

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 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

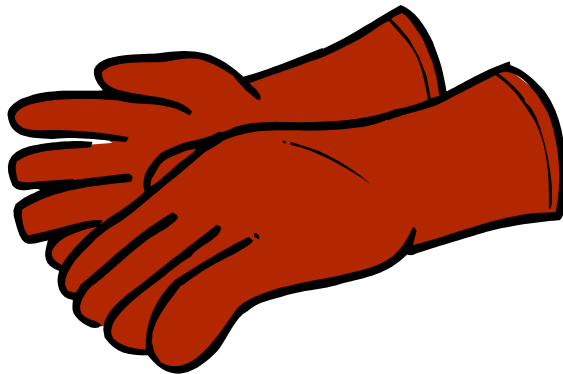
**Lab safety is everyone's responsibility**

**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)

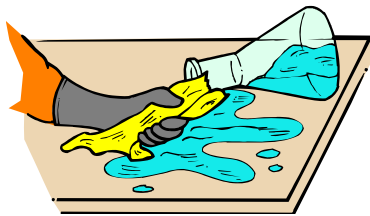


# GENERAL SAFETY RULES

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.



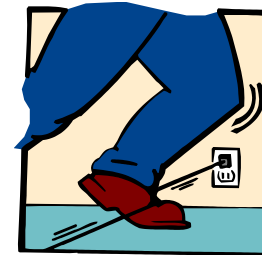






# ELECTRICAL SAFETY

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

**R**escue



**A**larm



**C**ontain



**E**vacuate



**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

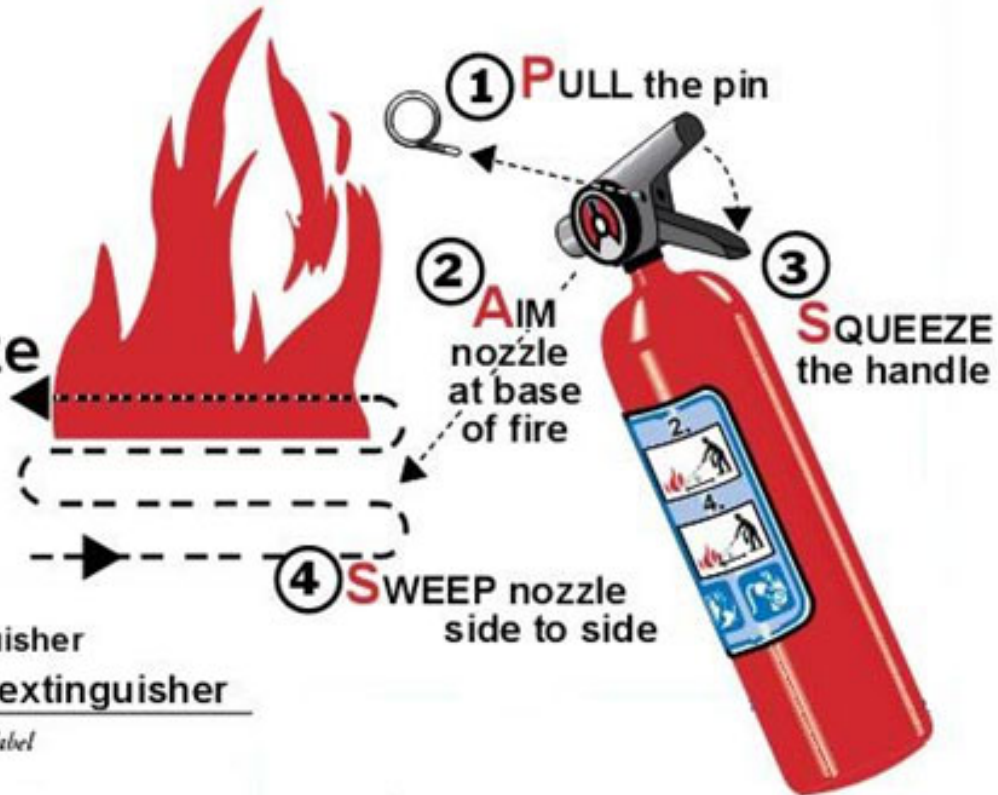
To operate an extinguisher:

**P**ull

**A**im

**S**queeze

**S**weep



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**

# 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



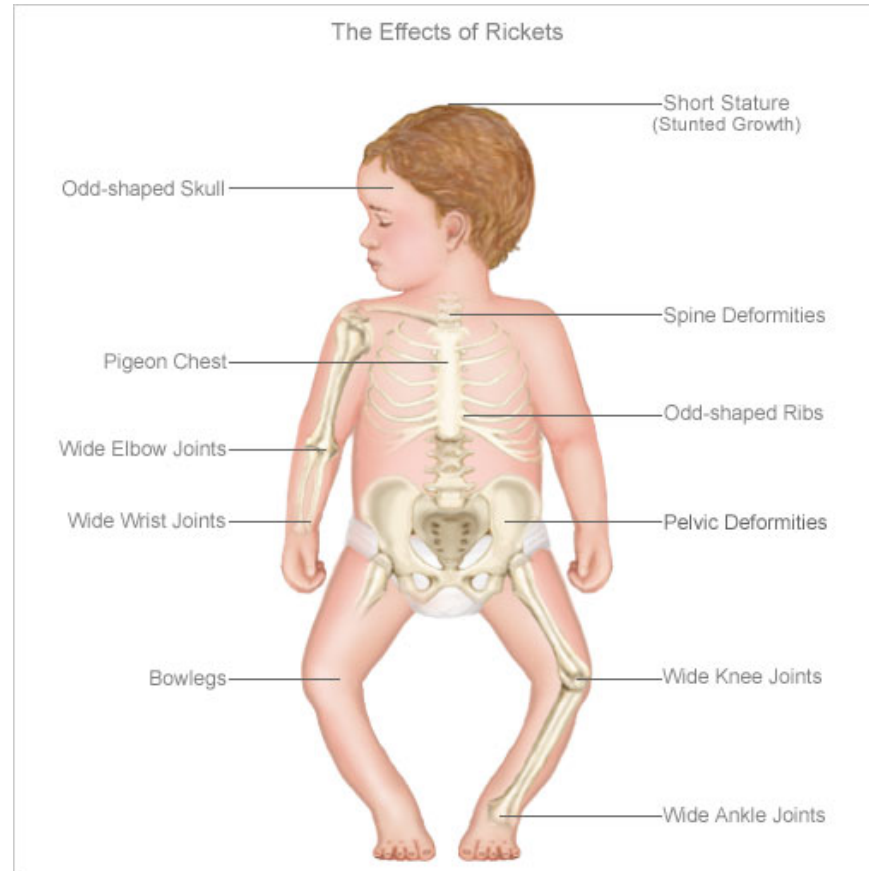
# JAUNDICE



# PHENYLKETONURIA (PKU)



# RICKETS

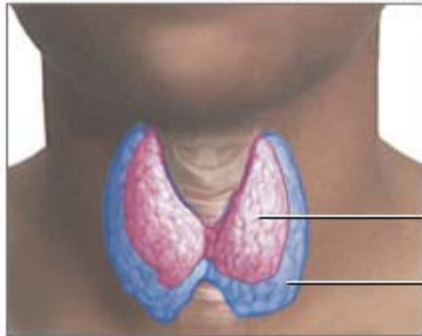




# THYROTOXICOSIS



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



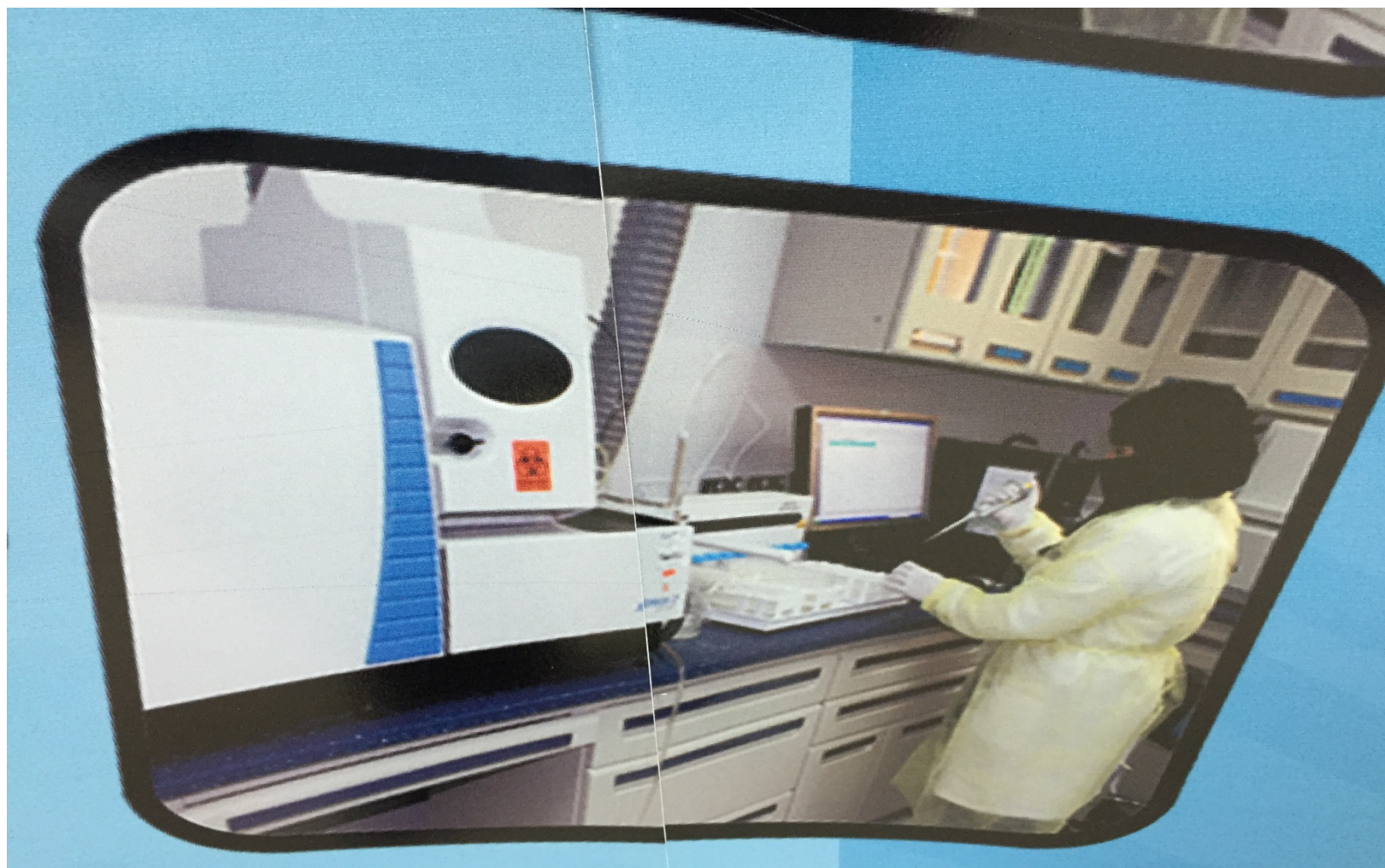
# RECEIVING BENCH



# 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



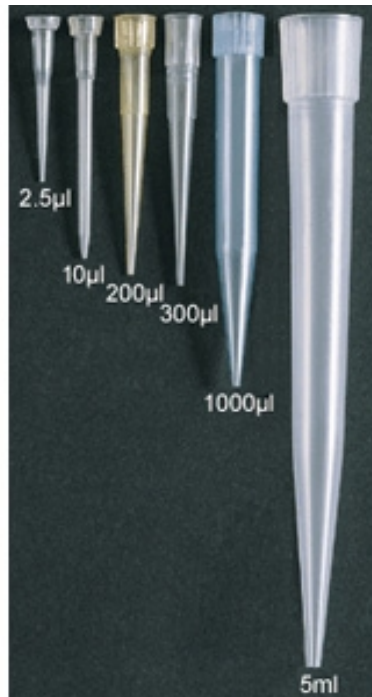
# LAB EQUIPMENTS



Eppendorf tube



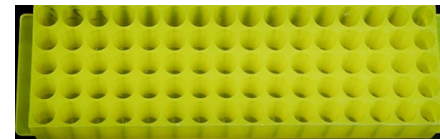
Cuvettes



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

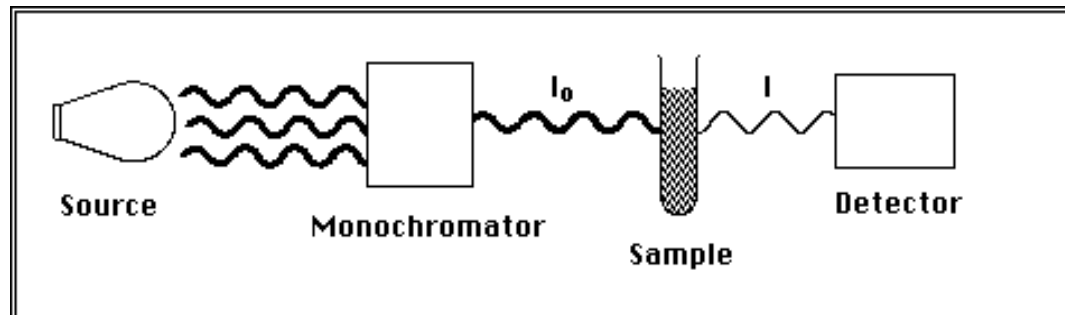


Figure 1

# LET'S VISIT THE BIOCHEMISTRY LAB

