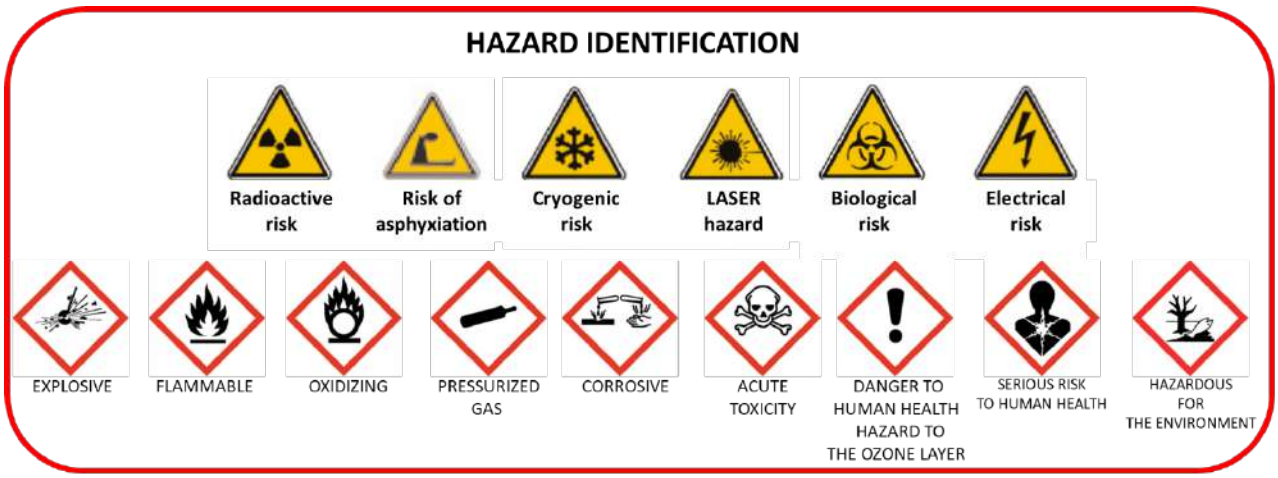
CENTRE DE RECHERCHE
DES CORDELIERS



PREVENTION

OF OCCUPATIONAL RISKS at CRC

Fall 2022

Université Paris Cité

Inserm
La science pour la santé
From science to health

SORBONNE UNIVERSITÉ

Table of contents

PREAMBLE

This document is intended for all persons working at the Cordeliers Research Centre (CRC) or UMRS 1138, and more particularly for newcomers, whether they are trainees, master's or thesis students, post-doctoral fellows, senior researchers or administrative staff, whatever their status (permanent or fixed-term contract) and whatever their employer (INSERM, CNRS, Sorbonne University, Université Paris Cité, APHP, association, etc.), **as we are all involved in the prevention of occupational risks.**

Its content has been determined in agreement with the CRC's health and safety officers (HSO) and the information quoted comes from documents on the prevention of professional risks from INSERM, Sorbonne University, CNRS and INRS (Institut National de Recherche et de Sécurité). **This booklet complements the CRC's Internal Regulations and aims to summarise the rules and recommendations on occupational risk prevention and their application within the CRC.** Its content is therefore not exhaustive, but each section indicates the resources to be consulted for further information. These are available on the CRC's intranet website, and on the intranets of the CRC's supervisory bodies, including Sorbonne University and INSERM.

We hope that this booklet will be useful to you and wish you a wonderful scientific and human experience at CRC,

The occupational risk prevention officers of CRC

PS : We strongly recommend reading the CNRS "Advice for newcomers" booklet (https://bip.cnrs.fr/wp-content/uploads/2020/03/Advice-for-newcomers-v18-06-2015.pdf) which is written in English

MY OCCUPATIONAL HEALTH AND SAFETY PREVENTION MEMENTO (*to be completed*) :

Location of the Occupational Health and Safety Register in my team :

Building :

Level :

Office :

List of preventionists in my team :

Everyone have to know who are the preventionists in their team or department :

Hygiene and Safety Officer (HSO) / Contact person for occupational health and safety :

- Name, first name :
- Phone N° :

- **Biosafety Level 2 Laboratory referent :**
  - Name, first name :
  - Phone N° :

- **Liquid nitrogen and -80°C freezers referent :**
  - Name, first name :
  - Phone N° :

- **Air conditioning and ventilation referent :**
  - Name, first name :
  - Phone N° :

- **Laser referent :**
  - Name, first name :
  - Phone N° :

- **Occupational first aiders :**
  - Name, first name :
  - Phone N° :

  - Name, first name :
  - Phone N° :

- **Fire evacuation agents : guide / deputy guide :**
  - Name, first name :
  - Phone N° :

  - Name, first name :
  - Phone N° :

- **Fire evacuation agents : queue clamp / deputy queue clamp :**
  - Name, first name :
  - Phone N° :

  - Name, first name :
  - Phone N° :

I. SOME REGULATORY REMINDERS

As the saying goes, "no one is supposed to ignore the law". In terms of occupational prevention, the basis of the regulations is contained in Articles L4111-1 to L4831-1 of the Labour Code (1).

Articles L4121-1 to L4121-5 detail the employer's obligations in terms of occupational risk prevention. Thus, Article L4121-1 stipulates:

« The employer shall take the necessary measures to ensure the safety and protect the physical and mental health of workers.
These measures include:
1° Actions to prevent occupational risks, including those mentioned in Article L. 4161-1 ;
2° Information and training actions;
3° The setting up of an organisation and appropriate means.
The employer shall ensure that these measures are adapted to take account of changing circumstances and aim to improve existing situations. »

In return, Articles L4122-1 to L4122-2 explain the obligations of workers. Article L4122-1 mentions in particular::

«In accordance with the instructions given by the employer, under the conditions laid down in the internal regulations for companies required to draw up such regulations, ***each worker has a responsibility to take care, in accordance with his or her training and abilities, of his or her own health and safety and that of others affected by his or her acts or omissions at work*** *.*

The employer's instructions shall specify, in particular where the nature of the risks justifies it, the conditions of use of work equipment, means of protection, dangerous substances and preparations. They shall be adapted to the nature of the tasks to be performed. »

It is therefore everyone's responsibility to respect the regulations and to use the means provided by the employer, the Research Centre or his/her team to protect him/herself from the risks to which he/she is exposed in the course of his/her professional activity and to protect his/her colleagues, his/her working environment and the Environment.

In concrete terms, in the event of an accident, if it is proven that the victim did not respect the recommendations and the means put in place by the employer for his/her protection, the accident at work will not be systematically recognised. In case of non-recognition of the accident at work, the medical costs will be borne by the victim.

In addition to the Labour Code, depending on the situation, such as in the case of handling genetically modified organisms (GMOs) or animal experimentation, European directives and/or decrees supplement the regulatory obligations and recommendations.

II. USEFUL CONTACTS

USEFUL CONTACTS FALL 2022

DIRECTION:

CRC Director	Jessica ZUCMAN-ROSSI	06 01 07 78 75
General Secretary	Catherine D'ASTIER	06 08 23 91 60
Scientific Animation director	Isabelle TRATNER	06 87 11 13 15
Financial & Human resources manager	Martine Dutilleul	(0) 01 44 27 64 22
Unit Health & Safety manager	Marie-Noëlle Navas	(0) 01 44 27 90 42
Laboratory support staff	Brigitte Jarrin	(0) 01 44 27 64 80

CORE FACILITIES:

Core facilities scientific director	Chiara MAIURI	06 19 37 76 23
Containment L2 facility managers	Audrey Didelot Delphine Le Corre	(0) 01 44 27 54 18
Containment L3 facility manager	Maxime Lecerf	(0) 01 44 27 82 08 or 07 64 76 90 79

OCCUPATIONAL HEALTH & SAFETY:

Cryogenic Risk	Didier JEAN	06 73 32 16 01
Hazardous waste management	Georges ZADIGUE	07 68 02 24 39
Lab dishes cleaning room / autoclave	Sylvie LACHKAR	06 10 98 41 86
Biological risk and ventilation	Marie-Noëlle NAVAS	07 63 99 50 32
Chemical risk	Cécile GODARD	(0) 01 44 27 37 44

CAMPUS DES CORDELIERS:

Reception and logistics :	(0) 01 44 27 68 96 / 06 89 03 00 39
Technical problems :	(0) 01 44 27 68 90
In case of theft or assault :	06 10 84 59 46/ 06 32 16 20 03

EMERGENCY CALLS :

In case of illness	Emergency medical service	15 / 112
In case of fire, accident or injury	Fire department	18 / 112

AND THEN CALL MARIE DONATIEN
06 10 84 59 46

ON-CALL DUTY CORDELIER CAMPUS : 06 32 16 20 03

Head of Campus des Cordeliers :

Marie DONATIEN : 01 44 27 68 90| 06 10 84 59 46 ; marie.donatien@sorbonne-universite.fr

Links for requests at the Cordeliers Campus :

For campus access request with parking space :

https://inscriptions.sorbonne-universite.fr/lime25/index.php/389833?lang=fr

For a request for technical assistance or work :

https://inscriptions.sorbonne-universite.fr/lime25/index.php/764465?lang=fr.

Validation of work carried out : *marie.donatien@sorbonne-universite.fr*

To request a reservation for a room or lecture hall :

https://inscriptions.sorbonne-universite.fr/lime25/index.php/218321?lang=fr

Hotline SU (problems with telephony, messaging…) :

https://hotline.sorbonne-universite.fr/plugins/portail/front/portail.php

Contact details of occupational physicians

INSERM staff:

Médecine du travail de la Délégation Régionale IDF Paris Centre Est:
Docteur Aurélie Rousselet: aurelie.rousselet@inserm.fr
Request for an appointment for a medical examination : medprev.idf@inserm.fr; Tel: 01.49.28.46.57

Sorbonne Université or CNRS staff:

Service Médecine de prévention: smp@sorbonne-universite.fr
Reception: from 8.30 am to 5.30 pm, Monday to Friday. Tel: 01 44 27 76 20
Campus Pierre et Marie Curie, Barre 55-56 niveau Jussieu
Occupational health nurses : 01 44 27 23 07
Request for an appointment for a medical examination : 01 44 27 39 33
If your call is not answered, it means that the line is already busy. Do not hesitate to call back or to leave an e-mail with your telephone number on the box infirmerie@sorbonne-universite.fr, the nurses will call you back as soon as possible.
For reasons of service organisation, if you are unable to attend the medical visit, please inform the service on the following number: 01 44 27 39 33.

Université de Paris Cité staff :

Médecins du travail Campus Saint-Germain des Prés:
Docteur Mireille Podchlebnik **:** mireille.podchlebnik@u-paris.fr (ex Diderot)
Docteur Laurent Zavidovique : laurent.zavidovique@u-paris.fr
To request an appointment, please contact :
Madame Lydia Amphiarus : lydia.amphiarus@u-paris.fr
or Madame Wided Marzouk : wided.lajili@u-paris.fr

Contact details of Health and Safety managers of CRC's supervisors :

Please add the Unit Health and Safety Manager (marie-noelle.brunelle-navas@sorbonne-universite.fr) in copy of all your correspondence.

Faculté des Sciences et de l'Ingénierie (FSI) de Sorbonne Université :

Sarah CHIMBAULT : 01.44.27.35.46 / 06 03 73 22 87 ; sarah.chimbault@sorbonne-universite.fr

INSERM DR Délégation régionale Paris-IDF centre-Est

Véronique LAGARDE : Tél. +33 (0) 1.82.53.34.63 | Mob. +33 (0) 7.61.92.02.46 ; veronique.lagarde@inserm.fr

UFR de médecine Secteur Paris Centre, Université Paris Cité :

Olivier SALTIEL, olivier.saltiel@parisdescartes.fr

III. OCCUPATIONAL HEALTH AND SAFETY : WELCOME OF NEWCOMERS

All newcomers to the CRC must report to the Health and Safety Officer (HSO) or the Prevention Correspondent (PC) of their team or department (see Table I) for the statutory welcome. If there is no HSO or PC, the newcomer must report to the CRC Health and Safety Manager (HSM), Marie-Noëlle Navas.

HEALTH AND SAFETY OFFICERS					
Team / Service	**Location**	**Name**	**First Name**	**E-mail**	**☎**
Unit Health and Safety manager	Esc. B 2ème étage mezzanine	NAVAS	Marie-Noëlle	marie-noelle.brunelle-navas@sorbonne-universite.fr	01 44 27 90 42
3 - Gilles CRAMBERT	Esc. JBIS RDC	CHEVAL	Lydie	lydie.cheval@crc.jussieu.fr	01 44 27 50 10
5-Ariane BERDAL	Esc. E 2ème étage G	ASSELIN	Audrey	audrey.asselin-fiol@crc.jussieu.fr	01 44 27 55 87
		LOIODICE	Sophia	sophia.loiodice@crc.jussieu.fr	01 44 27 55 79
8 - Fabienne FOUFELLE	Esc. E 3ème et 4 étage G	TAN	Sophie	sophie.tan@crc.jussieu.fr	01 44 27 24 31
11 - Guido KROEMER	Esc. A 2ème étage	LACHKAR	Sylvie	sylvie.lachkar@crc.jussieu.fr	01 44 27 76 67
13 - Isabelle CREMER	Esc. E 3ème étage D	JOSSEAUME	Nathalie	nathalie.josseaume@crc.jussieu.fr	01 44 27 90 82
15 - Jérôme GALON	Esc. E 3ème étage D	LAFONTAINE	Lucie	lucie.lafontaine@upmc.fr	01 44 27 90 98
16 - Sébastien LACROIX-DESMAZES	Esc. E 4 ème étage D	LECERF	Maxime	maxime.lecerf@inserm.fr	01 44 27 82 08
19 - Santos SUSIN	Esc. E 2ème étage D	BROUSSE	Aurélie	aurelie.brousse@inserm.fr	01 44 27 90 39
26 - Pierre-Laurent PUIG	Esc. A2 RDC	MULOT	Claire	claire.mulot@parisdescartes.fr	01 44 27 54 18
28 - Jessica ZUCMAN-ROSSI	Esc. A - 1er étage G	SCHAEFFER	Samantha	samantha.schaeffer@inserm.fr	01 44 27 80 97
PLATEFORMES CRC	Bâtiment de la Surélévation RDC	GODARD	Cécile	cecile.godard@inserm.fr	01 44 27 37 44
CEF	Esc. G	ZADIGUE	Georges	georges.zadigue@sorbonne-universite.fr	01 44 27 82 50
CHIC	Bâtiment de la Surélévation RDC	ARBARETAZ	Floriane	floriane.arbaretaz@crc.jussieu.fr	01 44 27 37 44
CGB	Esc. F 2ème étage	KAKANAKOU	Hermine	hermine.kakanakou@upmc.fr	01 44 27 92 07
PLATEFORME L3	Esc. E 2ème étage D	LECERF	Maxime	maxime.lecerf@inserm.fr	01 44 27 82 08
HEALTH AND SAFETY CORRESPONDENTS					
Team / Service	**Location**	**Name**	**First Name**	**E-mail**	**☎**
12- Michel ARTHUR	Esc. B 3ème étage	HUGONNET	Jean-Emmanuel	jean-emmanuel.hugonnet@crc.jussieu.fr	01 44 27 54 77
17 - Francine BEHAR-COHEN	Esc. B 2ème étage	TORRIGLIA	Alica	alicia.torriglia@inserm.fr	01 44 27 81 73
22 - Anita BURGUN	Esc. D - 1er étage				
24 - Sabine COLNOT	Esc. E 1 er étage	IDDIR	Akila	yasmine.iddir@sorbonne-universite.fr	01 44 27 60 36
25 - Chantal DESDOUETS	Esc. A - 1er étage D	GALY-FAUROUX	Isabelle	isabelle.galyfauroux@crc.jussieu.fr	01 44 27 69 07
27 - Marie-France MAMZER	Esc. F 2ème étage mezzanine				
PLATEFORME L2	Esc. F 2ème étage	DIDELOT	Audrey	audrey.didelot@parisdescartes.fr	01 44 27 54 18
		LE CORRE	Delphine	delphine.lecorre@parisdescartes.fr	01 44 27 54 18

Tableau I : List of CRC HSO and Prevention Correspondents.

Content of the statutory welcome :

- Explanation of the CRC's operations and procedures in terms of occupational prevention and of the team's own procedures
- Tour of the premises, including a presentation of all risk positions and procedures in the event of a fire
- Registration for Neo* training
- Identification of the premises/equipment needed by the newcomer to carry out his/her research work
- Orientation of the new entrant to the containment or equipment managers
- Definition of the new entrant's regulatory training needs (e.g. autoclave handling training)
- The newcomer signs a welcoming certificate in which he/she undertakes to comply with the procedures for the prevention of professional risks.

***What is Néo ?**

Néo is the dematerialised regulatory training course for raising awareness of risks in laboratories developed by the CNRS and used at INSERM and Sorbonne University. This training includes 4 independent modules, each followed by a quiz : prevention, fire risk, biological risk and chemical risk. Only the first two modules are required for administrative staff. Once the training has been validated, a certificate is issued. It is valid for all public service jobs. The Neo application is in French or English

If new entrants already have a certificate for Neo training, or equivalent training, they must provide this to their HSO/CP for transmission to the CRC Health and Safety Manager (HSM).

Warning : At CRC, this certificate is required for permission to work off-hours or as a lone worker.

IV. ORGANISATION OF OCCUPATIONAL RISK PREVENTION AT THE CRC

The CRC is under the supervision of INSERM, Sorbonne University and the Université Paris Cité, and Gilles Crambert's team is accredited by the CNRS. The CRC therefore benefits from the prevention departments of all these supervisory bodies, to which it is also accountable. Sorbonne University plays a particular role as the CRC's host : the Cordeliers Campus is managed by the Sorbonne University's Heritage and Logistics Department (DPL in French). As for the CRC, it is part of the Faculty of Science and Engineering (FSI) of Sorbonne University, a faculty that has an occupational health and safety departement (Service de Prévention des Risques Professionnels or SPRP).

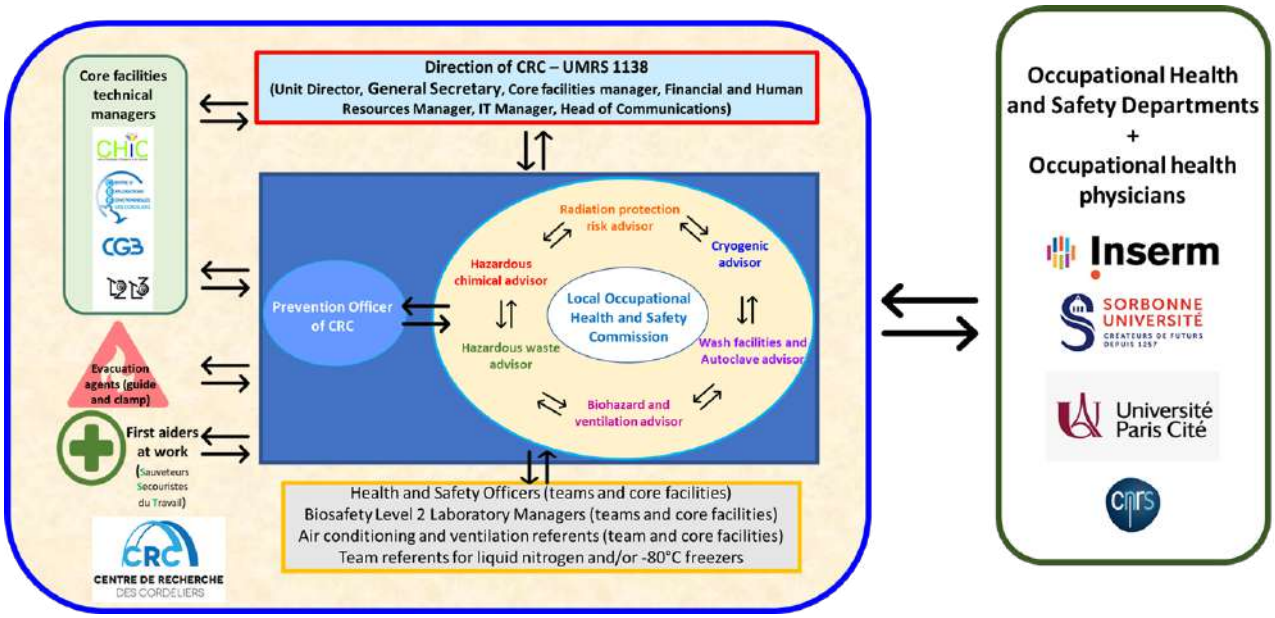


Figure 1 : Organisation of occupational health and safety at CRC

V. TRACEABILITY IN OCCUPATIONAL HEALTH AND SAFETY

(https://www.inrs.fr/demarche/tracabilite/ce-qu-il-faut-retenir.html)

Various documents are provided for in the regulations to ensure the traceability of certain information relating to the prevention of occupational risks. This information has various purposes, particularly in the context of workers' medical monitoring. Here are the main documents encountered by CRC staff.

1. Individual exposure sheets (Fiche individuelle d'exposition or FIE in French)

The employer is obliged to draw up records to ensure the traceability of workers' exposure. These forms are of interest to the worker (reconstitution of exposures during the professional career, useful in the event of an occupational disease) and his or her employer, but also to the prevention and occupational health services and the supervisory bodies.

At the CRC, two types of FIEs are to be filled in by the agents :

- FIE to hazardous chemicals

- FIE to optical radiation (laser use)

The FIEs are collected once a year by the CRC HSM through the teams' HSO or CPs to be sent to the employer of each agent. Please note that the forms are not identical from one employer to another !

2. **The Health and Safety Register** (http://www.prevention-risques-laboratoire.org/index.php/organisation-et-obligations/liste-des-registres)

This register, kept by the AP/CP, is made available to staff and must be accessible to all at all times. Observations, incidents, accidents and suggestions for improving health and safety are recorded.

At the CRC, the register model used is the INSERM one. Reports and remarks must be sent as soon as they are registered to the CRC HSM so that she can forward them to the Health and Safety Managers of the various supervisory bodies in order to analyse them and present them to the CHSCHT (health, safety and working conditions committee).

Figure 2 : Coverage of the INSERM Occupational Health and Safety Register

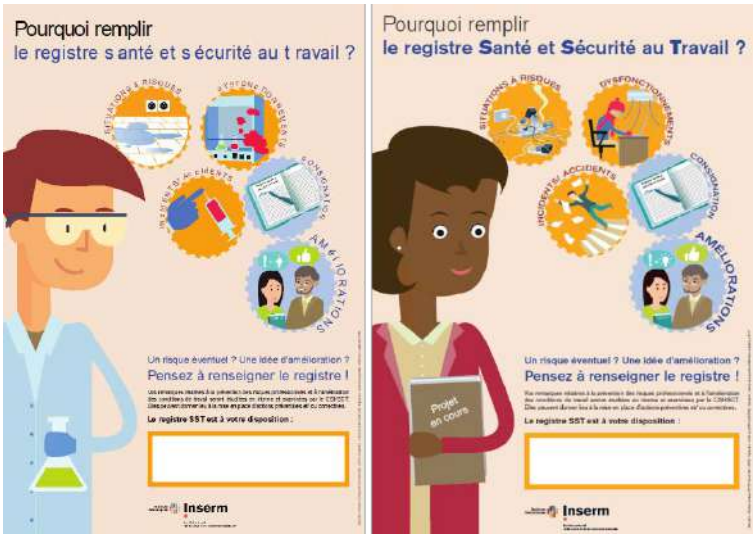


Figure 3 : INSERM occupational health and safety posters : left, poster for laboratories, right, poster for administrative departments

3. **The Single Risk Assessment Document** (Document Unique d'Evaluation des Risques or DUER in French)

The transcription of the assessment of occupational risks into a so-called single document is a l**egislative obligation** (Article 4121-1). Thus, the employer must identify and analyse the risks to which employees are subject in order to define corrective actions. The DU includes an inventory and ranking of the risks in each work unit as well as a **prevention action programme** to guard against risks.

The document must be **updated at least annually in order to monitor changes in risks, as well as after each major change in installation or protocol**. It is an effective basis for the prevention of occupational risks because the ranking of risks makes it possible to determine which prevention actions should be implemented as a priority.

As Sorbonne University hosts the CRC, it is its version of this document that is completed each year by the teams' HSO or CP via a dematerialised application, the EVRP. However, it is up to each team or department to report to the HSO or CP in order to produce the most complete risk assessment possible.

Once the risks and proposals for action have been drafted, the CRC HSM and then the CRC Director validate them. The Single Risk Assessment Document is then sent to all the Health and Safety managers of CRC's supervisors. Based on this document, the CRC HSM also draws up an inventory of the priorities to be dealt with, which is presented to the Local Occupational Health and Safety Commission. The commission then draws up an action plan for the year.

The Single Risk Assessment Document is requested by Health and Safety Managers of the supervisory bodies and occupational physicians at each laboratory visit.

VI. BASIC RULES FOR WORKING IN A TEAM

1. Recommendations from Sorbonne University, CRC's host

See Fact Sheets no. 5 and 8 of the Service de Prévention des Risques Professionnelles de Sorbonne Université in appendix 1 and 2.

2. Other obligations, prohibitions and recommendations

a. Protective equipments

The purpose of collective protection equipement (CPE) and personal protective equipment (PPE) is to avoid any physical contact of the manipulator or his environment with a danger vector.
Except in special circumstances, PPEs must be regarded as a complement to CPEs and not as a substitute for CPEs.
These equipments (collective or individual) are specific to a given risk.
(https://pro.inserm.fr/rubriques/prevenir-accompagner-et-agir/prevention-des-risques/equipements-de-protection).

❖ Collective protection equipement (CPE)

CPEs are technical measures put in place for the containment of an activity. They allow the protection of the handler and his environment. Depending on the model, they can also protect the product being handled.

For the chemical risk, the main CPEs at the CRC are :

FUME HOOD (Sorbonne, norme NF EN 14175)

Principle : Air is drawn into the laboratory and discharged to the outside atmosphere (roof top). No filtration of the exhaust air.

Guidelines for use:

- Switch on for 5 minutes before use to stabilise the air flow
- Handle pollutants more than 15 cm away from the opening
- Respect the indicated window height (mark or stop)
- Leave on for 15 minutes after use with the window closed
- Not a storage area ⇨ ventilated cabinet

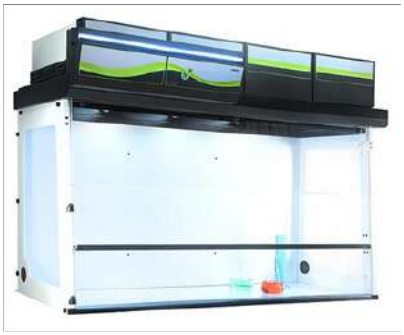
Efficiency: Universal protection against all chemicals.

MUST BE USED FOR :

- Products that may give off chemical, toxic or annoying vapours (acid, solvent, etc.)
- Carcinogenic, Mutagenic and Reprotoxic (CMR) products. To be completed by wearing PPE and respecting protocols

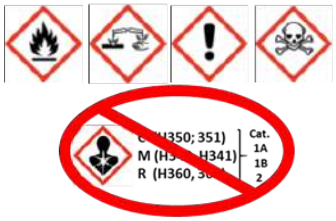
CHEMICAL HOOD (norme NF X 15 – 211)

Principle : The air is extracted from the working area, filtered by an active carbon filter and then released into the room.
To be reserved only if no access to a fume hood or as a supplement.



Guidelines for use:

- Keep the window down during handling.
- Switch on 15 minutes before use
- Allow to run for 15 minutes after use.
- Recommended speed: 0.4 to 0.6 m/s.
- Not for storage ⇨ ventilated cabinet



Efficiency: - Products that may give off chemical, toxic or annoying vapours (acid, solvent, etc.)

Only handle products for which the filter is suitable : see the list displayed on the device

Incompatible with the handling of CMR products

STORAGE CABINETS FOR CHEMICAL PRODUCTS :

There are different types of cabinets adapted to the products stored.
Use different cabinets for each class of product.
Ideally, the laboratory should have :

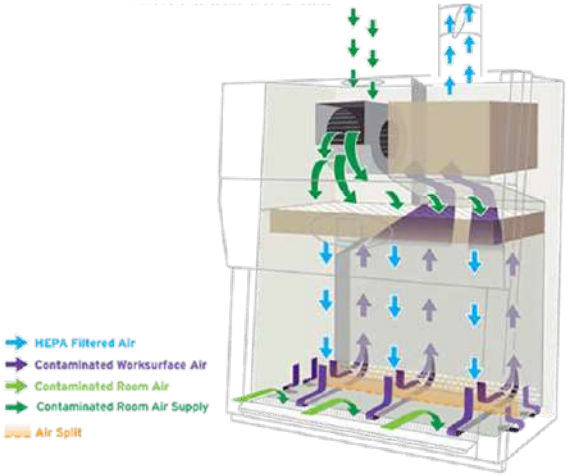
- a cabinet for acids and bases with insulated compartments
- a cabinet for flammable products (standard NF EN 14170 - 1)
- a cabinet for toxic, harmful or irritating products
- a lockable cabinet for CMR and acute toxicity products

For more information on storage cabinets :

- Intranet de Sorbonne Université : Prévention des risques professionnels : Consignes de sécurité et Fiches pratiques de prévention **:** Fiche 7 : Précautions d'utilisation des armoires ventilées

For the biological risk, the main CPEs at the CRC are :

TYPE II MICROBIOLOGICAL SAFETY CABINETS (MSC II, norme NF EN 12-469)



https://www.nuaire.com/resources/class-ii-type-b2-biosafety-cabinet-how-it-works-article

Principle: A stream of sterile air is pulsed through an absolute filter sweeping the working volume from top to bottom (avoids contamination of the manipulation). This air is then recycled through the work surface (environmental protection) creating a vacuum which causes air to enter through the guard vein (manipulator protection)

Guidelines for use:

- Wear PPE: labcoat, gloves, sleeves, etc.
- Use lowered glass at about 20 cm
- Handle at 10 cm from the guard vein
- Switch on 5 to 15 minutes before use to stabilise the air flow
- Disinfect before and after use

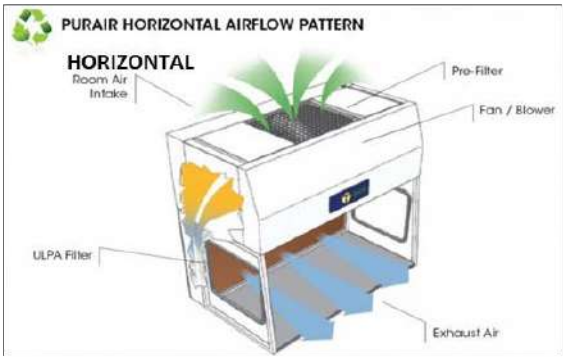
To avoid disturbing the air flow:

- Limit the material under the MSC II to what is strictly necessary
- Do not introduce a heat source (Bunsen burner)
- Do not make rapid movements
- Do not work with two people under a MSC

Efficiency: **This equipment is not designed to protect personnel from chemicals.**

- Protection of the experimenter and handling
- Suitable for handling Category 1 and 2 pathogens.

LAMINAR FLOW HOOD

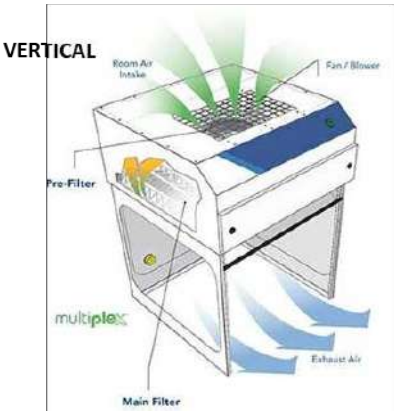


Principle:

The air is filtered through a filter and then blown to the manipulator. These hoods are available in horizontal (back to front) or vertical (top to bottom) configurations.

Guidelines for use: :

- Wear PPE: labcoat, gloves, sleeves, etc.
- Disinfect before and after use



Efficiency: Protection of the handling but not of the handler or his environment. Not to be used for handling pathogenic micro-organisms. **Not to be confused with an MSC.**

For more information on ventilated CPEs :

- Intranet de Sorbonne Université : Prévention des risques professionnels : Consignes de sécurité et Fiches pratiques de prévention : Fiche 6 : Précautions d'utilisation des hottes de laboratoires
- https://pro.inserm.fr/rubriques/prevenir-accompagner-et-agir/prevention-des-risques/equipements-de-protection: EPC
- Guide-risques-biologiques-CNRS-Edition-mai-2017

❖ Personal protective equipment (PPE)

As PPE is intended to protect the experimenter, it varies according to the risks encountered during experiments and the types of laboratory where they are carried out.

Safety level 1 laboratory (L1) :

PPE to be worn: Closed laboratory coat + protective goggles (CE marking + EN 166 standard) plus, depending on the case :

- **No handling of hazardous chemicals or biological products: :**
  - CE marked single-use gloves, NF EN 420, NF EN 374-1, NF EN 374-2
  - In case of weighing non-hazardous powder outside the Sorbonne or ETRAF : FFP1 mask to avoid inhaling particles.
- **Handling of hazardous chemicals : :**
  - PPE category III gloves. EN ISO 374-1 type B or A. NF EN 420 NF EN 374-1, tests according to : NF EN 374-2, NF EN 16523-1, NF EN 374-4 (15).
  - **CAUTION** : Hazardous chemicals should be handled under a laboratory fume hood or a recirculating air fume hood (formerly known as ETRAF) with filters adapted to the products handled. Wearing a mask is recommended and its nature varies according to the form of the product (powder, aerosol or gas) and the nature of the product (Sorbonne University's FACT SHEET No. 9, (14)).
- **Handling under UV light :**
  - Replace safety glasses with a face shield NF EN 166 + NF EN 170
  - Wear gloves adapted to the risks (chemical and/or biological)
- **Handling of dry ice or liquid nitrogen / "Nitrogen" room:**
  - Cryogenic gloves : NF EN420, NF EN388 **AND NF EN 511**. If there is a biological risk, wear gloves adapted to the biological risk under the cryogenic gloves : PPE category III, latex or nitrile type, NF EN 374-1,2,3 with the mention "Acceptable Quality Level" (AQL) of 0.65 (2)
  - Face shield to protect the face from liquid nitrogen splashes (risk of thermal burns), PPE category III, standard EN 166
- **Handling of category 3 and higher lasers :**
  - Do not wear contact lenses when using lasers
  - Wear protective glasses NF EN 207 with the CE marking and indication of the type of radiation treated, the wavelength treated and the attenuation level (16)
  - Wear disposable gloves adapted to the other risks present (biological and/or chemical)
- **Microtome handling :**
  - Anti-cutting gloves : EN388 : 4544

Safety level 1 animal facility (A1) :

- Disposable coveralls or labcoat made of non-woven material, standard EN 14126
- Disposable gloves PPE category III, latex or nitrile type, NF EN 374-1,2,3 with the mention "Acceptable Quality Level" (AQL) of 0.65 (2)
- Charlotte and disposable overshoes
- CE marked surgical mask and NF EN 14683 standard

Safety level 2 laboratory (L2) :

- PPE category III disposable labcoat, standard NF EN 141126
- PPE category III disposable gloves, latex or nitrile type with the mention " Acceptable Quality Level " (AQL) of 0.65 EN ISO 374-5 : 2016, Tests according to : NF EN 374-2. For handling viruses: NF EN 420 EN ISO 374-5, tests according to: NF EN 374-2, ISO 16604
- If a chemical risk is present, wear gloves adapted to the chemical risk over the gloves for the biological risk.
- Charlotte and disposable overshoes
- Wear a FFP2 mask
- Wearing protective glasses (standard EN 166) is recommended.

Safety level 2 animal facility (A2) :

- PPE category III disposable coveralls or labcoat standard NF EN 141126
- PPE category III disposable gloves, latex or nitrile type with the mention " Acceptable Quality Level " (AQL) of 0.65 EN ISO 374-5 : 2016, Tests according to : NF EN 374-2. For virus handling : NF EN 420 EN ISO 374-5, tests according to: NF EN 374-2, ISO 16604.
- Charlotte and overshoes
- Wearing a FFP2 mask
- The wearing of protective glasses (standard EN 166) is recommended.

Safety level 3 laboratory (L3) :

- Disposable full body suit made of non-woven material EN 14126 standard.
- Two pairs of PPE category III disposable gloves with an Acceptable Quality Level (AQL) of 0.65. PPE category III single-use gloves, latex or nitrile type with an Acceptable Quality Level (AQL) of 0.65 EN ISO 374-5 : 2016, Tests according to : NF EN 374-2. For virus handling : NF EN 420 EN ISO 374-5, tests according to : NF EN 374-2, ISO 16604
- Overboots + FFP2 or PPF3 mask and goggles (standard EN 166)

For more information on PPE:

- https://pro.inserm.fr/rubriques/prevenir-accompagner-et-agir/prevention-des-risques/equipements-de-protection: EPI
- Guide-risques-biologiques-CNRS-Edition-mai-2017
- Les cahiers de prévention du CNRS : risques chimiques

CAUTION :

The wearing of a lab coat is mandatory in the laboratory,

BUT PROHIBITED IN THE OFFICE OR DINING ROOM.

Do not clean your work clothes at home.

b. Good Laboratory Practice : General

In the laboratory :

Food and drink is strictly forbidden in the laboratory

Do not store food in refrigerators where chemicals and biological products are stored.

Do not obstruct corridors, stairways or emergency exits.

Leave safety equipment (fire extinguishers, showers, etc.) accessible.

Annotate the occupational health and safety register if you witness or experience an incident or malfunction.

If any equipment malfunctions, note this on the equipment and contact the person responsible immediately.

Ensure that stocks of pooled products are replenished.

Order only the smallest quantities needed

Do not intervene in the electrical distribution installations.

Request the intervention of the Campus Technical Service (see page 7).

The laboratory is kept clean, tidy and free from materials not related to the work

Follow the compulsory training courses related to your workstation

E.g. : animal experimentation, autoclave, use of L2...

c. **Organisation of an experiment** :

Before each handling :

Stress is a source of mistakes and accidents.

To avoid stressing yourself and your colleagues, and to work in good conditions, **you need to anticipate and plan experiments**, especially if it is the first time you are doing it or if it is in new conditions. You have to find the answer to all these questions :

- Is there someone who performs the same protocol as me and if so can we arrange a time for him / her to show me the equipment and procedures in the department ?
- What are the risks associated with each step of my protocol ?
- **What products will I be handling ? What hazards do they present ? How and where should I handle ?**
- Which collective or individual protection measures should I put in place ? Which collective protective equipment (CPE) to use and which personal protective equipment (PPE) to wear ?
- Where should I perform my experiment ? Under a Sorbonne ? In a L1, a L2? In a core facility ?
- Do I need to reserve a containment, a device or a facility? Where is it located ?
- Do I know how to use the equipment ? Do I need to be trained ?
- Will I encounter a lone worker situation ? If so, what are the procedures to follow to ensure my safety ?
- Are all the reagents and consumables I need available in the laboratory ?
- Do I know how to manage the biological and chemical waste I will produce during my protocol ?
- Is there a step where I can stop my protocol without risk to the outcome of my experiment ? If not, will I have to work off authorized hours ?
- Do I have permission to work off authorized hours and what are the procedures ?

During each handling :

Always handle in a way that minimises aerosol formation.

Do not smell a product.

Do **NOT** Recap a needle.

No sink discharge

During short absences (lunch breaks, conferences, etc.), put your experience on standby or entrust it to a colleague who remains on site.

Do not leave appliances plugged in overnight or unattended.

Change gloves regularly according to their use or as soon as they are damaged and/or soiled.

After each handling,

Work surfaces should be disinfected/cleaned after handling and after contamination. Example: clean bench and balance after weighing a chemical product

Knowing and respecting the waste disposal routes

RINSE your dishes before giving them to clean.

Dispose of the rinse water in an appropriate biological or chemical waste container. NO SINK DISCHARGE.

Wash hands before and after handlings.

When leaving the workplace

Close doors and windows

Turn off the lights when leaving the premises.

VII. MAIN RISKS IN THE CRC

The research topics dealt with at the CRC require the implementation of various techniques that necessitate the use of equipment and chemical or biological products, which are the source of the diversity of occupational risks encountered on this site, as illustrated in Figure 3. It is also common for an experimental protocol to expose the manipulator to a combination of risks, for example the combination of biological risk + chemical risk + fire risk.

The prevention approach in the case of a combination of several occupational risks requires a meticulous analysis which prioritises the risks according to their possible impact on the experimenter and the environment. In this configuration, it is always preferable to consult the HSO of one's team to ensure that the prevention measures planned by the experimenter are well adapted.

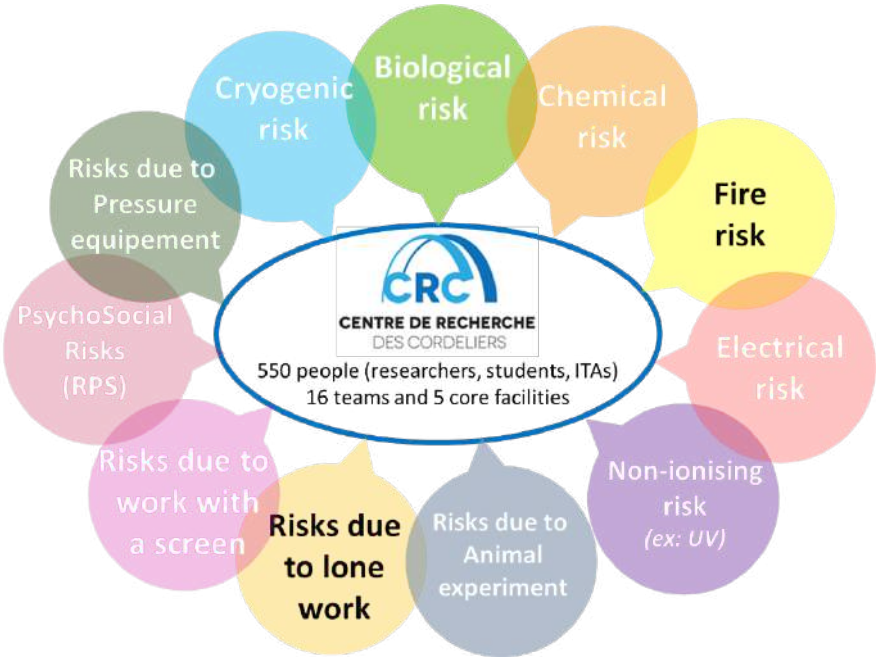


Figure 3 : Representation of occupational risks encountered at CRC

The following sections summarise the risks of exposure, the consequences and the main means of prevention. As biological and chemical risks are the two major risks at CRC, the sections devoted to them are more developed.

Biological risk

***Please note** : All the information below is taken from the Guide-risques-biologiques-CNRS-Edition-mai-2017 available on the Internet and strongly recommended for reading.* (https://bip.cnrs.fr/wp-content/uploads/2020/04/Guide-risques-biologiques-CNRS-Edition-mai-2017.pdf)

Possible routes of entry into the body : :

Airway : It is the main route of entry, but also the most insidious. Done through inhalation of aerosols created during handling.

Digestive way : The prohibition of pipetting, drinking, eating and smoking in laboratories has considerably reduced the risk of contamination by ingestion. However, non-compliance with basic hygiene rules (putting hands to the mouth without having washed them, sucking on a pen, etc.) still constitutes a significant risk

Dermal and ocular pathways : Contamination can occur by projection into the eye, or on healthy and especially injured skin, but also following a sting, cut, bite or scratch. Some pathogens can pass through healthy skin, either naturally or if a product facilitates passage through the skin (example : DMSO which permeabilises the skin). It is therefore essential to wear specific single-use gloves for biological risks and to change them regularly (approximately every 20 minutes)

Risks identification :

The case of natural biological agents :

The regulation on the prevention of workers against the risks resulting from their exposure to pathogenic biological agents (decree n°94-352 of 4 May 1994) is limited to micro-organisms, cell cultures and human endoparasites likely to cause an infection, an allergy or intoxication. In addition to these 3 risks, there are carcinogenic effects and neurodegenerative damage.

In order to assess biological risks, the regulations define biological agents and their classification into four groups according to the severity of the risk of infection :

Criterion	Group 1	Group 2	Group 3	Group 4
Pathogenic for humans	NO	YES likely	YES Serious disease	YES Very serious disease
Hazardous for the operator	Not applicable	YES Moderately	YES High risk	YES Very high risk
Spreading	Not applicable	Unlikely	Possible	High risk
Availability of prophylaxis or treatment	Not applicable	YES	YES Usually	NO
Examples	*B. Subtilis* *non-pathogenic E. coli*	*Measles virus* *Clostridium tetani*	*HIV, HBV* *Mycobacterium tuberculosis*	*Ebola virus* *Smallpox virus*

Table 2 : *Risk groups for natural biological agents: from lowest (1) to highest (4)*

Special case of Non-Conventional Transmissible Agents (NCTA or prions)

NCTAs are responsible for degenerative diseases of the central nervous system.
Certain organs are more likely to contain them : the assessment of the level of risk must therefore take into account the infectious potential of the tissues concerned.

Special case of highly pathogenic micro-organisms and toxins (HPM)

The agents referred to as "HPMs" (or MOT in French) are human pathogens and toxins that present a risk to human health if they are accidentally or intentionally released into the environment.
The list of MOTs is set out in a decree : it includes the vast majority of group 3 and 4 pathogens.
Currently, no MOTs are handled at CRC.

The case of genetically modified organisms (GMOs) :

These are living organisms whose genetic material has been modified other than by natural multiplication or recombination (Article L. 531-1 of the Environmental Code), which includes organisms obtained by directed mutagenesis (ZFN, TALEN, ODM, CRISPR...) according to the order of 25 July 2018 of the Court of Justice of the European Union.
Like natural biological agents, GMOs are classified in 4 groups, according to the risks they pose to public health or the environment. Each group defines the containment class in which the GMO must be handled.

	GMO class 1	GMO class 2	GMO class 3	GMO class 4
Risk for human health Risk for the environment	nil or negligible	low	moderate	high
Level of containment for handling or storage	L1	L2	L3	L4

Table 3 : GMO risk groups and containment levels.

The document currently available online for classifying a GMO is the "HCB Manual for the contained use of Genetically Modified Organisms".
(http://www.hautconseildesbiotechnologies.fr/fr/system/files/file_fields/2019/07/10/manuelduconfine2019.pdf).

IMPORTANT :
Any use of GMOs is subject to a declaration (GMOs of containment class 1) or an authorisation (GMOs of containment classes 2 to 4) after receiving the opinion of the Expert Committee on Contained Uses of GMOs (CEUCO placed at the Ministry of Higher Education, Research and Innovation (MESRI in French)). In addition, since 1 January 2022, any facility (laboratory (even imaging laboratories if live cells are handled), animal house or greenhouse) where GMOs are used* must be approved. The approval, issued by the MESRI, is valid for 5 years.*
For further information on procedures concerning GMOs, contact the CRC's HSM, Marie-Noëlle Navas.

** A use of GMOs is defined as any operation or set of operations during which organisms are genetically modified or during which GMOs are cultivated, stored, disposed of or implemented (Article L. 531-1 of the Environmental Code). (vademecum-ogm-avril-2022-18047)*

Means of prevention :

The regulatory reference texts concerning biological risk prevention measures are
- for biological pathogens, the order of 16 July 2007 setting out the technical prevention measures, particularly containment measures, to be implemented in research laboratories [...] where workers are likely to be exposed to biological pathogens.
- for the contained use of GMOs, the recommendations manual of the High Council for Biotechnology (HCB) and the European Directive 2009/41/EC.

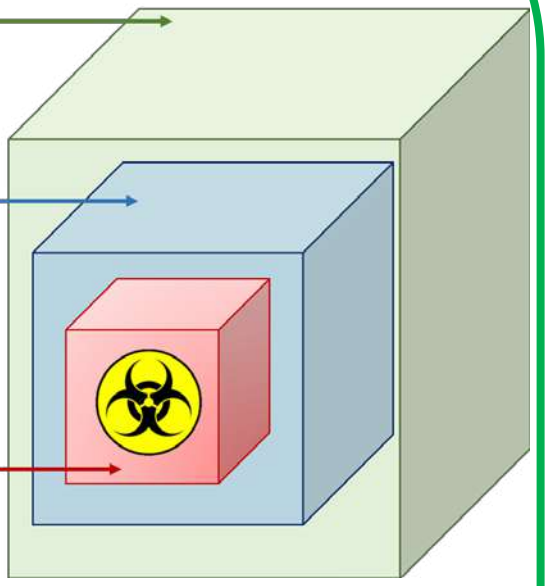
1. Organisational and equipment means

Protecting the experimenter and the external environment from the risks associated with biological agents involves setting up containment systems for the handling of these agents.

Containment #1:
Aims: 1. Isolate the handling of biological agents from the rest of the laboratory and the outside environment; 2. Prevent their spread.
In practice : Containment laboratory adapted to the risks to human and animal health and the environment (L1, L2, L3 or L4). For the protection provided by the containment to be effective, the rules of use and procedures in force in the containment must be scrupulously respected

Containment #2:
Aims: 1. Isolate the experimenter as much as possible from the biological agents when handling them; 2. Maintain the "chain of containment", as one would maintain the cold chain to preserve food.
In practice : 1. Handle as much as possible under Type II Microbiological Safety Cabinets (MSC II) that protect the experimenter and the environment from the biological agents handled **AND** the sample from external pollutants because the work area is sterile. 2. Close the centrifuge pods/rotors with a biosafety cover to limit the spread of the biological agent in case of centrifuge tube breakage or leakage. The closing/opening of the pods or rotor must be done in a MSC II.

Containment #3:
Aims: 1. Limit the space for proliferation of the biological agent to the needs of the experiment and allow its manipulation.
In practice : the culture dish, the tube containing the biological agent.



Please note : The use of level 2 containment laboratories (L2) requires prior training on the rules and procedures for use. This training is provided by the facility manager who should be contacted before using the L2. If the team does not have an L2 on its premises, the CRC has an L2 facility available to all CRC staff. For more information, contact the technical and operational managers of the facility Delphine Le Corre (delphine.lecorre@parisdescartes.fr) and Audrey Didelot (audrey.didelot@parisdescartes.fr). The CRC also has an L3 facility. To use it, contact the manager and operational Maxime Lecerf (maxime.lecerf@inserm.fr).

When it is not possible to implement containment (use of certain equipment (microscopes, cell sorters, ultracentrifuges, sonicators, etc.) or certain activities (changing contaminated bedding, etc.), the risk assessment must be thorough in order to find, on a case-by-case basis, compensatory preventive measures of a human (specific training, guidelines for use, etc.), technical (reinforcement of the wearing of personal protective equipment (PPE), manufacture of customised containment equipment, etc.) and organisational (reserved room, increased frequency of disinfection, etc.) nature.

If biological agents are to be taken out of the containment laboratory, for example for analysis on a facility, the triple packaging rule must be followed. For example : the biological sample may be contained in a sealed tube (package 1), which is then placed in a sealed 50 ml bag or conical tube (package 2), and all of this placed in a sealed, shock-proof box filled with absorbent paper (package 3). Do not use an expanded polystyrene box, but transport boxes such as the one below or the lidded ice trays distributed to teams by the CRC Direction.

Within buildings, it is also recommended that biological samples be transported using triple packaging to avoid the risk of breach of containment due to the package being dropped or accidentally opened or mishandled.

In the case of transport that requires biological samples to be kept at low temperature, the hermetically sealed bag containing the samples can be immersed in ice or dry ice placed at the bottom of the transport box.

FOCUS ON TRANSPORT OF BIOLOGICAL SAMPLES :

The risk associated with the transport of a biological product is that of a breach of containment of a package containing a pathogenic agent. To prevent this risk, the shipment of biological materials is subject to different rules depending on the nature of the samples to be shipped (non-hazardous biological product, category A or B infectious materials, GMOs, etc.), and whether transport with dry ice is required. In addition, CRC's supervisors have set up contracts with service providers specialising in the transport of dangerous products.

Caution : The shipper is responsible for the classification of the hazardous material, the packaging (including labels which vary according to the nature of the sample), the choice of carrier and the documentation provided to the carrier.

Conclusion : Before any shipment of biological products, **contact the team's HSO for advice**. This will avoid the risk of losing the sample if the transport rules in force are not respected.

THE PROHIBITIONS TO REMEMBER :

1) Sending hazardous products by post is strictly prohibited.

2) In general, the transport of a hazardous product is prohibited in all means of public transport (metro, bus, train, ferry, etc.).

3) The transport of a hazardous product in a personal vehicle is prohibited.

For more information….

- CRC's intranet, section « Santé et Sécurité au Travail », rubriques Prévention » :
  - Fiches réflexes de l'INSERM, Transport des matières biologiques
- Guide-risques-biologiques-CNRS-Edition-mai-2017, chapitre 5 : Le transport

2. Other means of prevention :

- Wear appropriate disposable and/or single-use PPE (labcoats, gloves, masks, overshoes, overboots) to ensure that, in the event of soiling, the experimenter does not spread biological agents outside the containment. PPE must therefore be discarded or temporarily stored before each exit from the containment. Single-use gloves have limited effectiveness over time and it is advisable to change them every 20 minutes to maintain a good protective barrier.

- Depending on the biological agents handled, vaccination, where available, may be required for permission to handle a hazardous biological agent, as is the case for the human hepatitis B virus.

- Inactivation of waste from containment laboratory activities, as early as level 1 for GMOs, prior to disposal by a specialised company to prevent their release. Refer to section IX on waste management.

Procedures in case of accident or incident :

The following procedures are available on the CRC intranet in the Occupational Health and Safety section, folder « Conduites à tenir en cas d'incidents ou d'accidents ») and then " INCIDENTS / ACCIDENTS LIÉS AU RISQUE BIOLOGIQUE " :

- Procédure en cas de projection biologique non humain

For more information….

- CRC's intranet, rubrique « Santé et Sécurité au Travail », rubriques Prévention » :
    - Fiches réflexes de l'INSERM, Risques Biologiques
    - Fiches synthétiques INSERM sur le risque biologique
- Guide-risques-biologiques-CNRS-Edition-mai-2017

The risk associated with animal testing

Risks identification :

A major component of the risk associated with animal testing is closely linked to biological risk due to the handling of GMO animals which may additionally be injected with biological agents or cell cultures for research purposes. This aspect has already been addressed in the previous section. With regard to risks strictly related to the handling of animals, these include

- Bites and scratches
- Infections and zoonoses (infectious diseases that pass from animals to humans)
- Allergies

Means of prevention :

-Any persons handling animals must have their mandatory vaccination records (diphtheria, tetanus and polio (DTP)) up to date. Depending on the biological agents that will be handled during the research project, other vaccinations may be mandatory or recommended. In this case, make an appointment with your employer's occupational physician.

- In order to limit the biological risk and the risk of allergies to the animals, the breeding and handling of rodents must be carried out in the premises of the Centre d'Exploration Fonctionnel (CEF) des Cordeliers, which are independent of the other buildings occupied by the CRC and equipped with all the EPCs necessary for the protection of the handlers (change hood, PSM II, suction table, etc.), as well as level 2 (A2) containment.

Please note : Access to the CEF is limited to trained and authorised personnel, i.e. personnel directly involved in an ongoing protocol declared to the animal facility's steering committee and is also subject to

• Acceptance of the project within the CEF by the Darwin Ethics Committee and the Ministry of Agriculture. A copy of the referral and approval letter must be provided to the CEF.
• GMO level 1 or 2 approval to house and handle animals in the CEF facilities (transgenic lines, GMO injections, genetic modifications by injection...).
• Proof of initial training for animal experimentation accreditation and 3 days of continuous training over 6 years.
• Training by CEF staff for the various CEF procedures
• Training in technical gestures on laboratory animals by CEF staff and/or the direct supervisor
• The signing of a commitment to respect the CEF's procedures.
• A commitment to carry out within the CEF only those protocols declared and covered by a GMO referral and approval.

• Completion of the access request form

For further information, please contact Valérie Chauffeton (valerie.chauffeton@crc.jussieu.fr) or Sonia Prince (sonia.prince@sorbonne-universite.fr)

If it is not possible to carry out the experiments at the CEF, the following preventive measures must be put in place in the experimental laboratory :

- Use of EPC (handling in laboratory fume hood or chemical hood)
- Use of appropriate PPE (gloves, masks, labcoats, goggles)

Procedures in case of accident or incident :

The following procedures are available on the CRC intranet in the Occupational Health and Safety section, folder « Conduites à tenir en cas d'incidents ou d'accidents » puis « INCIDENTS / ACCIDENTS LIÉS AU RISQUE BIOLOGIQUE » :

- Accident avec un animal de laboratoire

For more information ….

- CRC's intranet, rubrique « Santé et Sécurité au Travail », rubriques Prévention » :
  - Fiches réflexes de l'INSERM, Expérimentation Animale
  - Fiches synthétiques INSERM sur l'expérimentation animale
- Guide-risques-biologiques-CNRS-Edition-mai-2017

The chemical risk

CAUTION :

In biomedical research laboratories, such as those of the CRC, chemical risk is the poor relation of biological risk, to which it is frequently associated. Although omnipresent in experimental protocols, it is often underestimated or even neglected. One explanation lies in the dangerous nature of the biological samples handled.

Example : Treatment of human cell lines of tumour origin with an acutely toxic product. The analysis of the risks to which the experimenter is exposed will prioritise the biological risk by recommending handling in a level 2 containment under a MSC II, which offers no protection against chemical products. For the chemical risk, palliative measures will be put in place to prevent the chemical risk, such as wearing two pairs of gloves one on top of the other, one of which is specific to the chemical risk, or the use of products in very low concentrations.

It is therefore possible that, by drift, the chemical risk, even when it is predominant compared to other risks, has become a negligible risk for the experimenters. This situation is all the more worrying for the health and safety departments as this negligence can lead to explosive situations, in the literal sense, and lethal or occupational diseases.

Risks identification :

In reality, chemical risk is the most complex of the risks encountered in the laboratories :

- It is very diverse, as there are in fact as many chemical risks as there are categories of chemicals (see Annex 3), each of which may require specific means of prevention.

- Chemicals retain their characteristics even after use, hence the importance of good chemical waste management

- Chemicals of different categories are mostly not compatible, which makes their storage and waste collection cumbersome.

- Some are carcinogenic, and/or mutagenic and/or reprotoxic. With the passage of time, the list of CMRs is getting longer and longer

- They are sensitive to environmental conditions (temperature, light, pressure, etc.), change over time and can be the site of dangerous chemical reactions, hence the importance of good stock management.

- As already mentioned, improper use or management of chemicals can lead to explosion and fire.

The purchase of a chemical product is therefore not to be taken lightly and requires a proper risk assessment that takes into account the storage of the product, the protocol of use and the management of the waste generated (see Annex 6).

Possible routes of entry into the body : :

- Airway (inhalation)
- Dermal pathway (absorption and skin burns)
- Ocular pathway following splashes
- The ban on oral pipetting in laboratories has considerably reduced the risk of contamination by ingestion

Means of prevention :

1. **Know the chemical you will be working with to identify the associated risks :**

- Look at the product label and identify the pictogram(s) (Annex 4), hazard statements (HXXX, Annex 5) and precautionary statements (PXXX). But the label does not contain all the information,
- Read the Material Safety Data Sheet (MSDS) that all suppliers must provide when delivering the product. The MSDS completes the pictograms. They include 16 mandatory headings comprising 3 categories of information : hazards, general information and prevention and emergency advice.
- In the case of a mixture, the MSDS also indicates the precise composition of the product and adapts the risks according to the percentage of a pure chemical product in the mixture

For more information on reading labels and MSDSs….

- Intranet Sorbonne Université : Fiches pratiques de prévention n°11
- INSERM : Fiches reflexes 1 à 7 des Risques chimiques
- INRS : Mémento du règlement CLP

FOCUS ON CMR (Carcinogenic, Mutagenic and Reprotoxic) LABELLING

As all CMRs are seriously harmful to health, the label of the containers will display the corresponding GHS 08 pictogram :

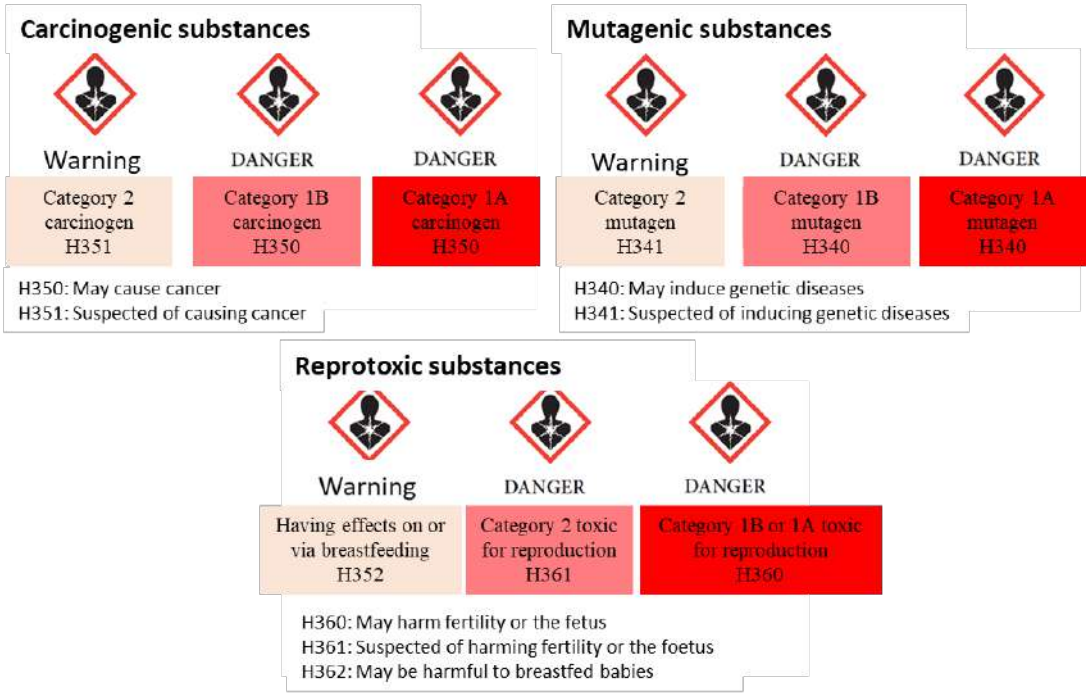
But BEWARE, this pictogram does not systematically mean that the product is a CMR. It also applies in the following cases :

- Alters the functioning of certain organs

- Causes serious and potentially fatal effects on the lungs

- Causes respiratory allergies

To ensure that the product is a CMR, refer to the hazard statement HXXX :



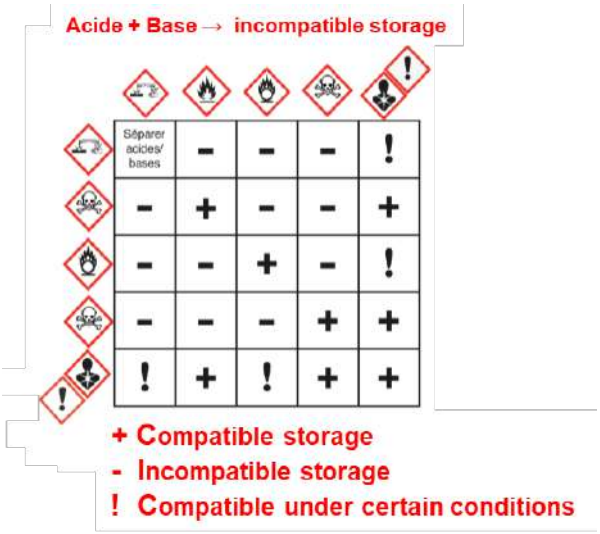
Adapted from « Fiches Réflexes », INSERM

For more information on CMRs :

-Intranet Sorbonne Université : Fiches pratiques de prévention n°3
-Le Risque CMR, livret du manipulateur,
https://www.dgdr.cnrs.fr/sst/CNPS/guides/doc/Livret_CMR/Livret_CMR_Octobre_2017.pdf

2 Respect the rules on labelling, storage and compatibility of chemicals:

- Do not store in traffic or evacuation areas
- Avoid storing heavy and bulky hazardous products at height (H<1.60 m)
- Do not store in front of fire extinguishers, safety showers or emergency exits
- Lab benches, chemical fume hoods and sinks are not places for storage
- All products, without exception, must be labelled, regardless of their packaging
- Separate incompatible chemicals



Incompatibility rules

- Store in different cabinets depending on the product category

Flammables (strong reducers) should be stored in a ventilated cabinet. All flammables can be stored together.

Oxidisers (strong oxidisers) can react with flammables and cause them to ignite or even explode. They must be stored in a separate cabinet from the flammables cabinet. It should also be ventilated.

Explosives cannot be stored with any other product category. Each of them may have particular characteristics that require additional precautions (airtight storage, protection from sparks, etc.)

Concentrated acids and bases can react violently with each other. They should be stored separately from other categories of products and acids and bases should be stored in two separate cabinets. Some acids react with each other; it will be necessary to isolate them from each other with retention tanks.

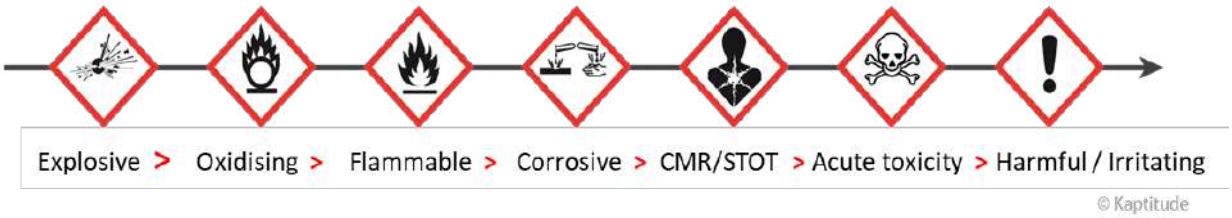
Toxic products should be stored separately from the above products because in the event of a fire they will exacerbate the toxic effects of the fire.

Products bearing the GHS08 pictogram (CMR, respiratory allergens, STOT) will be stored in a locked cupboard to allow access only to authorised persons. The same cupboard can house toxic (GSH06) and harmful (GSH07) products if the products bearing the GHS08 pictogram are stored in bins labelled with this pictogram.

Products with GHS07 pictograms (toxic in high doses) may be stored with flammables if separate storage is not possible and only in small quantities.

https://www.kaptitude.com/les-incompatibilites-au-stockage/

If products have more than one pictogram, storage should be arranged in the following order :



For more information : Intranet Sorbonne Université : Fiches pratiques de prévention n°1

3 Ensure proper management of the chemical stock :

- Keep an up-to-date inventory of stored chemicals. **Keeping the inventory should involve all members of a team. It is not the HSO's job to do it alone.**
- - Before placing an order for a chemical :
    - Check that it is not already present in the laboratory
    - If the need is minimal, ask other teams if they have any rather than buying a product that will not be reused
    - Order the smallest possible quantity corresponding to the needs
    - If it is a hazardous chemical, consult the HSO
    - if it is a very hazardous chemical, check that a shared stock does not already exist in a CRC team (e.g. picric acid solution at less than 2%).
- Once the order is placed, remember to add the new product to the laboratory inventory and notify the HSO.
- Once a year, sort through the chemicals to dispose of those that are out of date
- NEVER STORE A CHEMICAL IN A CELLAR.

4 Read protocols carefully beforehand to :

- Identify and locate the CPEs where products are handled (chemical fume hood, recirculating chemical hood (or « ETRAF » in French)
- Identify the PPE to be worn (specific protective gloves, labcoats, glasses, masks, etc.)
- Identify the equipment (apparatus, glassware, plastic consummables, etc.) required
- Anticipate the management of chemical waste generated during the experiment

FOCUS ON Ethidium Bromide or BET (see Annex 7) :

ETB is an intercalating agent (CMR) used mainly to detect the migration of DNA or RNA bands on agarose gel by exposure to ultraviolet light. More specifically, this product is toxic by ingestion (H302), fatal by inhalation (H330) and likely to induce genetic abnormalities, thus mutagenic (H341). Experimenters are particularly exposed to this :

- When adding ETB to the molten agarose to prepare the gel : THIS STEP MUST BE PERFORMED UNDER A WORKING LABORATORY FUME HOOD to avoid breathing ETB vapours. No filter can capture this molecule, so recirculating fume cupboards (ETRAF or chemical hoods) are not effective CPEs.
- When handling gel : ALWAYS WEAR CHEMICAL PROTECTIVE GLOVES according to EN374 EN ISO 374-1 : 2016 Protection against splashes of chemicals type B (JKT) and EN 374-4:2003 Resistance to degradation by chemicals.

The procedure for using the BET is presented in Annex 7.

Procedures in case of accident or incident :

The following procedures are available on the CRC's intranet in the Occupational Health and Safety section, under the heading "Behaviour in the event of incidents or accidents" and then "INCIDENTS / ACCIDENTS RELATED TO CHEMICAL HAZARDS" :

- What to do in case of chemical splashes
- Incident with the ETB (available in English)
- Incident with phenol (available in English)
- Incident involving hydrofluoric acid
- Incident with osmic acid (available in English)
- What to do in the event of inhalation of toxic gases, vapours and aerosols (available in English)
- Chemical spill: thoughts to consider
- Use of the spill kit

Cryogenic risk

At CRC, cryogenic risk is present when handling dry ice (-80°C) and liquid nitrogen (-196°C; note: nitrogen gas: -170°C). But the handling of samples stored in freezers at -80°C is also to be taken into account.

Risks identification :

In the case of dry ice and liquid nitrogen :

- Risk of asphyxiation due to the release of CO_2 for dry ice or nitrogen for liquid nitrogen

- Risk of explosion due to the passage to the gas stage (1 litre of liquid nitrogen gives 680 litres of nitrogen gas ; 1 kg of dry ice = 0.5 m3 of CO_2 gas)

- Risk of thermal burns. Beware of liquid nitrogen splashes and skin adherence to metal surfaces.

Means of prevention :

- Wearing suitable PPE :

  Liquid nitrogen :

  Dry ice :

- Never flush down the drain
- Gas detection systems
- Allow gases to evaporate in a ventilated room
- Do not store in an airtight container, even a refrigerated one, as there is a risk of bursting
- Do not store in a confined area
- Ventilate the storage area
- Do not go alone to the nitrogen room
- Avoid the formation of liquid nitrogen sprays (e.g. by dipping a sample at room temperature in liquid nitrogen to cryopreserve it)

Procedures in case of accident or incident :

The following procedures are available on the CRC's intranet in the Occupational Health and Safety section, folder "Behaviour in the event of incidents or accidents" and then "INCIDENTS / ACCIDENTS WITH BURNS":

- What to do in the event of a chemical or thermal burn

- Accident involving the use of cryogenic liquid

For more information :

- CRC Intranet, "Occupational Health and Safety" section, "Procedures and Good Practices" folder, Cryogenic Procedures section :

- Procedure for transporting samples from the nitrogen room to the laboratory
- Transport of liquid nitrogen by lift on the Cordeliers campus
- Instructions for using the emergency freezer
- PPE NITROGEN ROOM
- PPE DRY ICE
- Fire procedure for the nitrogen room
- Recommendations for handling liquid nitrogen
- Recommendations for the use of liquid nitrogen for cryopreservation : Freezing / Thawing of cryotubes
- Procedure for anoxia alarm Local Nitrogen (available in English)
- INSERM : Fiches réflexes 17

Radioactive risk

This risk will no longer be present at CRC in 2023 as all activities related to the use of radioelements will have ceased and regulatory authorisations will be terminated by the end of 2022.

It will therefore no longer be possible to use radioelements from 1 January 2023 on the site.

Physical and material risks

These risks are multiple and concern the use of equipment and the work environment. They include electrical risk, noise, optical or electromagnetic radiation, equipment under pressure, as well as light environments and machine tools.

Electrical risk

Risks identification :

- - Electrification (burns, muscle tetany)
- - Electrocution (cardiac arrest)

Means of prevention :

- Do not touch electrical installations unless you have a valid electrical qualification (e.g. do not reset a circuit breaker that has tripped, do not fiddle with an electrical socket, do not change a light bulb)
- Do not pull on the power cable to unplug or move an electrical appliance
- Avoid using power strips and do not overload them
- Do not touch a socket with hands that are wet with water or hydroalcoholic gel
- If purchasing new equipment, ensure that the electrical installation can supply the required electricity.

Procedures in case of accident or incident :

The following procedures are available on the CRC intranet in the Occupational Health and Safety section, under the heading « Conduites à tenir en cas d'incidents ou d'accidents » puis « INCIDENTS / ACCIDENTS LIES A D'AUTRES RISQUES» :

- Procédure en cas d'électrisation

For more information :

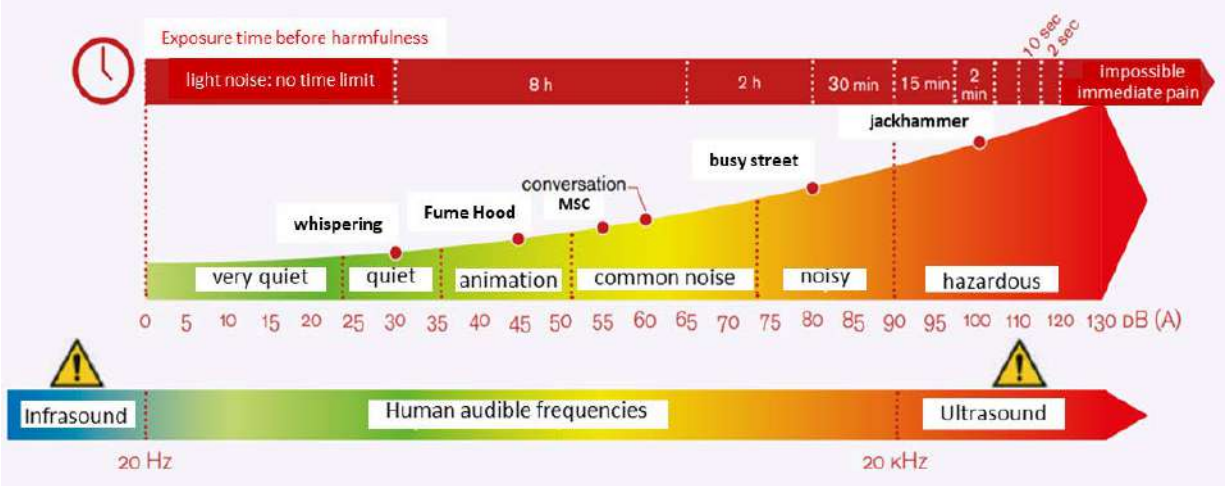
- CRC's intranet, rubrique « Santé et Sécurité au Travail », dossier Prévention des risques :

FICHES SYNTHÉTIQUES DE PRÉVENTION DES RISQUES DE L'INSERM : Risque Électrique

- Intranet INSERM, rubrique Sécurité au travail> Prévention des risques> Risques physiques et matériels

Noise risk

Theoretically, the noise level in the CRC laboratories is below the regulatory threshold of 80 dB(A) for 8 hours of exposure. Nevertheless, there is a risk of hearing fatigue.



Risks identification :

- Deafness (irreversible)
- Decreased cognitive performance
- Stress
- Sleep disorders
- Cardiovascular problems
- Digestive disorders, cramps
- Mask effect : one noise can hide another.
- Risk of accident due to reduced alertness and attention, increased fatigue.
- Danger for the foetus, particularly during the last trimester of pregnancy.

Means of prevention :

- Acoustic treatment of premises (ceilings, walls, floors, partitions, screens)
- Partitioning and enclosure, insulation of the noisiest machines
- Layout of work areas, choice of furniture
- Marking of noisy areas
- Limiting exposure times : breaks, alternating tasks
- Information and training of personnel
- PPE : ear muffs, disposable plugs

CAUTION : Headphones or earpieces do not constitute hearing protection. Their use is prohibited because they isolate the wearer from the environment and from warning signals.

FOCUS ON ULTRASOUND DEVICES (example : sonicators) : they generate sound frequencies between 20 khz and 40 khz with a sound level varying from 90 to 130 dB near the workstation (INRS 2007).

Risks identification :

- Hearing fatigue, headaches
- Associated risks : Biological risks : production of aerosols

Means of prevention :

- Dedicate a room to the use of the appliance
- Warn of its use (display on the door)
- Limit exposure time
- Keep as far away as possible from the source of the ultrasound
- Use soundproof enclosures for 500 to 750 Watt energy probes.
- If purchasing a tank model, purchase the optional lid
- Wear hearing protection : helmet (EN352-1) or earplugs (EN 352-2)
- Protection against inhalation of aerosols : wear a FFP2 mask (EN149)

For more information :

- Intranet INSERM, rubrique Sécurité au travail> Prévention des risques> Risques physiques et matériels

- INRS : https://www.inrs.fr/risques/bruit/ce-qu-il-faut-retenir.html

Pressure equipment (https://pro.inserm.fr/rubriques/prevenir-accompagner-et-agir/prevention-des-risques/risques-physiques-et-materiels-2)

Pressure equipments are intended for the production, manufacture, storage or use of compressed, liquefied or dissolved vapours or gases at a pressure above atmospheric. In research laboratories, three categories of equipment can be found :

- Devices under pressure : compressors, compressed gas bottles, tanks, piping and steam equipment : boilers, liquid sterilisation autoclaves, hydraulic equipment.
- Vacuum devices : evaporators, desiccators.
- Experimental set-ups using a fluid in overpressure or underpressure.

Portable or fixed "fire" extinguishers are also part of pressure equipment.

Risks identification :

- Explosion (splintering)
- Implosion (shock wave)
- Leakage of contents (harmful, flammable)

Means of prevention :

- Use of protective grids and screens
- Training in the use of equipment (e.g. autoclave training, compressed gases, etc.)
- Control and inspection of installations
- Compliance with operating standards (pressure, temperature)

For more information :

- CRC's Intranet, rubrique « Santé et Sécurité au Travail », dossier Prévention des risques :

FICHES SYNTHÉTIQUES DE PRÉVENTION DES RISQUES DE L'INSERM : Autoclave

FICHES PRATIQUES DE SORBONNE UNIVERSITÉ : Les Bouteilles de Gaz Comprimés

-Intranet INSERM, rubrique Sécurité au travail> Prévention des risques> Risques physiques et matériels

Risques_et_mesures_Bouteilles_Gaz

- Les cahiers de prévention du CNRS : risques liés aux équipements sous pression

The risk linked to UV, non-ionising radiation

Risks identification :

- For the skin : burns, accelerated ageing, allergies or UV intolerance.

- For the eyes : photokeratitis and, in the long term, lens opacity, retinal degeneration

Means of prevention :

- Prefer UV-tight devices as soon as possible (visualization via a CCD camera on an external video monitor)
- Wear PPE (gloves and labcoat) + face shield (adapted to the wavelength emitted (standard EN166)) when the equipement is not equipped with a protective screen
- Vigilance regarding the wearing of PPE when using a UV table.

Procedures in case of accident or incident :

- - Consult a doctor or emergency room within 24 hours.
- - In the event of a medically confirmed injury, file an occupational accident report.
- - Notify the HSO and/or the team leader and record the event in the Health and Safety Register

For more information :

- Intranet INSERM, rubrique Sécurité au travail> Prévention des risques> Risques physiques et matériels

The risk linked to optical and artificial radiation : LASER and LED

- **LASER :**

Risks identification :

- - Ocular risk (keratitis, cataract, retinal damage, corneal burns)
- - Skin risk (burns)
- - Electrical, chemical and fire risks

Means of prevention :

- Hooded equipment
- Equipment located in a dedicated room accessible only to authorised personnel
- Suitable, marked out and signposted premises
- Training of the operator in laser risk, **Individual exposure sheets** - Wear suitable PPE (protective glasses adapted to the power of the laser)
- Reduction of the risk of reflection (e.g. specific black curtains)

Procedures in case of accident or incident :

The following procedures are available on the CRC intranet under « Santé et Sécurité au Travail », dossier « Conduites à tenir en cas d'incidents ou d'accidents » puis « INCIDENTS / ACCIDENTS LIES A D'AUTRES RISQUES » :

- Procédure en cas d'accident ophtalmique avec un laser de forte puissance (3B ou 4)

For more information :

- Intranet INSERM, rubrique Sécurité au travail> Prévention des risques> Risques physiques et matériels

- Cahier de prévention CNRS sur les risques liés aux LASERS

- LED :

LEDs (light emitting diodes) are present in several pieces of equipment used in laboratories such as microscopes or LED transilluminators, which are used as alternatives to UV transilluminators.

Risks identification :

Blue light can have effects on health and visual performance, including

- Risk of damage to the retina,

- Risk of glare,

- Effects on the biological clock,

- Risk of flicker from LEDs (stroboscopic effect).

Means of prevention :

- Do not stare directly at the light emitted by the LEDs.
- Equipment with scrolling grids, opal plates, protective screens or filtering screens.
- If collective protection cannot be provided, make personal protection equipment such as filtering glasses available.
- Prevent glare from reflections on smooth surfaces

Procedures in case of accident or incident :

- Consult a doctor or emergency room within 24 hours.

- In the event of a medically confirmed injury, file an occupational accident report.

- Notify the HSO and/or the team leader and record the event in the Health and Safety Register.

For more information :

- Intranet INSERM, rubrique Sécurité au travail> Prévention des risques> Risques physiques et matériels

Risk linked to electromagnetic fields

At CRC, staff are exposed to the electromagnetic field when using Magnetic Resonance Imaging (MRI) or Nuclear Magnetic Resonance (NMR) equipment (e.g. rodent imaging).

Risks identification :

May pose a risk to workers with or without special risks and to wearers of active implants.

Means of prevention :

Prohibit access to wearers of active and passive implants (pacemakers, hearing aids, drug pumps, metal prostheses)

- Avoiding exposure of pregnant women (precautionary principle)
- Restrict access by young workers under 18 years of age
- Reduce the duration of exposure and limit access
- Mark the "five Gauss line" around the device (5 G = 0.5mT)
- Inform and train workers on the risks and precautions to be taken
- Prohibit the use of metal tools and flammable liquids in the direct vicinity of the device
- Mark the area with appropriate pictograms :

For more information :

- Intranet INSERM, rubrique Sécurité au travail> Prévention des risques> Risques physiques et matériels
- https://www.inrs.fr/media.html?refINRS=ED%204209
- L'imagerie par résonance magnétique : https://www.inrs.fr/media.html?refINRS=ED%204209

Fire risk

In all cases, "any person who notices the start of a fire must sound the alarm and implement first aid measures, without waiting for the arrival of specially designated personnel" (Labour Code - art. 232.12.20).

Risks identification :

The primary cause of death in a fire is smoke (asphyxiation, toxicity).

- Damage to premises and equipment.
- Destruction of equipment, premises or even buildings. In the laboratory : destruction of samples
- On human health : from burns to death

Means of prevention :

- Risk analysis of the working environment and work situations (e.g. storage of flammable products)
- Emergency exits must be kept free of obstruction
- Fire doors must never be blocked
- Staff must be trained in fire fighting and evacuation of the building
-
- Fire extinguishers must be checked annually

The different means of fire extinguishing

CO2 extinguisher
- **Electrical fires**
- **Small flammable liquid fires**

Do not touch the black cone: risk of cold burns (-70°C)

Water extinguishers + additive (blue dowel pin)
- **Dry fires: wood, paper, cardboard, fabric...**

Powder extinguishers (yellow dowel pin)
Flammable liquid fires

Cover fireproof

Portable safety shower
Allows the body to be rinsed after a chemical or dangerous product has been sprayed.
Not a fire extinguisher

For more information :

INSERM : Fiches Réflexes 1 à 9 sur le risque incendie

Intranet INSERM, rubrique Sécurité au travail> Prévention des risques> Risque incendie

INRS : brochure ed3336 : L'incendie sur le lieu de travail

Lone working risk

Definition *(file:///C:/Users/Direction/Downloads/Proc%C3%A9dure%20d'utilisation%20des%20DATI%20-%20Campus%20Pierre%20et%20Marie%20CURIE.pdf):*

A worker is isolated if he or she performs a task alone, whatever its nature and duration, in a working environment where he or she cannot be seen or heard by others and where the likelihood of visits is low (geographical isolation or working outside the unit's working hours and days).

Risks identification : *(https://www.inrs.fr/risques/travail-isole/expositions-risques.html)*

- Aggravating factor : A lone worker has only himself to rely on. In case of difficulties, his / her decisions may be inappropriate and dangerous. In addition, when an accident occurs, the injured worker may have difficulty being rescued.
- Risk of aggression
- Loss of alertness

Means of prevention :

- Reduce the number and duration of isolated interventions
- Do not carry out dangerous manipulations
- Wear a « DATI » (Isolated Worker Alarm Device) available on working days at the Cordeliers Campus reception desk
- Notify one or more third parties of your isolation (Whatsap group for example)
- Follow the procedure in force on the Campus : register on the attendance register, indicate your presence on the landing door of the premises with a sign indicating "lone worker" and the telephone number where you can be reached.

To note : In order to be authorised to work in isolated conditions by the Director of the Unit, certification of Neo training, or equivalent training, is required.

SEE SECTION X. OFF HOURS WORK

For more information :

INSERM : Fiches Réflexes sur le travail isolé

Sorbonne Université : Accueil >L'université>Prévention des risques professionnels>Consignes de sécurité et fiches pratiques de prévention

INRS : https://www.inrs.fr/risques/travail-isole/expositions-risques.html

Labor code, articles R4543-19 à R4543-21

Musculoskeletal disorders (MSDs)

MSDs affect the joints and can be work-related. Screen work, repetitive movements (e.g. using a micro-pipette) or carrying heavy loads can cause MSDs.

Screen work

Risks identification :

- MSDs
- - Other risks : stress, visual fatigue

Means of prevention :

- Screen placed perpendicular to windows
- Correct adjustment of seats, keyboard, mouse and screen (see INSERM guide "Bien aménager son espace de travail")
- Interruption of screen work every 2 hours

Handling :

Risks identification :

- Low back pain and back pain
- Falling loads
- Injuries

Means of prevention :

- Use of appropriate PPE (gloves, shoes)
- Do not carry loads that are too heavy for you
- Use of trolleys, tractors
- Job sheet

For more information :

- Intranet INSERM, rubrique Sécurité au travail> Prévention des risques> TMS

- INRS : https://www.inrs.fr/risques/tms-troubles-musculosquelettiques/ce-qu-il-faut-retenir.html

Psychosocial risks

Risks identification :

According to the French National Institute for Research and Safety (INRS), "psychosocial risks correspond to work situations where the following are present, whether or not combined

- stress : an imbalance between a person's perception of the constraints of their work environment and their perception of their own ability to cope with them

- internal violence committed within the organisation by a staff member : moral or sexual harassment, exacerbated conflicts between individuals or between teams

- external violence committed against a staff member in the course of his or her duties by persons outside the institution.

These are risks that may be induced by the activity itself or generated by the organisation and work relations.

WHAT ARE THE RISK FACTORS ?

Psychosocial risk factors can be grouped into six categories : (Source : Gollac Report page 62-65)

- Work intensity and time
- Emotional demands
- Lack of autonomy
- Degraded social relations at work
- Conflict of values
- Insecurity of the work situation

WHAT ARE THE CONSEQUENCES ?

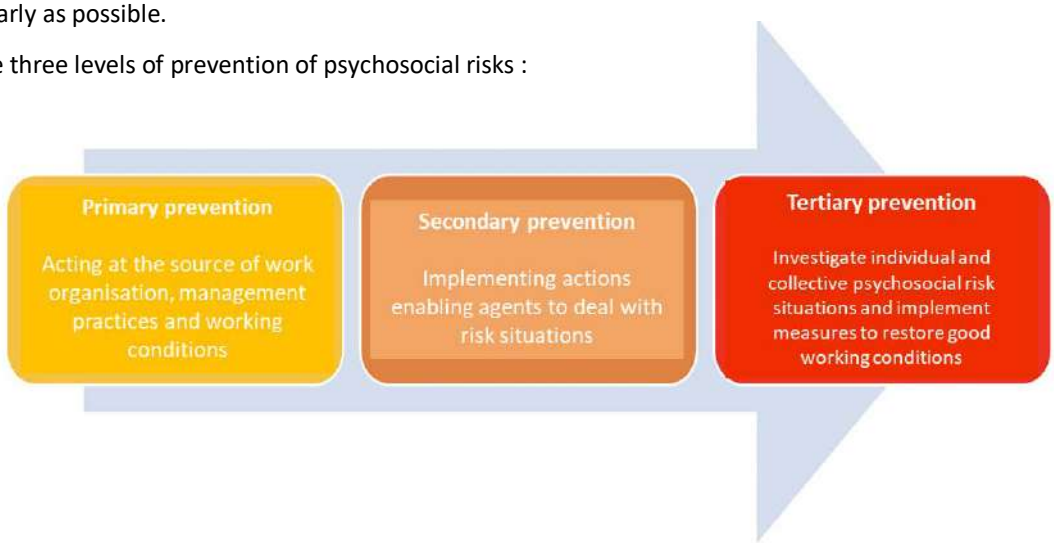
Exposure to these situations can have consequences (Source : Gollac Report)

- On health : sleep disorders, fatigue, pain, weight gain or loss, frequent infections. The most frequently identified health problems are : cardiovascular diseases, musculoskeletal disorders, anxiety, depression, etc.
- On behaviour : violent and aggressive behaviour, changes in eating habits (excess or loss of appetite), recourse to calming or exciting products (alcohol, medication, etc.), social isolation, withdrawal, etc.
- On intellectual capacities : difficulty in concentrating, memorising, making decisions, etc.
- On the emotional state : sensitivity, irritability, nervousness, anxiety, uneasiness, sadness, frequent crying etc.

Means of prevention :

Psychosocial risks are taken into account in the same way as other occupational risks. It is necessary to assess them, to plan appropriate preventive measures and to give priority to collective measures likely to avoid the risks as early as possible.

There are three levels of prevention of psychosocial risks :



If you are a victim or witness :

If you are a victim : Do not remain alone.

Alert, preferably in writing

- within the institution : your immediate superior (or a higher hierarchical level, if the first is involved) / a HSO / the General Secretary,

- at employer level :

INSERM :

- The human resources manager, the regional delegate,
- And/or the occupational physician, the social service assistant, a staff representative.

Victim or witness, report the facts: signalement@inserm.fr

For more information see Annex 8.

Sorbonne Université :

- Staff of the Faculty of Science and Engineering (FSI) :

Frédérique CONCORD : frederique.concord@sorbonne-universite.fr

And /or : https://portail-signalement.sorbonne-universite.fr/

For more information see Annex 9.

Université Paris Cité :

- The occupational physician :

Docteur Mireille Podchlebnik **:** mireille.podchlebnik@u-paris.fr (ex Diderot)
Docteur Laurent Zavidovique : laurent.zavidovique@u-paris.fr

For more information :

INSERM : intranet : • Accueil> Santé et sécurité au travail> Prévention des risques > Risques psychosociaux : plaquette sur le Harcèlement Moral et sur le harcèlement sexuel

Sorbonne Université : intranet : Accueil> Ressources humaines > Santé et qualité de vie au travail > Prévention des risques professionnels >Risques psycho-sociaux

Sorbonne Université : https://portail-signalement.sorbonne-universite.fr/: je veux m'informer

Risks for pregnant or breastfeeding women in research laboratories

Risks identification :

1. Exposure to chemicals, including CMRs
2. Exposure to biological agents*: viruses, bacteria, parasites, fungi, cell cultures, zoonosis (animal experiments), ...
3. Exposure to ionising radiation
4. Carrying heavy loads, prolonged standing, as well as exposure to electromagnetic radiation are also work situations to be taken into consideration.

* For information, the placenta is permeable to viruses before 3 months, to all germs from the 4th month, to large parasites from the 7th month.

Means of prevention :

Certain risks are major during the first trimester of pregnancy, which is why it is preferable to report your pregnancy as early as possible !

If your occupational physician is informed in good time, she / he will be able to advise you and suggest adjustments that will allow the pregnancy to run smoothly for you and your child.

For more information :

INSERM : intranet : Accueil > Santé et sécurité au travail > Suivi médical des agents, rubrique Grossesse et Lettre OSS n°16 – Être enceinte en laboratoire

Sorbonne Université : intranet : Accueil> L'université > Prévention des risques professionnels > Consignes de sécurité et fiches pratiques de prévention > Fiche n°4 Grossesse et risques professionnels en laboratoire

VIII. INTERVENTION OF EXTERNAL COMPANIES

As soon as an appointment with an external company or its subcontractor is scheduled :

1. Request a parking permit for the vehicle on the Campus des Cordeliers via the following link :
https://inscriptions.sorbonne-universite.fr/lime25/index.php/389833?lang=fr
You will need the following information :

Name of the company and the intervener

Vehicle model and registration number

Date of the intervention

Arrival and departure times

2. Notify the HSO as soon as possible so that a prevention plan can be drawn up in accordance with the model of the CRC's host, Sorbonne University. This prevention plan, drawn up BEFORE the intervention, must be signed by the manager of the external company or his legal representative AND the dean of the FSI of Sorbonne University. A copy of the prevention plan must be sent to the CRC HSM.

3. During the intervention, accompany the company's agent and re-explain to him the scope of his work, the risks to which he is exposed and the prevention measures in place. Ensure that he is wearing the necessary PPE.

4. At the end of the intervention, sign the intervention form and ask for a copy to be sent to the financial secretary so that the service can be paid.

What is a prevention plan ?

The aim of the prevention plan is to prevent the risks associated with the joint activity of the laboratory and the external company. It enables the regulatory obligations to be met. When an external company brings in workers to carry out or participate in the carrying out of an operation, whatever its nature, in an establishment of a user company, a set of measures must be taken in order to prevent risks linked to interference between the activities, installations and equipment of the various companies present in the workplace.

Companies concerned :

- Contracts carried out for several laboratories and/or over one year (maintenance of equipment or installations (e.g. annual maintenance contracts for air conditioning, rental and maintenance of linen, calibration of micropipettes, centrifuge controls, cleaning, etc.)
- One-off operations (repair of equipment or installations, minor works, etc.)
- All subcontractors of these companies

What is a fire permit ?

The fire permit, much more than a formality, is a major element in the prevention of fire/explosion risks.

It is a written prevention plan for the occasional performance of work involving hot spots (welding, grinding, etc.). When preparing the intervention of an external company, it is necessary to ensure that a fire permit is required or not.

If this is the case, you must inform the person in charge of the Campus des Cordeliers, Marie Donatien, by e-mail.

On the day of the intervention, the intervener must go to the campus reception to complete the necessary documents.

For more information :

5. Plan de prévention : intranet de SU : https://intranet.sorbonne-universite.fr/fr/l-universite/prevention-des-risques-professionnels/plan-de-prevention.html
6. Permis de feu : https://www.inrs.fr/dms/inrs/CataloguePapier/ED/TI-ED-6030/ed6030.pdf

IX. WASTE MANAGEMENT AT CRC

Discharge into sink

PROHIBITED

Even rinsing water from soiled dishes

COLLECTION OF LIQUID WASTE IN THE APPROPRIATE CONTAINER

Canisters for collection of chemical waste

Canister for collection of non chemical inactivated biological waste (e.g. bleach)

Differences between non-hazardous and hazardous waste :

NON-HAZARDOUS WASTE

- Household rubbish
- Plastic and paper packaging of consumables
- Absorbent paper not soiled with chemicals or biologicals
- **THAT'S ALL!**

IN HOUSEHOLD WASTE BINS ARE PROHIBITED

But also

- chemical products
- biological products
- sharp / cutting products
- soiled or unsoiled glass
- ink cartridges
- light bulbs
- batteries

ANYTHING THAT IS HAZARDOUS TO PEOPLE OR THE ENVIRONMENT

Even if not soiled with hazardous products

Gloves

Plastic pipets

Plastic lab bottle

Psychological impact on cleaning staff and garbage collectors of the city of Paris (threat to stop collecting waste)

Collection of hazardous waste :

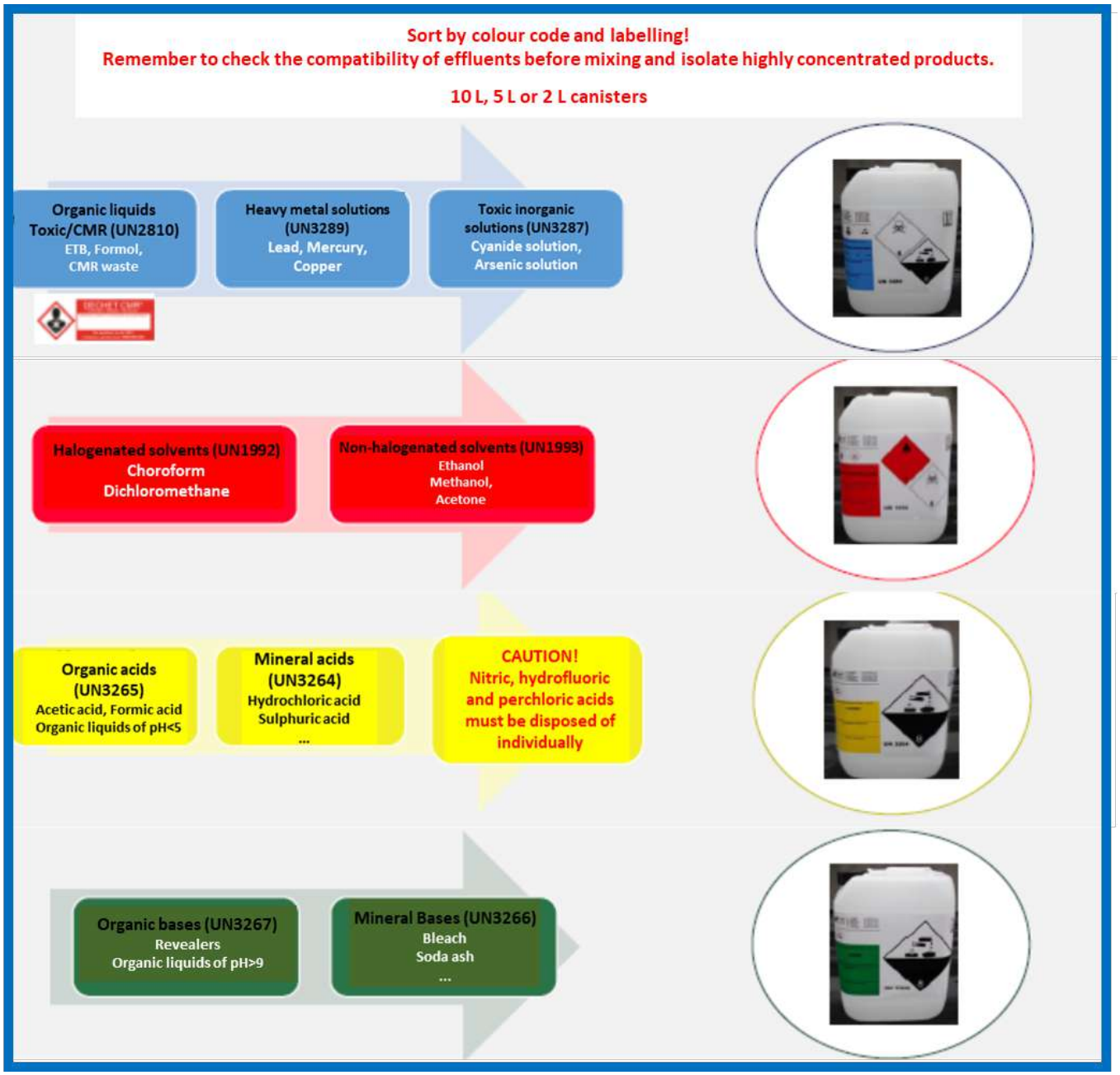
Twice a week, on Tuesday and Friday from 10 :00 to 11 :00.

Write on each waste container : the number of the team or the name of the service and the nature of the content

Management of hazardous chemical waste :

Liquid waste :

1. DO NOT MIX CHEMICAL WASTE
2. RESPECTING THE RULES OF COMPATIBILITY
3. 1 CONTAINER = 1 TYPE OF CHEMICAL
4. LABEL ANY CONTAINER WITH THE NAME OF THE CHEMICAL TO AVOID HAZARDOUS MIXTURES



Solid waste :

COMPACTION AND VOLUME REDUCTION ARE PROHIBITED.

Materials soiled with NON-CMR products

Glassware:
Pipettes, broken glass (beakers...), glass bottles

→ **30 l or 60 l blue drum with white lid**

Soiled consumables:
(gloves, tips, plastic pipettes, absorbent paper, etc.)

→ **5, 10 or 30 l buckets**

Empty plastic or metal Reagent bottles

→ **Chemical waste bunker where they will be weighed and stored in pallet boxes pending removal**

Toxic organic solids or CMR products (ETB, acrylamide gels...) or solid waste (gloves, papers, pipets...) that have come into contact with toxic substances or CMRs

= Carcinogenic, Mutagenic and toxic to Reproduction substances

→ **30 or 60 l round blue drum with black lid**

→ **5, 10 or 30 l buckets**

Out-of-date or used products (solids or liquids) in bottles

1) Establish the list of products
2) Separate incompatible products
3) Pack in a secure box and wedge with vermiculite
4) Bring to the bunker

Management of biohazardous waste :

Biological waste is Waste from Healthcare Activities with Infectious Risks, or, in French, « Déchets d'Activités de Soins à Risques Infectieux (DASRI) ».

The waste are : A. Solids, liquids, pungent/sharp.
B. Putrescibles of human, animal or plant origin.
C. Human pathogens (groups 2 to 4).
D. and/or environmental pathogens (GMO* groups 1 to 4).

C and D pathogens must be inactivated before leaving the premises and being picked up by the transporter EXCEPT those that have been in contact with CMR products.

Inactivations : - Chemical inactivation : addition of bleach to be used at a specific final concentration (0.43% active chlorine)

- Heat inactivation : autoclave : 134°C for 20 to 30 minutes

CAUTION : depending on the type of inactivation, the collection container will be different.

Liquid wastes :

Canister for collection of non chemical inactivated biological waste:
- autoclave-inactivated biological waste
- non pathogenic for humans : group 1
- non-GMO

Examples: - murine cell culture medium
- non-GMO primate cell line downgraded to biosafety level 1

Canister for collection of chemical inactivated biological waste, inactivation with bleach (base):
- all GMO from group 1 to 4
- and / or all pathogenic for humans (group 2 to 4)

Examples: - human cell lines with a biosafety level 2
- murine cells with a pathogenic from group 2

Never put waste decontaminated with bleach in an autoclave: risk of corrosion.
Depending on model 15000 € < cost of an autoclave < 80 000 €.

Canister for collection of biological that has been in contact with CMRs
For all biological waste
No inactivation, no autoclave, no bleach
Do not forget to stick the label:
and indicate the name of the substance on the container

Carcinogenic,
Mutagenic
and toxic to Reproduction substances

Example: - dilution of cells in Trypan blue (H350: may cause cancer)

Solid wastes :

COMPACTION AND VOLUME REDUCTION ARE PROHIBITED

Solid waste not soiled with CMR substances

Waste sharp/edged (scalpel, needle...)

Perforating waste (plastic pipets, micropipet tips...)

Non-perforating waste (gloves, absorbent paper, cell culture containers, tubes ...)

Needle boxes and mini-collectors (0.25, 3 or 5 L)

Then put the full, **closed** box in a plastic drum

Plastic drums 30, 50 ou 60 L

Cardboard bin with 50 L plastic bag

50 L plastic bag

Caution : For the contents of a plastic drum container to be autoclaved, the lid must not be **tightly closed** to allow water vapour to pass.

Bacterial culture petri dishes: Collect the petri dishes in a large autoclavable bag, close it loosely and autoclave it (134°C for 20 to 30 minutes) and put the autoclaved bag in a cardboard DASRI bin.

Waste soiled with CMR* products

NO INACTIVATION

* e.g. Trypan blue stained cell count slide

30 or 60 L round blue drum with black lid

5, 10 or 30 L buckets

Management of hazardous mixed biological and chemical waste :

MANAGEMENT OF MIXED BIOLOGICAL AND CHEMICAL WASTE:

- For liquids: chemical waste route according to the risk of the chemical used
- For solids: DASRI disposal route except if CMR.

COMPACTION AND VOLUME REDUCTION ARE PROHIBITED

Waste Electrical and Electronic Equipment (DEEE or D3E in French)

- When replacing equipment (freezer, microwave, etc.), ask the supplier if he can take back your old appliance
- If not, inform the CRC HSM : depending on the needs of the teams, the CRC Direction orders a D3E skip once or twice a year. In your message to the CRC HSM, please specify the dimensions and weight of the appliance to find out whether a removal service should be provided
- For computers, contact Emmanuelle Gelize (emmanuelle.gelize@sorbonne-universite.fr)

IMPORTANT : All equipment disposed of must be decontaminated of any chemical or biological products beforehand. A decontamination certificate may be required.

Household waste :

Instructions pending the implementation of the new market.

Printer cartridges : Waiting for new instructions.

Batteries : Waiting for new instructions.

X. INSTRUCTIONS TO BE FOLLOWED IN THE CASE OF OFF-HOURS WORK

Any person, whatever his or her position and supervision, who comes to work in a department located on the Cordeliers Campus outside usual working hours (7 a.m. to 7 p.m. from Monday to Friday), at weekends, on public holidays or outside authorised working hours following government orders (confinement, curfew) must :

- Do so in an exceptional manner and for imperative needs, in compliance with the regulations of the labour code and the regulations of his or her employer,
- Do so only after written agreement from his/her department head and/or validation by the head of his/her research unit,
- Never come alone, but always in pairs,
- To indicate his presence by filling in the register called "Registre de Présence en Horaires Décalés du Campus" located next to the reception of the Cordeliers Campus,
- Indicate the time of departure in the Register before leaving the Campus,
- Whenever possible, use an alarm device for isolated workers (DATI or PTI) which can be requested from the Cordeliers Campus reception.

In addition, it is reminded that :

- Isolated work is prohibited for risky operations (with radioactive or dangerous chemicals, microorganisms that are pathogenic for humans, etc.),
- Working outside of working hours and working alone is not allowed for trainees from secondary schools, BTS, M1, M2.

IN CASE OF NEED/EMERGENCY: CONTACT THE CORDELIERS CAMPUS ON-CALL SERVICE: 06 32 16 20 03

To obtain permission to work off-hours or to work isolated :

- Provide certification for Neo training or equivalent training.
- Ask the department's HSO to add his/her name to the authorisation request form.
- The HSO will forward the form, together with the training certificate, to the CRC HSM for validation before signature by the Unit Director.

XI. IN THE EVENT OF AN OCCUPATIONAL ACCIDENT

In order to be recognised, any accident at work must be reported according to a specific procedure using the employer's forms. In the case of certain accidents, the occupational physician provides specific medical follow-up, as in the case of accidents involving exposure to blood. Do not give your "carte vitale" to pay for care resulting from an accident at work.

Any accident (at work or on the way to work) must be reported to your employer within 48 hours.

The various employer forms are available on request from the CRC Direction or on the CRC's intranet, under the heading " Santé et Sécurité au Travail", tab " Déclaration des accidents de travail".

Do not forget to mention any accident in the Health and Safety at Work Register

MAIN SOURCES AND BIBLIOGRAPHY :

- CRC intranet site : https://www.crcordeliers.fr/extranet/accueil-extranet/ et aller dans le dossier « Santé et Sécurité au Travail »
- Sorbonne Université intranet site : https://intranet.sorbonne-universite.fr/fr/l-universite/prevention-des-risques-professionnels.html
- 'INSERM intranet site : https://pro.inserm.fr/ et aller dans l'onglet « Santé et Sécurité au Travail »
- Site Santé et Sécurité au travail du CNRS : https://www.dgdr.cnrs.fr/sst/cnps/
- INRS : https://www.inrs.fr/
- CRC L2 platform booklet

BIBLIOGRAPHY :

1. Code du travail, Partie législative (Articles L1 à L8331-1), Quatrième partie : Santé et sécurité au travail (Articles L4111-1 à L4831-1), Livre Ier : Dispositions générales (Articles L4111-1 à L4163-22), Titre II : Principes généraux de prévention (Articles L4121-1 à L4122-2), Chapitre Ier : Obligations de l'employeur. (Articles L4121-1 à L4121-5) : https://www.legifrance.gouv.fr/codes/section_lc/LEGITEXT000006072050/LEGISCTA000006160774/#LEGISCTA000006160774
2. Guide-risques-biologiques-CNRS-Edition-mai-2017 (https://bip.cnrs.fr/wp-content/uploads/2020/04/Guide-risques-biologiques-CNRS-Edition-mai-2017.pdf)
3. *« Manuel du HCB pour l'utilisation confinée d'Organismes Génétiquement Modifiés » (http://www.hautconseildesbiotechnologies.fr/fr/system/files/file_fields/2019/07/10/manuelduconfine2019.pdf).*
4. INRS : https://www.inrs.fr/risques/bruit/ce-qu-il-faut-retenir.html
5. Les cahiers de prévention du CNRS : risques liés aux équipements sous pression
6. Cahier de prévention CNRS sur les risques liés aux LASERS
7. INRS : brochure ed3336 : L'incendie sur le lieu de travail
8. (file:///C:/Users/Direction/Downloads/Proc%C3%A9dure%20d'utilisation%20des%20DATI%20-%20Campus%20Pierre%20et%20Marie%20CURIE.pdf)
9. (https://www.inrs.fr/risques/travail-isole/expositions-risques.html
10. Code du travail, articles R4543-19 à R4543-21
11. INRS : https://www.inrs.fr/risques/tms-troubles-musculosquelettiques/ce-qu-il-faut-retenir.html
12. Plan de prévention : intranet de SU : https://intranet.sorbonne-universite.fr/fr/l-universite/prevention-des-risques-professionnels/plan-de-prevention.html
13. Permis de feu : https://www.inrs.fr/dms/inrs/CataloguePapier/ED/TI-ED-6030/ed6030.pdf
14. FICHE PRATIQUE N°9 de Sorbonne Université : Les équipements de protection individuelle en chimie : intranet de SU : https://intranet.sorbonne-universite.fr/fr/l-universite/prevention-des-risques-professionnels/consignes-de-securite.html
15. Les cahiers de prévention du CNRS : risques chimiques
16. Les cahiers de prévention du CNRS : Risque lies aux lasers v11-2019

ANNEXES :

Annex 1 :

SORBONNE UNIVERSITÉ

Service de Prévention des Risques Professionnels

FACT SHEET N° 5

GENERAL RECOMMENDATIONS

The purpose of this sheet is to inform users of the main safety rules and recommendations to be applied within the establishment.

THE OBLIGATIONS OF EACH AGENT

The general principles of prevention are enshrined in the Labour Code (art. L4122-1): "It is the responsibility of each worker to take care, in accordance with his or her training and abilities, of his or her own safety and health as well as that of other persons affected by his or her actions or omissions at work. "

RECOMMENDATIONS

1. Fight against disorder, clutter and excessive storage, especially in high-traffic areas.
   Nothing should obstruct traffic.

DISORDER = ACCIDENT, the only solution CLEAN UP, TIDY.

2. Keep emergency routes and exits clear, unlocked and free of traffic at all times.
3. Check that you are not obstructing access to energy cut-offs (gas, electricity, etc.) and safety equipment (fire extinguishers, safety showers, etc.). Respect them.
4. **Do not obstruct the closing of fire doors.**
5. **Park your vehicle in the spaces reserved for this purpose so as not to obstruct access to the emergency services.**
6. Take note of the general safety instructions (in the corridors) and specific instructions (in the laboratory). These instructions must remain visible.
7. **Do not store unnecessary combustible materials..**
8. **Do not overload electrical outlets or modify installations. Electrical cables must not obstruct traffic. The use of multiple sockets is prohibited. Multiple socket outlets are allowed but their use must be limited. Power strips must comply with the NF standard and be CE marked (beware of cheap models).**

9. Do not smoke on the premises. Decree 2006-1386 of 15 November 2006 setting out the conditions for the application of the ban on smoking in places assigned to collective use.
10. Storage of chemical products: See practical sheet n°1
11. Storage of special gases: see Fact sheet n°2

Annex 2 :

SORBONNE UNIVERSITÉ

Service de Prévention des Risques Professionnels

Fact sheet N°8

BEHAVIOUR IN THE LABORATORY

THE PROHIBITIONS

- Eating, drinking or putting anything in your mouth
- Smoking, including electronic cigarettes
- Working alone
- Wearing contact lenses
- Wearing unsuitable clothing (flotation and/or flammable)
- Pipetting with the mouth
- Discharge into the sink
- Wearing jewellery

THE OBLIGATIONS


Wearing glasses


Wearing masks


Wearing gloves


Wearing labcoat

- Wearing a garment covering the legs and closed shoes
- The labcoat must be cotton, long-sleeved and buttoned
- Long hair must be tied back
- Bottles must be labelled (name, hazard symbol...)
- Carry out statutory checks on collective protection equipment (chemical fume hoods, MSC, etc.)
- Display safety instructions
- Check the presence and condition of personal protective equipment

THE RECOMMENDATIONS

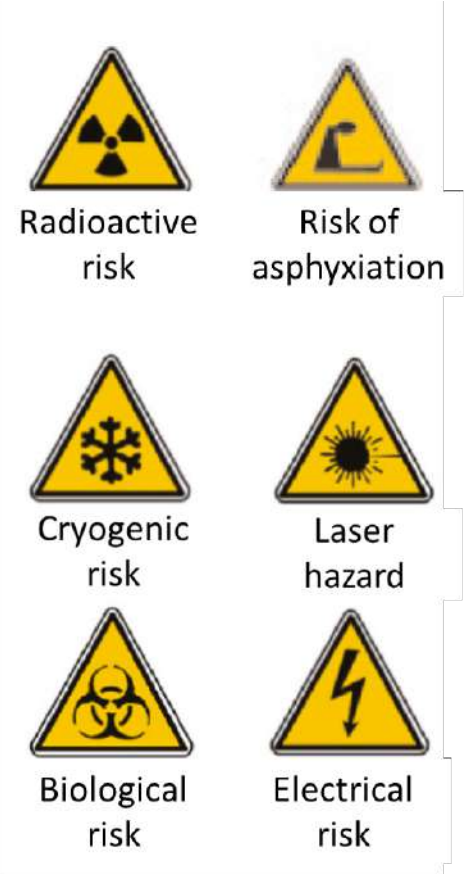
- Be aware of the general safety instructions (emergency numbers, etc.)
- All exits must be accessible and not locked
- Use appropriate equipment in good condition
- Move around without running
- Work in a stable position
- Wash hands before and after handling
- Work in a fume hood when handling volatile, noxious or toxic products
- Leave benches clean and uncluttered
- Leave free access to emergency equipment (safety showers, fire extinguishers, etc.) and to emergency cut-off devices
- Remember to check the operation and good condition of safety showers and the eye wash station
- Have absorbent (sand or vermiculite) available in case of accidental spillage
- Have a considered attitude, aware of the potential risks and the appropriate measures to take
- Make an inventory of chemical products
- Have material safety data sheets (MSDS) available

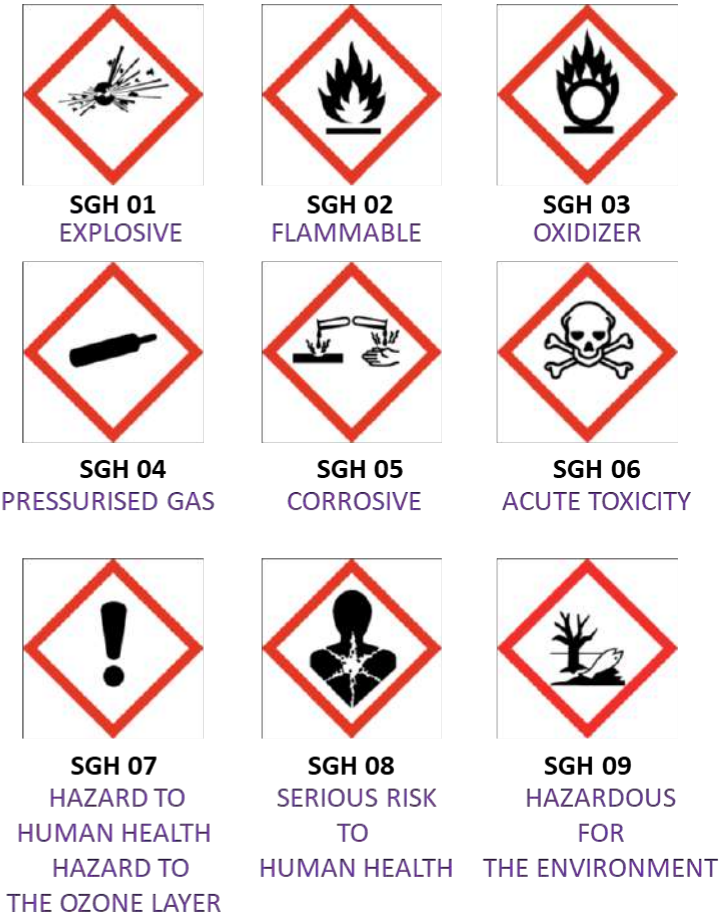
Annex 3 :

(https://www.inrs.fr/media.html?refINRS=A%20746)

Annex 4 :

HAZARD IDENTIFICATION PICTOGRAMS





Annex 5 :

UNDERSTANDING THE LABELLING OF CHEMICALS

A. The hazard classes and categories

16 physical hazard classes
- explosive
- flammable gases
- aerosols
- oxidising gases
- gases under pressure
- flammable liquids
- flammable solids
- self-reactive substances and mixtures
- pyrophoric liquids
- pyrophoric solids
- self-heating substances and mixtures
- substances and mixtures which, in contact with water, give off flammable gases
- oxidising liquids
- oxidizing solids
- organic peroxides
- substances or mixtures which are corrosive to metals

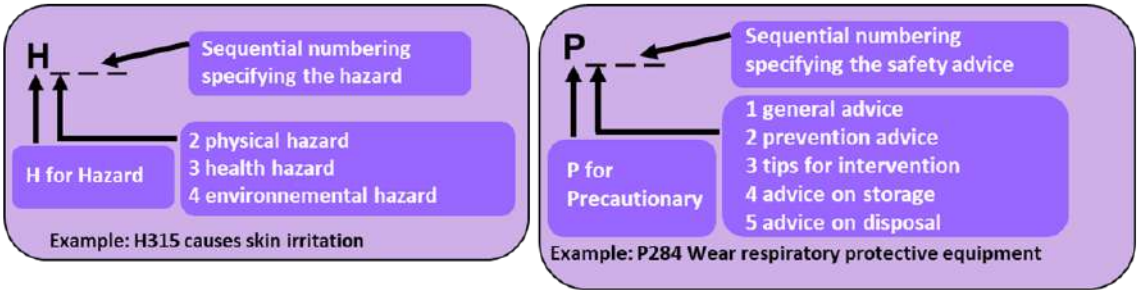
10 health hazard classes
- acute toxicity
- skin corrosion/skin irritation
- severe eye damage/eye irritation
- respiratory or skin sensitisation
- germ cell mutagenicity
- carcinogenicity
- reproductive toxicity
- specific target organ toxicity (STOT) - single exposure
- specific target organ toxicity (STOT) - repeated exposure
- aspiration hazard

2 environmental hazard classes
- hazards to the aquatic environment
- hazardous to the ozone layer

Some hazard classes are divided into categories (e.g. carcinogen category 1A, AB or 2).

B. The hazard pictograms

C. Hazard statements and safety advice

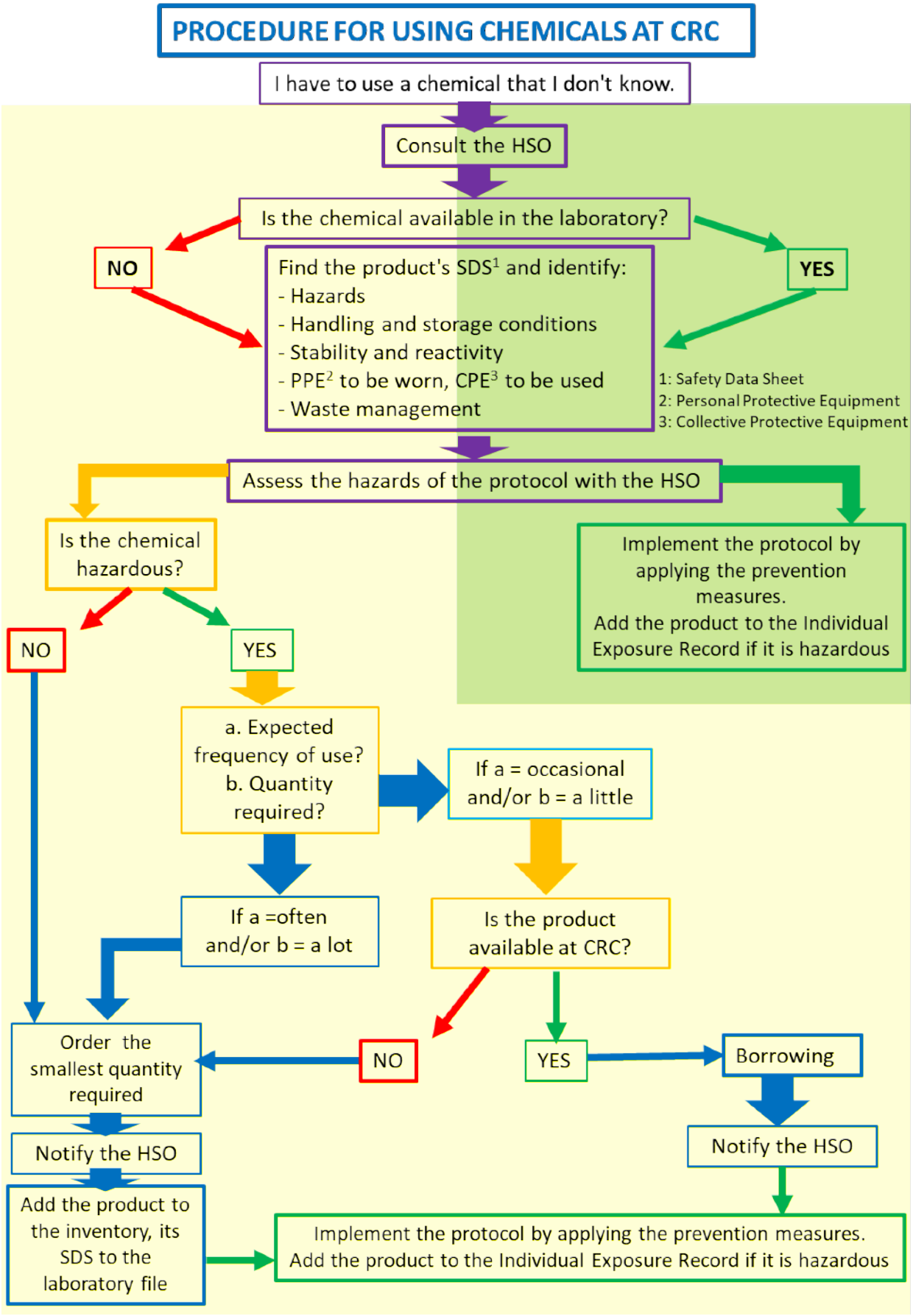


D. Warning statement

DANGER
Statement used for the most severe hazard categories
Example: Causes skin burns (H314)

WARNING
Statement used for less severe hazard categories
Example: causes skin irritation (H315)

Annex 6 :


PROCEDURE FOR USING CHEMICALS AT CRC
I have to use a chemical that I don't know.
Consult the HSO
Is the chemical available in the laboratory?
NO
YES
Find the product's SDS[1] and identify:
- Hazards
- Handling and storage conditions
- Stability and reactivity
- PPE[2] to be worn, CPE[3] to be used
- Waste management
1: Safety Data Sheet
2: Personal Protective Equipment
3: Collective Protective Equipment
Assess the hazards of the protocol with the HSO
Is the chemical hazardous?
Implement the protocol by applying the prevention measures.
Add the product to the Individual Exposure Record if it is hazardous
NO
YES
a. Expected frequency of use?
b. Quantity required?
If a = occasional and/or b = a little
If a =often and/or b = a lot
Is the product available at CRC?
Order the smallest quantity required
NO
YES
Borrowing
Notify the HSO
Notify the HSO
Add the product to the inventory, its SDS to the laboratory file
Implement the protocol by applying the prevention measures.
Add the product to the Individual Exposure Record if it is hazardous

Annex 7 :

CENTRE DE RECHERCHE DES CORDELIERS

USE OF ETB : GUIDELINES
(ETHIDIUM BROMIDE , CAS N°1239-45-8)

HAZARD IDENTIFICATION

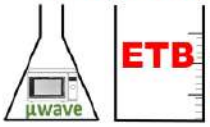
ETB is an intercalating agent, carcinogenic, mutagenic and reprotoxic (CMR).
Commercialised substitutes should be handled with the same precautions.

Several solutions exist to avoid contact with ETB as much as possible:
- O Migration system with pre-cast gels in cassette
- O Automated capillary migration as at CGB for the highest throughput

RECOMMENDATIONS FOR USE

- Prefer to buy an aqueous solution in a flacon dropper
- HANDLING UNDER FUME HOOD IN OPERATION
- Handling areas must be marked with the above pictograms
- Wear suitable nitrile GLOVES, LABCOAT AND PROTECTIVE GLASSES

- Preparation of agarose gel + ETB :



☞ 2 containers :
- A "microwave" container that never receives ETB
- An "ETB" container that never goes in the laboratory laundry or the microwave

☞ UNDER THE FUME HOOD in a dip tray:
- Pour the warm agarose gel into the "ETB" container and add the BET
- Pour and let the gel cool completely

☞ Transport the gel in a drip tray

Cécile GODARD, août 2021

Annex 8 :

Inserm

INCIDENT REPORTING PROCESS

Treatment of violence,
psychological or sexual harassment,
discrimination, gender-based behaviours

Inserm protects its staff

Victim or witness, report it

signalement@inserm.fr

CIDFF
Centre d'information sur les droits des femmes et des familles

To complement internal reporting and provide specialized care

Inserm provides a listening and support unit outsourced into CIDFFs to the staff from **Ile-De-France**. They are experts in supporting victims of gender-based and sexual violence.

ecoute_cidff_idf@outlook.com

Access the report form and more information on the website

Inserm pro
Human Resources / Protection

Specialized structures for reporting and preventing discrimination, harassment and sexual and gender-based violence can also listen to, advise and support victims :

The **AVFT**, European association combatting violence against women at work advises, defends and supports women victims of gender-based and sexual violence in the workplace.
www.avft.org

Le Défenseur des Droits, an independent State institution in charge of defending victims of discrimination and promoting equality and access to rights.
www.defenseurdesdroits.fr

SOS homophobie, association fighting against LGBTIphobic discrimination and violence
www.sos-homophobie.org

Violences Femmes Info - 3919, listening platform for victims of domestic, gender-based and sexual violence

October 2022

Annex 9 :


SOUFFRANCE AU TRAVAIL
VIOLENCES SEXUELLES OU SEXISTES
DISCRIMINATION
PARLEZ-EN
Victime ou témoin ?
Rendez-vous sur le portail
de signalement Sorbonne Université
SORBONNE UNIVERSITÉ
Signaler c'est agir
Pour qui ?
Tous les personnels de Sorbonne Université et les personnels hébergés sur les campus.
Pour quoi ?
• S'informer
• Faire un signalement
• Être mis en relation avec un acteur ou une actrice d'écoute
Comment se connecter ?
→ https://portail-signalement.sorbonne-universite.fr
→ Se connecter avec ses identifiants Sorbonne Université
SORBONNE UNIVERSITÉ


Agissements sexistes,
harcèlement,
violences sexuelles...
TOLÉRANCE
ZÉRO
Victime ou témoin ?
Contactez la Cellule d'écoute contre les violences sexuelles et sexistes*. Une équipe dédiée vous propose un accompagnement médical, psychologique et juridique.
Dispositif gratuit et anonyme
Ligne réservée aux universités
07 88 15 12 92
Standard Institut Santé Génésique (ISG)
01 39 10 85 35
Du lundi au vendredi, de 9h à 17h30
accueil.universite.isg@gmail.com
*Cellule indépendante gérée par l'Institut en Santé Génésique (ISG)/ Women Safe, en partenariat avec Sorbonne Université
SORBONNE UNIVERSITÉ

GENERAL SAFETY INSTRUCTIONS

In the event of a fire outbreak

The first 3 minutes are decisive!!!!

Attack the fire with the nearest fire extinguisher <u>without taking risk</u>

If the fire is out of control, sound the nearest alarm on the landing

Call the emergency services : 1. Fire Department: 18 / 112
2. Safety post: 01 44 27 68 96

Specify:
- the location of the fire (address, building, floor, etc.)
- the severity (localized or generalized fire)
- the first measures taken (attempt to extinguish the fire, etc.)

DO NOT HANG UP FIRST

In case of an audible alarm in the building

If possible close the doors

Go to the nearest emergency exit following the evacuation and signs

Do not use lifts

Don't turn back

In case of smoke, lower yourself

When you are outside, go to the assembly point

Medical emergency

Get help from a first-aid worker

Call the emergency services :
1. Medical malaise: Emergency Medical Service : 15 / 112
1'. If accident or injury: Fire department 18 / 112

Specify:
- the location (address, building, floor, etc.)
- the severity (conscious, unconscious, type of injury)
- the first measures taken (first aid, etc.)

DO NOT HANG UP FIRST

Alert the Security Post of the arrival of the emergency services: 01 44 27 68 96