



BIOCHEMISTRY LAB ORIENTATION

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LAB ORIENTATION OBJECTIVES

The students should be able to understand & become familiar with:

- 1) General safety rules followed in Biochemistry laboratory
- 2) Safety with laboratory equipments
- 3) Basic emergency procedures
- 4) Biological safety and waste disposal
- 5) The basics of spectrophotometer and general equipments to be used in the lab during Biochemistry practical sessions

LABORATORY SAFETY

INTRODUCTION

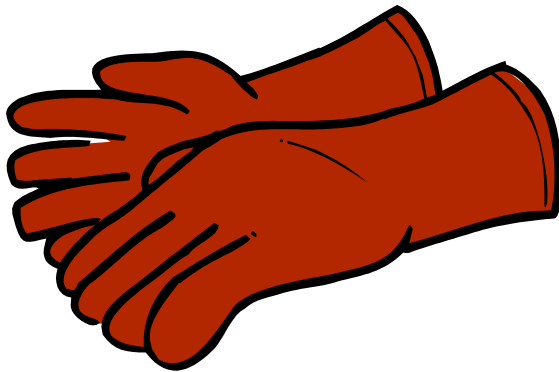
Lab safety is everyone's responsibility

Lab safety policy and procedures must be strictly followed

GENERAL SAFETY RULES



Always use appropriate clothes and personal protective tools (Lab coat, safety goggles, masks, gloves, no open shoes, no eye lenses)

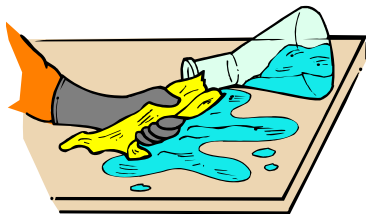


GENERAL SAFETY RULES

After handling chemicals, always **wash your hands** with soap and water.

During lab work, **keep your hands away from your face.**

Tie back **long hair.**



GENERAL SAFETY RULES

Roll up **loose sleeves**.

Know the **location** of the fire extinguisher, fire blanket, eyewash station, and first aid kit.

Keep your **work area uncluttered**. Take to the lab station only what is necessary.



GENERAL SAFETY RULES

It is suggested that you wear
glasses rather than contact lenses.

Never eat or drink during a lab work.



SAFETY WITH LABORATORY EQUIPMENTS

Never use any laboratory equipment unless you are trained & have been authorised to do so

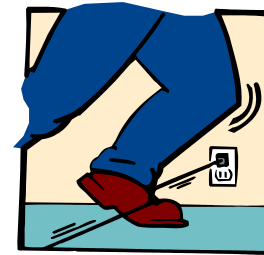
As well as injuring yourself you may cause very costly damage





ELECTRICAL SAFETY

Lay **electrical cords** where no one can trip on them.



Be sure your **hands and your lab area are dry** before using electrical equipment.

Unplug cords by **pulling the plug** and not the cord.



EMERGENCY PROCEDURES

FOR SPILLS/LEAKS OF HAZARDOUS MATERIALS

Rescue



Alarm



Contain



Evacuate



R - Rescue and relocate anyone in immediate danger

A - Alert others by activating the building fire alarm

C - Confine the emergency by closing the doors

E - Evacuate immediately. Do not use elevators. Use stairs.

FIRE EXTINGUISHER

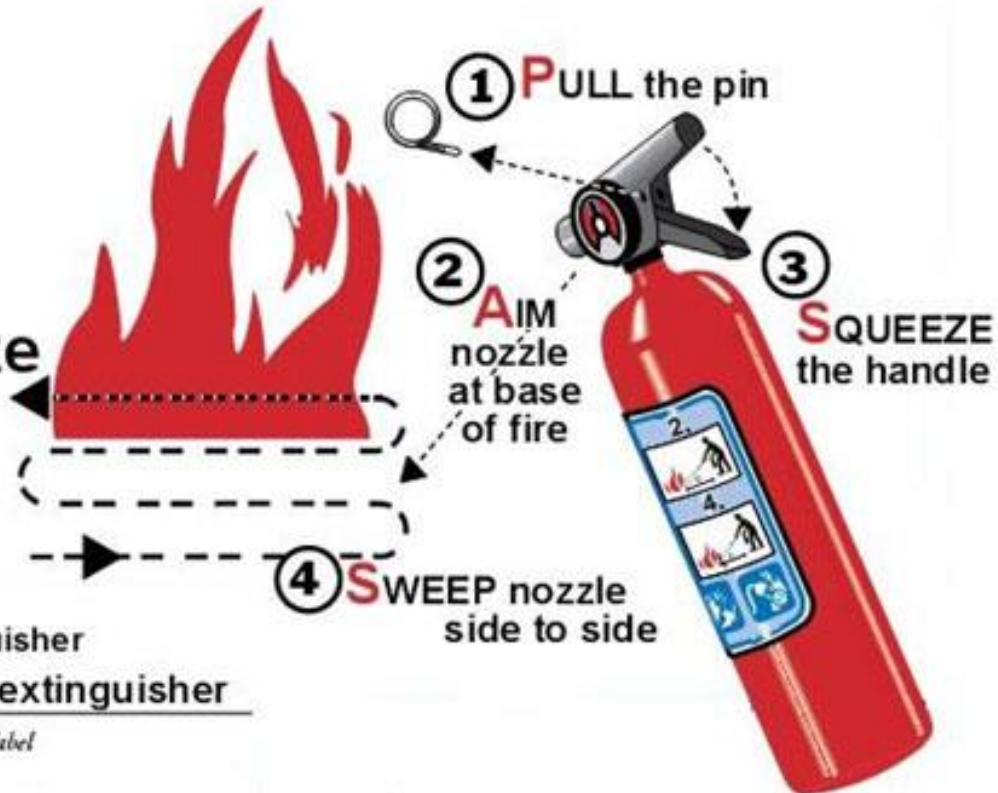
To operate an extinguisher:

Pull

Aim

Squeeze

Sweep



Know your extinguisher

Use the correct extinguisher

(Check your own extinguisher's label for detailed instructions.)

BIOLOGICAL SAFETY

All biological samples are considered
potentially infectious

Should be handled and processed using
strict precautions

WASTE DISPOSAL

For disposal of **contaminated waste**, use containers with **yellow plastic bags**

Regular waste like papers etc go into containers with **black/white plastic bags**

All sharp objects such as needles, scalpels and even broken glassware go into **yellow-red sharps container**

A framed sign is mounted on a grey stone wall. The sign has a white border and a black center. The text is in white, bold, serif font. To the right of the wall is a vertical purple bar with a diamond pattern.

**SOME SUPERHEROES
DON'T WEAR CAPES...**

**THEY ARE CALLED
DOCTORS.**

CLINICAL BIOCHEMISTRY LABORATORIES

Routine
Biochemistry/
STAT Bench
Lab

Endocrinology
Lab

Inherited
Metabolic Lab

Toxicology Lab

Newborn
Screening Lab

Receiving Bench

BIOCHEMICAL TEST PROFILES

Cardiac Profile

- S. Creatinine kinase
- S. Lactate dehydrogenase
- S. Troponin

BIOCHEMICAL TEST PROFILES

Renal Profile

- Blood urea
- S. Creatinine
- S. Electrolytes (Na, K & Cl)

Hepatic Profile

- S. Total proteins
- S. Albumin
- S. Alanine & Aspartate Aminotransferases (ALT & AST)

BIOCHEMICAL TEST PROFILES

Lipid Profile

- S. Triglycerides
- S. Cholesterol
- S. HDL-Cholesterol
- S. LDL-Cholesterol

Bone Profile

- S. Calcium
- S. Phosphorous
- S. alkaline Phosphatase
- S. Vitamin D

BIOCHEMICAL TEST PROFILES

Glucose (Diabetic) Profile

- S. Fasting glucose
- S. 2 Hours postprandial glucose
- S. Random glucose
- Glycosylated hemoglobin

CLINICAL BIOCHEMISTRY FOR DIAGNOSIS OF DISEASES

Biochemical laboratory tests are crucial tools for diagnosis of many human diseases:

Kidney diseases e.g., nephrotic syndrome

Liver diseases e.g., hepatitis and jaundice

Metabolic diseases e.g., diabetes mellitus

Endocrine diseases e.g., Thyrotoxicosis

Cancers & malignancy e.g., prostate cancer

Inherited diseases e.g., PKU

NEPHROTIC SYNDROME



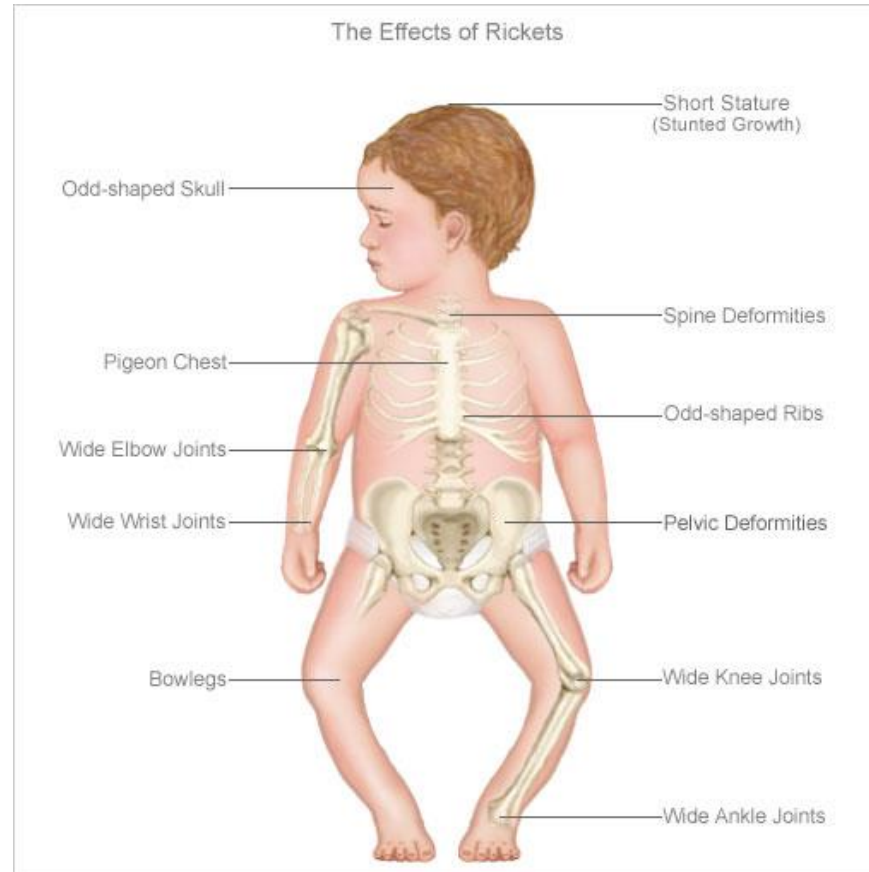
JAUNDICE



PHENYLKETONURIA (PKU)



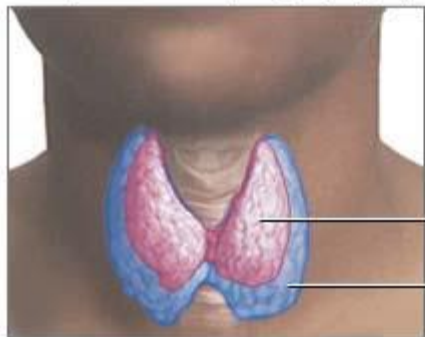
RICKETS



THYROTOXICOSIS



Exophthalmos (bulging eyes)



Diffuse goiter

Graves' disease is a common cause of hyperthyroidism, an over-production of thyroid hormone, which causes enlargement of the thyroid and other symptoms such as exophthalmos, heat intolerance and anxiety

Normal thyroid

Enlarged thyroid

 ADAM.



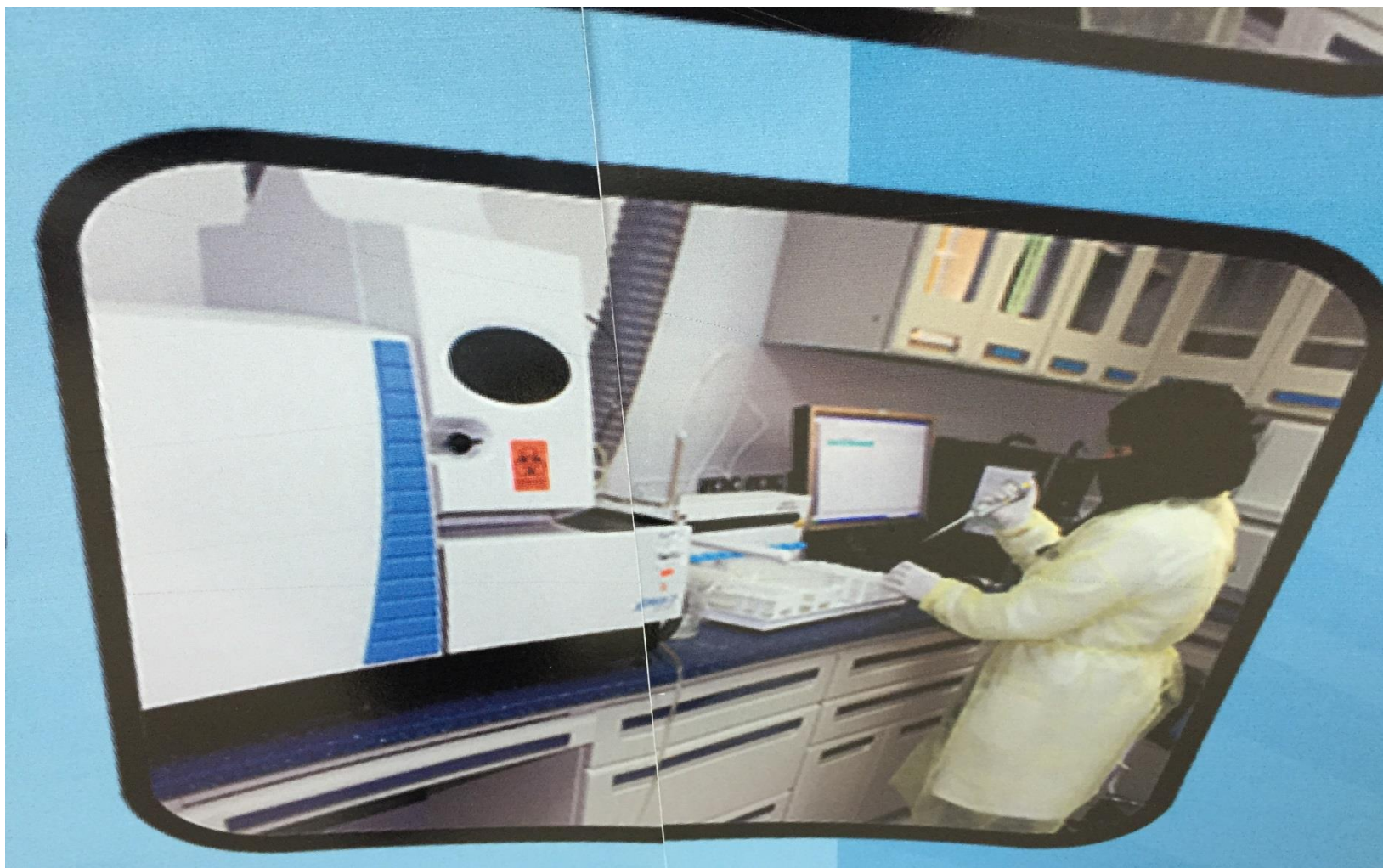
RECEIVING BENCH



ROUTINE CHEMISTRY



SPECIAL CHEMISTRY SECTION



ENDOCRINE SECTION



INHERITED METABOLIC LAB



NEWBORN SCREENING LAB



IN THE UNDERGRADUATE LAB.....

LAB EQUIPMENTS

Automatic pipettes



Vortex



Microcentrifuge



Water bath

UV-spectrophotometer



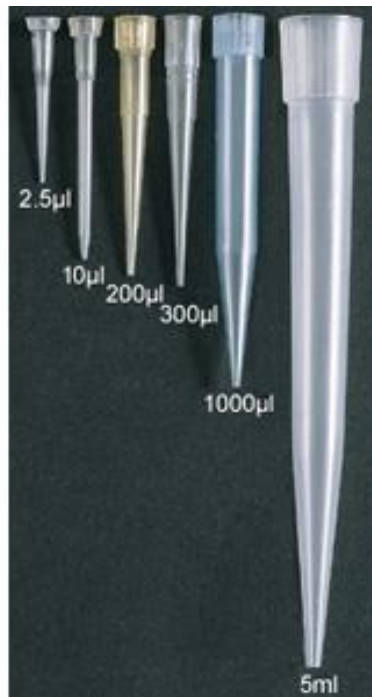
LAB EQUIPMENTS



Eppendorf tube



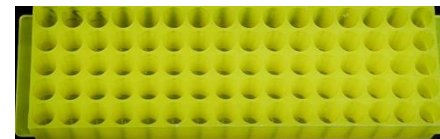
Cuvettes



Tips



Rack- test tube



Rack- eppendorf tube

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

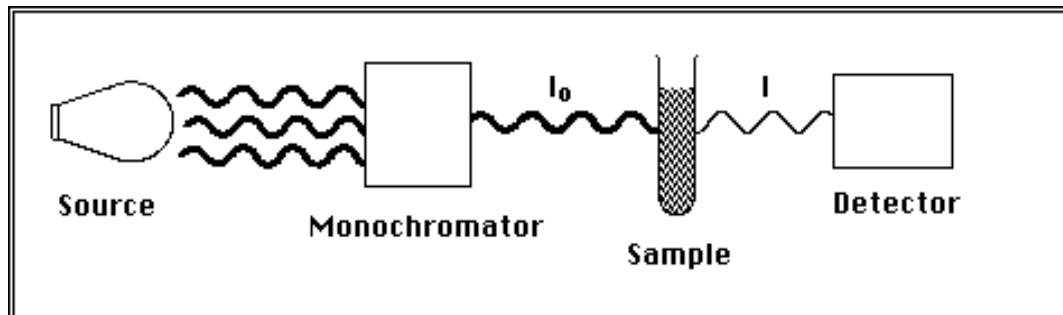


Figure 1

LET'S VISIT THE BIOCHEMISTRY LAB LEVEL 1, ROOM-

