelength
- Sample holder (cuvette)
- Detector
- Meter or recorder




Procedure

	Test	Standard	Blank
Reagent	2 ml	2 ml	2 ml
CSF sample	40 μ l	-	-
Standard	-	40 μ l	-
H ₂ O	-	-	40 μ l

Normal Range

Normal reference values for CSF protein:
15 - 45 mg/dL (0.1 - 0.4 g/L)

- 
1. Mix and incubate for 15 minutes at room temperature
 2. Measure absorbance at 546 nm

Calculation

Protein conc (g/L) =

Abs of sample

Abs of standard

\times

Conc of standard (60 g/L)





Biochemistry
Team

If you find any mistake, please contact us:)

Biochemistryteam@gmail.com

