Lab.1

**Safety in the Laboratory**

Quite common hazards and accidents can occur in the Laboratory. The need and importance of laboratory safety should be the real concern of the laboratory.

**Source of Laboratory Hazards:**

1. Physical.

2. Chemical.

3. Biological.

**1. Physical Hazards:**

A. Burns.

B. Electrical shock.

C. Cuts.

**2. Chemical Hazards:**

A. Toxic harmful chemicals.

B. Explosive chemicals.

C. Flammable chemicals.

D. Kinds of chemicals.

E. Carcinogens.

**3. Biological Hazards:**

Laboratory acquired infections: Infections can be caused by:

1. Pathogens being inhaled in aerosols (airborne droplets).
2. Pathogen being ingested from contaminated fingers, or in food that has been contaminated, e.g. by being stored in a laboratory refrigerator.
3. Cuts, scratches, insect bites, and sores or other open skin lesions. Laboratory workers must always handle infected needles with great care.
4. Pathogens can also be acquired from unclean or non disinfected room floors and walls, water taps, and laboratory benches.
5. Pathogens are acquired directly through careless contacts with patients or carrier staff through breathing, hand contact, etc.

**Safety Measures**

**1.1. Safely Designed and Organized Laboratory**

1. Adequate floor, benches, and storage space.
2. A floor that is well constructed with a surface that is nonslip, impermeable to liquids, and resistant to those chemicals used in the laboratory.
3. Walls those are smooth, free from cracks, impermeable to liquids, and easily washable.
4. A door at each end of the lab. So that lab. staff will not be trapped, also it should be a firebreak out.
5. Adequate ventilation with windows that can be opened.

**1.2. Safe Use of Laboratory Equipments**

A. Positioning.

B. Installation.

**1.3. Safe Use of Electrical Equipments**

**1.4. Safe use and Storage of Chemicals and Reagents**

Labeling of dangerous chemicals and reagents to reduce accidents caused by chemicals, many countries have introduced legislations requiring manufacturers to label dangerous chemicals with hazard symbols and to provide simple safety instructions. The six accepted danger symbols currently in use are: toxic, corrosive, explosive, oxidizing, highly flammable, and harmful or irritant. The safe use and storage of these hazardous chemicals is presented in detail in the lecture note introduction to med Lab.



*Highly Flammable Oxidizing Corrosive Toxic harmful or Irritant*

Figure 1: Common symbols of hazard

**1.5. Preventing Laboratory Infection**

All specimens received in the lab should be regarded as potentially pathogenic. For example, a blood specimen sent for measuring hemoglobin may contain highly infectious organisms.

**Laboratory acquired infections can be prevented by:**

1- Practicing personal hygiene.

2- Wearing of Laboratory masks, safety goggles, covering sachets for shoes & hair, coat or smock and protective gloves.

3- Safe handling of specimens and infectious materials.

4- Avoiding mouth-pipetting.

5- Disposing safely of specimens and contaminated materials.

6- Being immunized against highly infectious pathogens.

7- Cleaning, disinfection, sterilization, and disposal of biohazard waste.

**Other Important Laboratory Safety Instructions & Ethics (List of Do not!):**

1. Do not eat food, drink beverages, or chew gum in the lab. Do not use lab glassware as containers for food or beverages.
2. Work area should be kept clean and tidy at all times before & after performing the experiment.
3. Do not touch any equipment, chemicals, or any other materials in the laboratory or work alone until instructed to do so by the teacher.
4. Be prepared for your work in the laboratory before entering to the laboratory. Read all labels, equipment instructions, and procedures carefully or thoroughly before use. Set up and use equipments as directed by the teacher.
5. Experiments must be personally monitored (don’t rely on the others).
6. Do not and never wander around or fool around in the laboratory, horseplay, practical jokes, distract or startle other students, and pranks are dangerous and prohibited. Also don’t interfere with the laboratory experiments of others.
7. Dispose of all chemical waste properly. Never mix chemicals in sink drains. Sinks are to be only for water. Find the suitable way for disposal of chemicals and solutions.
8. Keep hands away from face, eyes\*, mouth (wear safety goggles and masks esp. with chemicals, heat or glassware), and body while using chemicals or laboratory equipment. Wash your hands with soap and water after performing all experiments.
9. Know the locations and operating procedures of all safety equipments including: first aid kit(s), and fire extinguisher. Know where the fire alarm and the exits are located. Know what to do if there is a fire drill; containers must be closed, and any electrical equipment turned off.
10. Dress properly during a lab activity. Dangling jewelry and loose or baggy clothing are hazard in the laboratory. Dangling jewelry and baggy clothing must be secured. Shoes must completely cover the foot. No sandals allowed on lab days.

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\*Contact lenses are preferred not to be worn in the lab.