جامعة الملك سعود
King Saud University

BIOCHEMISTRY LAB ORIENTATION

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 equipment
3) Basic emergency procedures
4) Biological safety and waste disposal
5) The basics of spectrophotometer and general equipment to be used in the lab during Biochemistry practical sessions

LABORATORY SAFETY

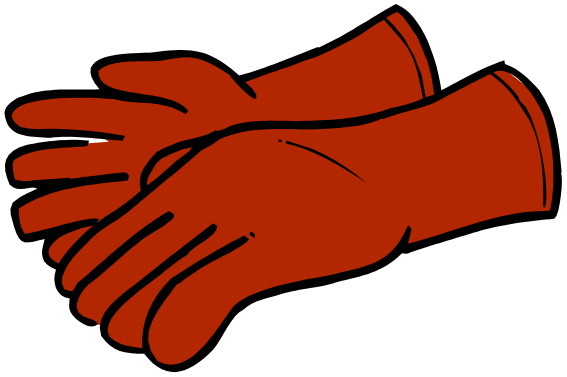
INTRODUCTION

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)

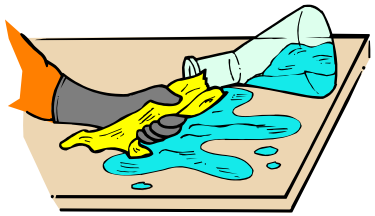


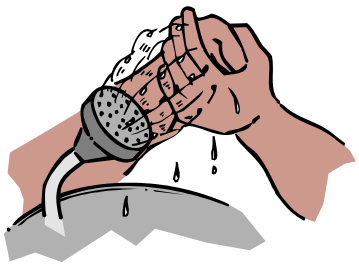
GENERAL SAFETY RULES

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.

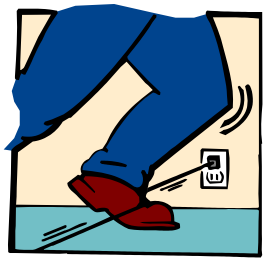
SAFETY WITH LABORATORY EQUIPMENT

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.

FIRE SAFETY- R.A.C.E

Procedures to follow in the event of a fire emergency

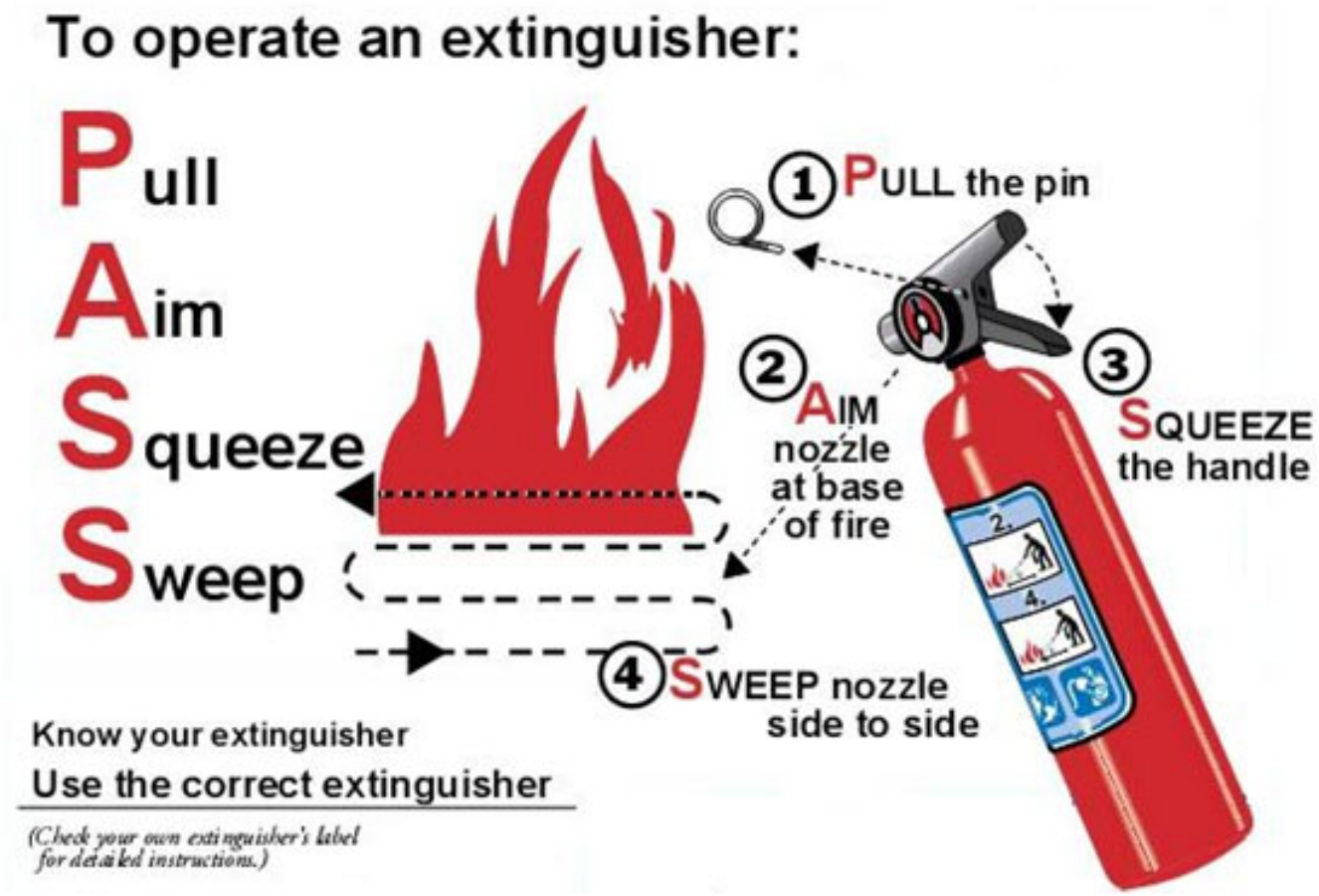
R – Remove or secure individuals in immediate danger.

A – Activate the alarm by pulling a fire pull station located in the corridors and calling 953.

C – Confine the fire by closing windows, vents, and doors.

E – Evacuate to a safe area.

FIRE EXTINGUISHER



BIOLOGICAL SAFETY

All biological samples are considered
potentially infectious

Should be handled and processed using
strict precautions

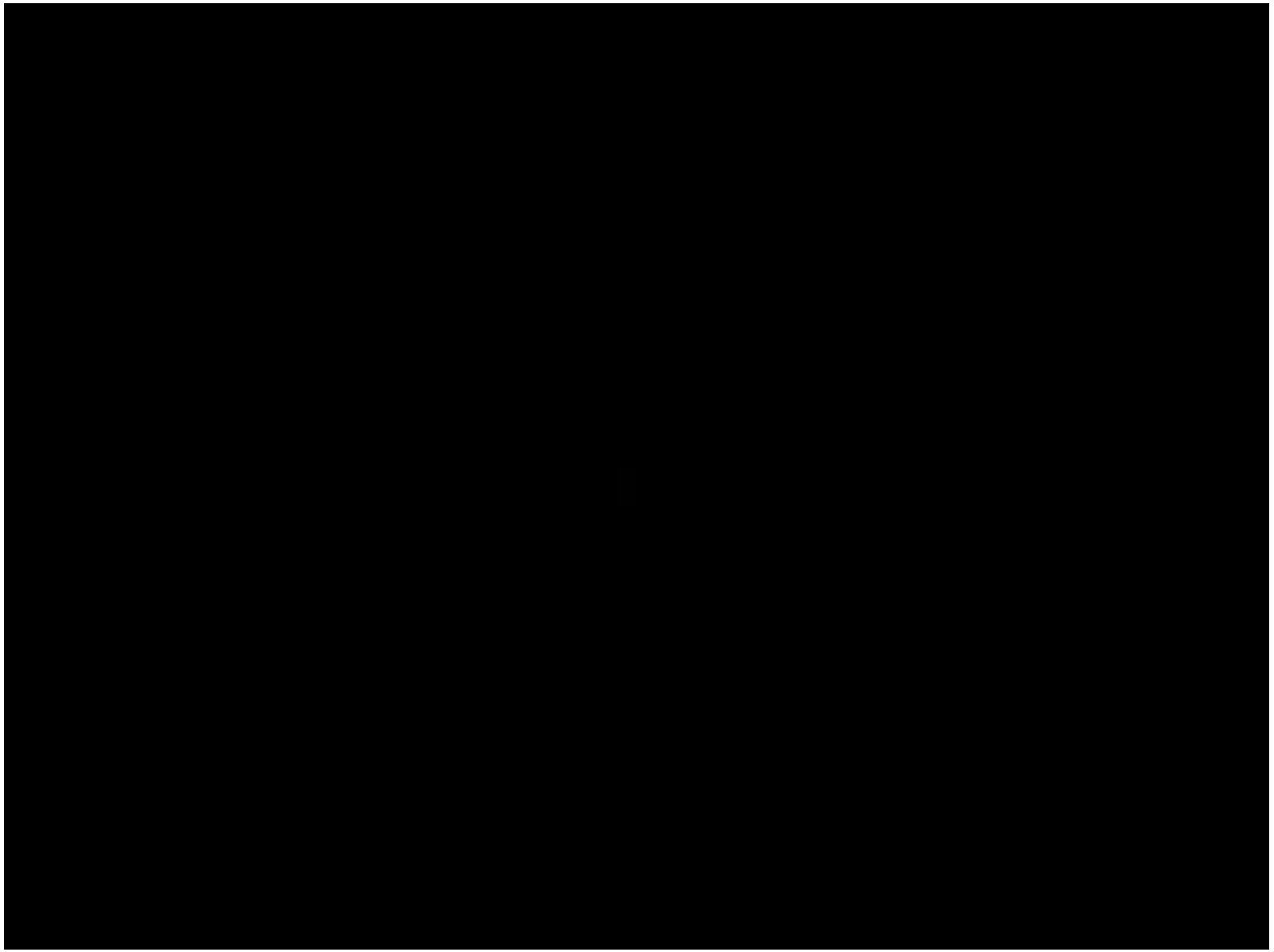
WASTE DISPOSAL

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


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

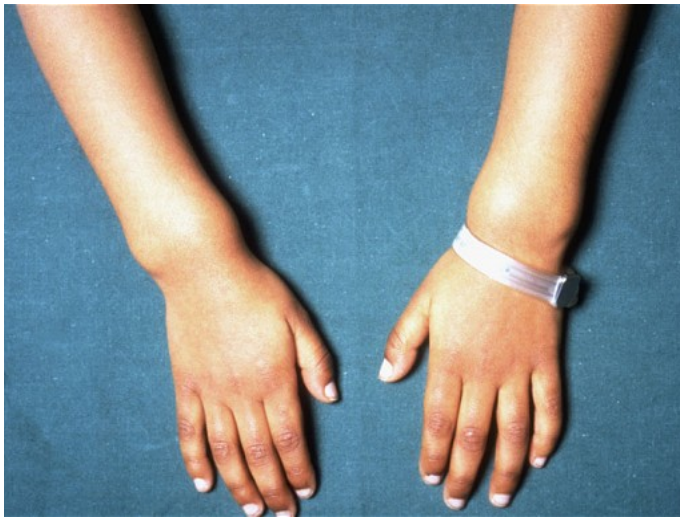
Inherited diseases e.g., PKU

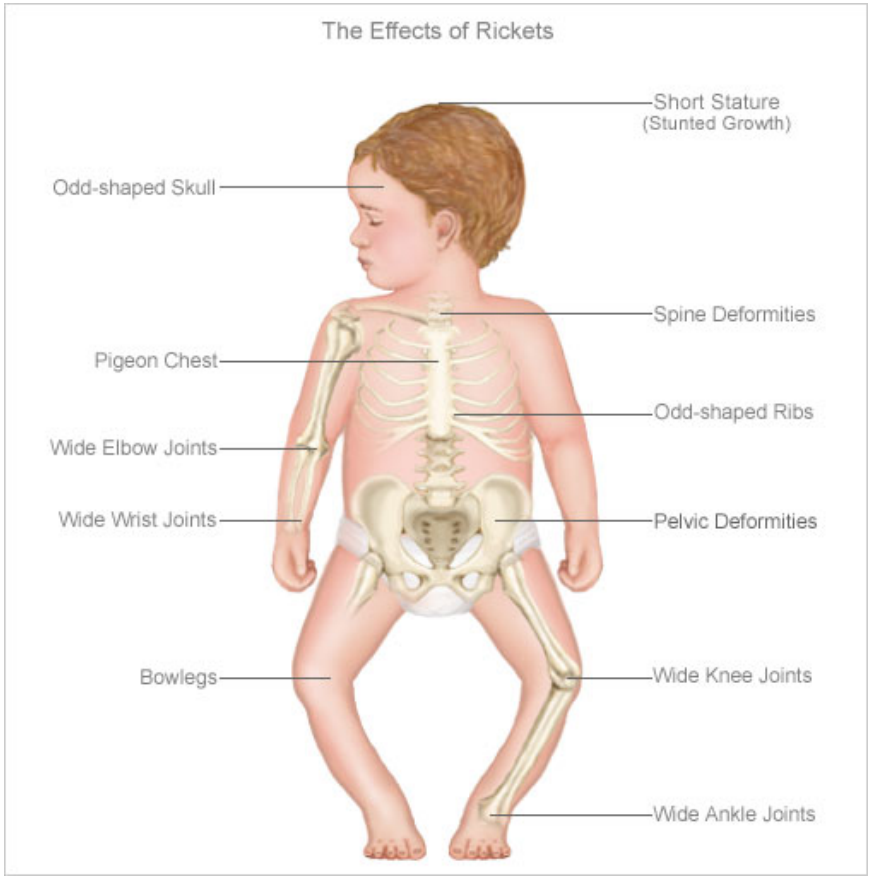
NEPHROTIC SYNDROME

JAUNDICE

PHENYLKETONURIA (PKU)

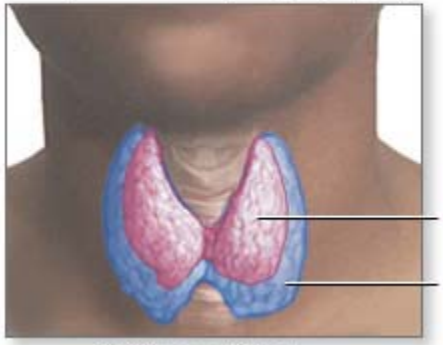
RICKETS




The Effects of Rickets
Short Stature
(Stunted Growth)
Odd-shaped Skull
Spine Deformities
Pigeon Chest
Odd-shaped Ribs
Wide Elbow Joints
Wide Wrist Joints
Pelvic Deformities
Bowlegs
Wide Knee Joints
Wide Ankle Joints

THYROTOXICOSIS

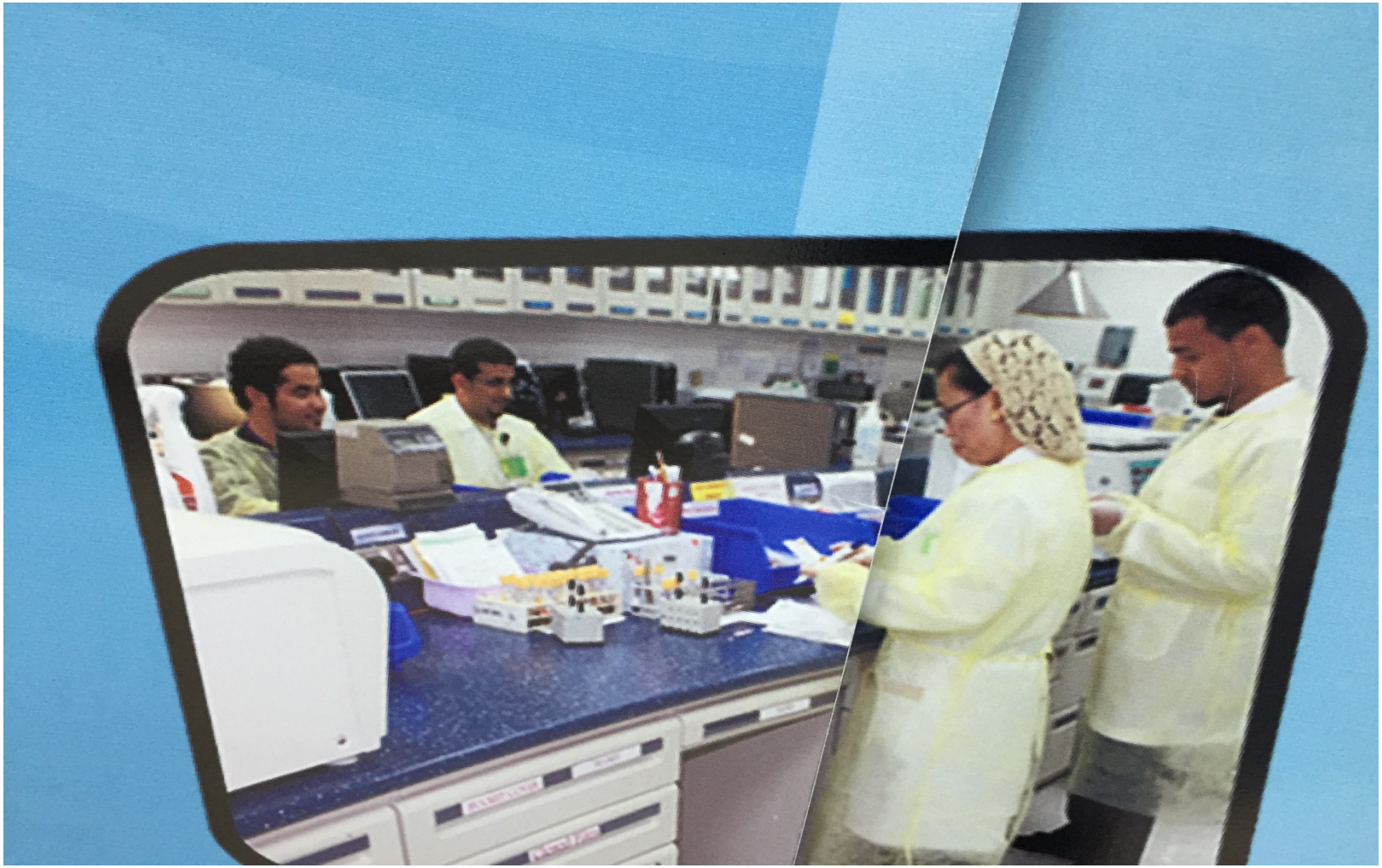
Exophthalmos (bulging eyes)



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

RECEIVING BENCH



ROUTINE CHEMISTRY

SPECIAL CHEMISTRY SECTION

ENDOCRINE SECTION

INHERITED METABOLIC LAB

NEWBORN SCREENING LAB

IN THE UNDERGRADUATE LAB……..

LAB EQUIPMENTS

Automatic pipettes

Vortex

Water bath

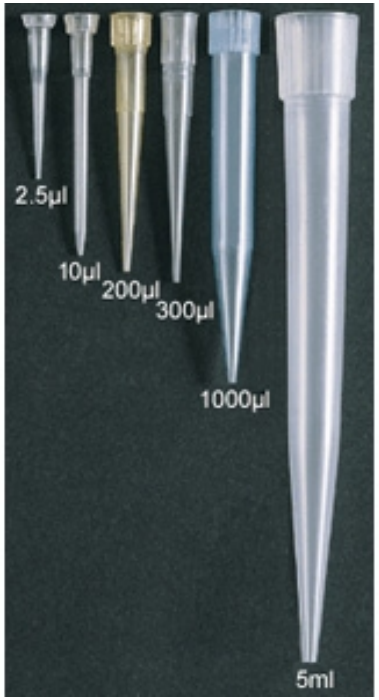
Microcentrifuge

UV-spectrophotometer

LAB EQUIPMENTS

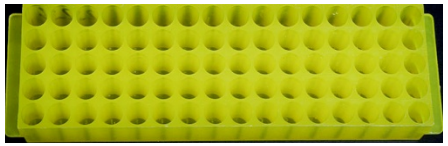
Eppendorf tube

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

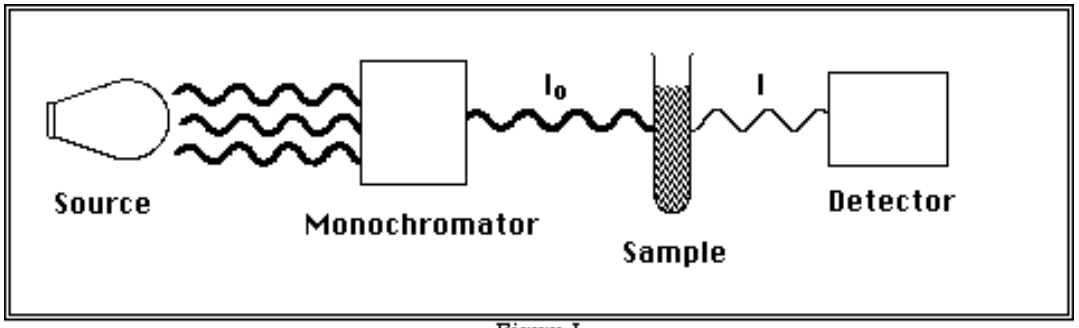


Figure I

LET'S VISIT THE BIOCHEMISTRY LAB