

SAFETY MEASURES IN THE LAB

DON'T GO
BLINDY
INTO THE LAB



PREVENTION
MEANS
THINKING
BEFORE DOING



UNIVERSITAT DE
BARCELONA

Oficina de Seguretat,
Salut i Medi Ambient



SAFETY MEASURES IN THE LAB

1. When you enter the laboratory

Familiarise yourself with the evacuation routes, extinguishing media and first aid equipment available:

a) Locate all exits, emergency and non-emergency, in the event of a possible evacuation.

b) The exact location of fire extinguishers, fire blankets, safety showers and eyewashes and their correct use must be known.

2. When you detect an emergency

Notify your supervisor or the caretaker's office.

Communicate the type of emergency, the place where it occurs, its consequences and your name.

Try to fight the emergency with the means at your disposal without endangering your life. If it is a fire, you should act as follows:

a) In the event of a small fire: extinguish it by using a suitable fire extinguisher or by covering the fire with a suitably sized container to smother it. Remove flammable chemicals from around the fire. Never use water to extinguish a fire caused by the ignition of a solvent.

b) In the event of a large fire: Isolate the fire. Use appropriate fire extinguishers. If the fire cannot be controlled and you have reported the fire, evacuate the laboratory quickly. Stay calm, do not run or shout.

3. When you hear an evacuation warning

Before leaving the workplace, you must switch off all equipment that you would not leave running at the end of your work in the laboratory.

Do not dawdle.

Follow the evacuators' instructions. If you are alone, leave the building following the evacuation route indicated.

Close all doors. Go to the assembly point indicated on the plans distributed throughout the building. Never use the lifts.

4. Eye protection and work clothing

Safety glasses must be worn at all times when in the laboratory. If contact lenses are worn, and in the case of people who normally wear glasses, it is advisable to wear prescription safety glasses or goggles.

The mandatory work clothing is the lab coat. Closed shoes are recommended, as well as cotton clothing that protects the extremities from possible direct contact with chemical products, in case of splashes.

5. Basic hygiene rules

Never eat, drink or smoke in the laboratory.

Do not store food or drink either in the laboratory or in your work clothes, as they may become contaminated during handling, with possible splashes or vapours of chemical products.

Always wash your hands after any handling and before leaving the laboratory.



6. Conditions of the work area

The order and cleanliness of the work area is the first condition to avoid accidents, it must be as free as possible, therefore, take only what is strictly necessary to carry out your work, and leave personal objects in cupboards.

7. Conduct in the laboratory

Be responsible: your attitude in the laboratory is important to avoid accidents.

8. Experiments in the laboratory

Only those experiments expressly authorised by the supervisor may be carried out in the laboratory. In case of doubt, always consult your supervisor before improvising solutions that may cause accidents.

9. Equipment and apparatus

Before starting an experiment, inform yourself about the functioning of the equipment and apparatus you are to use and ensure that the set-ups and apparatus are in perfect working order, and always leave them clean and in proper working order at the end of the experiment.

10. Heating liquids in the laboratory

When heating liquids, it is preferable to use heating plates or baths to avoid the presence of flames in the laboratory. Containers that are heated must never be hermetically sealed, because overpressure may occur, and they may explode.



_HANDLING OF BIOLOGICAL AGENTS

If handling non-pathogenic biological samples or agents:

1. Wear gloves if you have wounds or skin lesions.
2. Wash your hands at the beginning and end of the day and after any technique that may involve contact with infectious material.
3. Use mechanical pipetting devices; do not pipette with your mouth.
4. Use extreme care when handling sharp or pointed objects.
5. Any technique or handling must be performed in a manner that minimises the generation of aerosols.
6. Work surfaces shall be decontaminated at least once a day and whenever there is a spillage of infectious material.

If you handle blood, other body fluids, cultures, pathogens, etc., you should also take into account:

1. Vacuneu-vos dels agents manipulats o potencialment presents (hepatitis A, B, tètanus...).
2. Work in a biosafety cabinet, especially if you carry out procedures where you can generate aerosols or if you use large volumes or high concentrations of infectious agents.
3. Always wear gloves and safety goggles when contact with infectious materials is possible.

_HANDLING OF CHEMICAL PRODUCTS

Many chemicals can be dangerous by their own characteristics (toxic, corrosive, irritant, flammable...), or by reacting with other substances. That is why, before handling chemical products:

- a) You must inform yourself of their dangerousness or reactivity and know the possible dangerous reactions that can occur during their handling;
- b) Familiarise yourself with the hazard pictograms;
- c) Read carefully the risk phrases (R/H phrases), and the safety advice (S/P phrases) on the labels.
- d) Be familiar with the information given in the safety data sheets for each chemical.

Handling of chemical products

1. Do not inhale, taste or smell chemicals.
2. Work under fume hoods whenever you carry out experiments that may emit gases or vapours, and whenever you handle toxic products. Periodically check its operation.
3. You must maintain a clean working environment, so it is important both to ventilate the laboratory and to keep closed all types of containers used. This minimises the risk of accidental spillage of chemicals.

In case of accidental spillage of chemicals, the spill should be



collected immediately, using absorbent products.

4. Always wear a lab coat, safety goggles and gloves to protect you from any contact with chemicals. This is the basic laboratory equipment, which you must take off when you leave the laboratory.
5. Choose the right container for each type of chemical and label prepared solutions appropriately. Do not use products that are not correctly labelled.
6. A person should never be alone in the laboratory, especially if he/she must perform hazardous operations with chemicals.

_RADIOISOTOPES

1. Radioactive material consists of unstable nuclei which are transformed while emitting ionising radiation.
2. Only personnel who have received prior training by the Radiation Protection Department may work with radioactive material.
3. Radioactive material must be always marked, both in the case of radioactive chemicals (non-encapsulated sources) and solid radioactive material immobilised in an inert sheath (encapsulated sources).
4. Areas where radioactive material is handled or stored require administrative authorisation prior to the start of their



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operation. These areas constitute Radioactive Installations.

5. The management of radioactive waste must be carried out in a procedural and duly authorised manner.

6. Radioactive material basically presents two types of risk:

a) Of contamination: when the radioactive material is deposited directly on work surfaces, clothing, externally to the body or internally (with incorporation through ingestion, inhalation or wounds).

b) Irradiation: when, despite being at a certain distance from the radioactive material, part of the ionising radiation emitted is received.

7. In order to minimise the risk of irradiation, three basic variables must be considered:

- a)** exposure time
- b)** distance from the source
- c)** intervening shielding

_WHAT TO DO WITH WASTE?

1. Do not pour chemicals or biological agents down the drain. They can cause violent reactions, clog water pipes, and pollute rivers and aquifers.

2. Place each waste product in the corresponding container, following the UB's existing classification system. Before throwing away any product, check which container it should be placed in, always avoiding mi-

xing waste from different categories.

Paper, glass, contaminated gloves and the material used to collect spills must not be thrown in the waste bin but must be treated like other chemical and biological waste.

3. Uncontaminated material, such as paper, plastic or glass, can be recycled by depositing it in the selective collection containers.

4. As with products, laboratory waste must be handled with great care, taking appropriate protective measures (use of personal protective equipment, avoid transferring, do not mix incompatible products, etc.).

5. To avoid a product becoming waste, ask the laboratory manager for advice on how to reduce the amount of product used in the experiment or reuse the by-products.

_ERGONOMICS

Working postures and over-exertion. Postural habits and safe behaviour:

1. Always maintain relaxed and comfortable postures that keep the spine straight and aligned, i.e. gently pull your shoulders back, keep your head up with your neck straight, your belly in and your abdominal muscles contracted.

2. Place your work utensils on the table, in an organised manner, according to frequency of use.



3. Adapt the height of the work surface to the type of effort being made.

4. When standing for lengthy periods of time, try to move your feet and distribute the weight of the load; it is advisable to place one foot on a higher support and alternate between them.

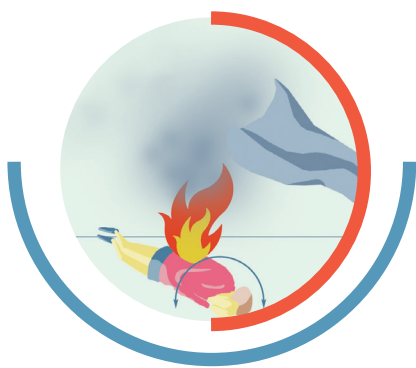
5. Adjust the height of the chair to the type of work:

- a)** Sit as far back in the chair as possible and rest your back against the backrest.
- b)** Place your feet firmly on the floor.
- c)** Use a footrest if necessary.

6. When lifting a load, use the weight of your own body, i.e. bend down and bend your legs, without leaning your torso forwards.

7. Exercise work habits, whenever possible:

- a)** Take micro-breaks and take the opportunity to stretch.
- b)** Rotate tasks.
- c)** Don't become fatigued.



_ IN CASE OF FIRE

Fire in the laboratory

Notify the building's Information Point as soon as possible. Also warn all your work colleagues, without stretching the panic and always remaining calm. Evacuate the laboratory, no matter how small the fire, by the main exit or by the emergency exit if the previous one is blocked. When evacuating, close the doors you have left behind.

Small fires: If the fire is small and localised, while the Information Point is notified and the majority evacuates the laboratory, a small number of you can try to extinguish it using a suitable fire extinguisher, sand or by covering the fire with a suitably sized container. Remove any flammable chemical products around the fire. Never use water to extinguish a fire caused by the ignition of a solvent.

Large fires: Isolate the fire. Use the appropriate fire extinguishers. If the fire cannot be controlled quickly, activate the fire alarm, notify the fire extinguishing service and evacuate the building.

Fire in the body

If your clothes catch fire, call for help immediately. Stretch out on the ground and roll over yourself to extinguish the flames. Do not run or try to reach the safety shower unless it is very close to you. It is your responsibility to help someone

who is on fire. Cover him/her with a fire blanket, take him/her to the safety shower if it is nearby or roll him/her on the floor. While these operations are being carried out, someone must report the incident to the Information Point.

The use of a fire extinguisher on a person is the last option to extinguish the fire, and it must be done at a prudent distance.

Once the fire is out, keep the person lying down, make sure they do not catch cold and make sure that medical assistance is on the way.

_ IN CASE OF ACCIDENT: FIRST AID

Cuts and punctures

In case of a cut or wound, wash it thoroughly with soap and running water for 10 minutes, disinfect the wound with an antiseptic and cover it with a sterile dressing.

If the wound is bleeding profusely, compress it directly with sterile gauze or a clean handkerchief while keeping the affected limb elevated.

Biohazard accidents

In case of an accidental puncture with biological risk, apply pressure on the area to provoke bleeding, wash the wound with water and soap and then disinfect it with an antiseptic.

In case of splashes to the mucous membrane of the eye or mouth with biological risk, wash with abundant running water or



physiological serum for 10 minutes.

Traumatisms

In case of limb trauma (contusions, sprains, dislocations and fractures) apply local cold and immobilise the joint above and below the point of injury. If it is an arm, remove the watch, rings and bracelets. Go to a health centre.

In case of an open fracture of a limb, cover it with a sterile wet gauze, immobilise it and take it to a health centre or call 112.

Thermal burns

Small thermal burns should be treated by cooling the area by immersion in water for a period of 15 minutes. Avoid direct impact of the water jet on the affected area. Remove clothes, rings and bracelets. Do not remove the clothes adhered to the body. Do not use ointments or any other medicine or product.

Do not burst the blisters; if they should burst, apply an antiseptic, cover with sterile gauze and refer the patient to a medical centre.

Burns affecting a large area of the body require urgent medical attention (112).

Chemical splashes and burns

Immediately wash the surface that has come into contact with the product under running water for at least 15 minutes, while removing clothing, rings or bracelets. For washing, use the washbasins or safety showers in case of large surfaces. Always respect the washing times.

In all cases, have the injury assessed by a doctor.

Eye accidents

Foreign bodies: Do not rub your eye. Rinse with a sterile syringe filled with water, pouring it under pressure over the eye. Repeat as many times as necessary. If the body is stuck, do not try to remove it, cover the eye with a sterile dressing and go to a health service with an ophthalmological emergency service.

Thermal burns or chemical splashes: Wash the eye immediately with plenty of water for at least 20 minutes, holding the eyelids open with your fingers. Afterwards, go to a health centre with an ophthalmological emergency service.

Trauma: Whether it is closed (contusion) or open (wounds), cover the eye with gauze and go to a health centre with an ophthalmological emergency service.

Poisoning by chemical products

Poisoning by ingestion: Call 112 for urgent medical attention first. Monitor the victim's consciousness and breathing. While awaiting the arrival of medical personnel, if the person is conscious, keep them supported, never induce vomiting if the product ingested is caustic or corrosive. If the person is unconscious, put him/her in a lateral safety position, loosen clothing and cover him/her.

Poisoning by inhalation: Remove the casualty to fresh air. Call for emergency medical help. Check consciousness and breathing and if the person is unconscious and not breathing, call 112 and start CPR (cardio-pulmonary resuscitation).

_In case of medical emergency CALL IMMEDIATELY 112. In all cases, communicate the accident to the OCCUPATIONAL MEDICINE UNIT / OSSMA (24597)

For more information on referrals:

<https://www.ub.edu/ossma/en/safety-health/take-care/even-accident>

_ HAZARD PICTOGRAMS



Toxic (T) Very tòxic (T+)
Carcinogenic, mutagenic and / or toxic for reproduction



Harmful (Xn) / Irritant (Xi)



Corrosive (C)



**Highly flammable (F) /
Extremely flammable (F+)**



Explosive (E).



Comburent (O)



**Dangerous for the
environment (N)**



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