WELCOME PLAN FOR NEW PERSONNEL IN THE CAJAL INSTITUTE

INDEX:

WELCOME LETTER TO THE CAJAL INSTITUTE

Welcome to the Cajal Institute!

In this first contact with our Institute, you should carefully read the content of this document, prepared with the intention of making your stay in the Institute easier, more efficient and safer.

The Cajal Institute from the High Council of Scientific Research (CSIC) is a public Center for Research in Neurobiology. For more than 100 years the Institute has contributed decisively to the knowledge of the structure and functioning of the Nervous System. We wish to maintain this spirit, and for that reason we want to transmit to all newcomers the passion of continuing the scientific work of Santiago Ramón y Cajal, and acquire the knowledge and know-how of the Institute in current neurobiological research so that their work in the Center contributes to their personal and professional development. With this aim we have prepared this guide.

This document is subject to periodic changes. We suggest to the personnel that access our Center to periodically revise it, since the information will be progressively updated.

Thank you very much in advance.

DEPUTY DIRECTOR OF SCIENTIFIC

AND TECHNICAL RESEARCH

José María Frade

PREAMBLE

The complexity and variability of the work carried out in the Center, as well as the implementation of the criteria that govern the CSIC's policy on Occupational Risk Prevention, make it necessary to draw the main lines of the **itinerary and the procedure that must be carried out during the incorporation of new members to the Center**. In accordance with these criteria, it is the responsibility of the Management Team of the Center to implement these guidelines in a specific manner for each Institute, to promote the necessary measures for its implementation and to monitor the observance of said measures.

This plan is based on an analysis of the information that all new personnel should be aware of when joining the CSIC, and specifically our Institute. This analysis has been carried out by the Health and Safety Commission of the Cajal Institute by delegation of the Management Team of the Center. In this regard, priority has been given to some lines of action with specific objectives, and mechanisms for monitoring and evaluation have been defined.

The Welcome Plan has a double objective: on the one hand, to serve new personnel as a reference guide for their stay at the Institute, and on the other hand, to serve as a support tool for all members of the Institute.

With this aim, the **Welcome Plan** includes:

- The roadmap that the newcomer must carry out in the initial moments of his/her stay at the Institute, including the documentation that must be submitted and received from each instance (Administration, Service, Laboratory).
- The list of Units/Facilities.
- The Code of Good Practices from CSIC.
- The Guide for Prevention, Safety and Occupational Health.

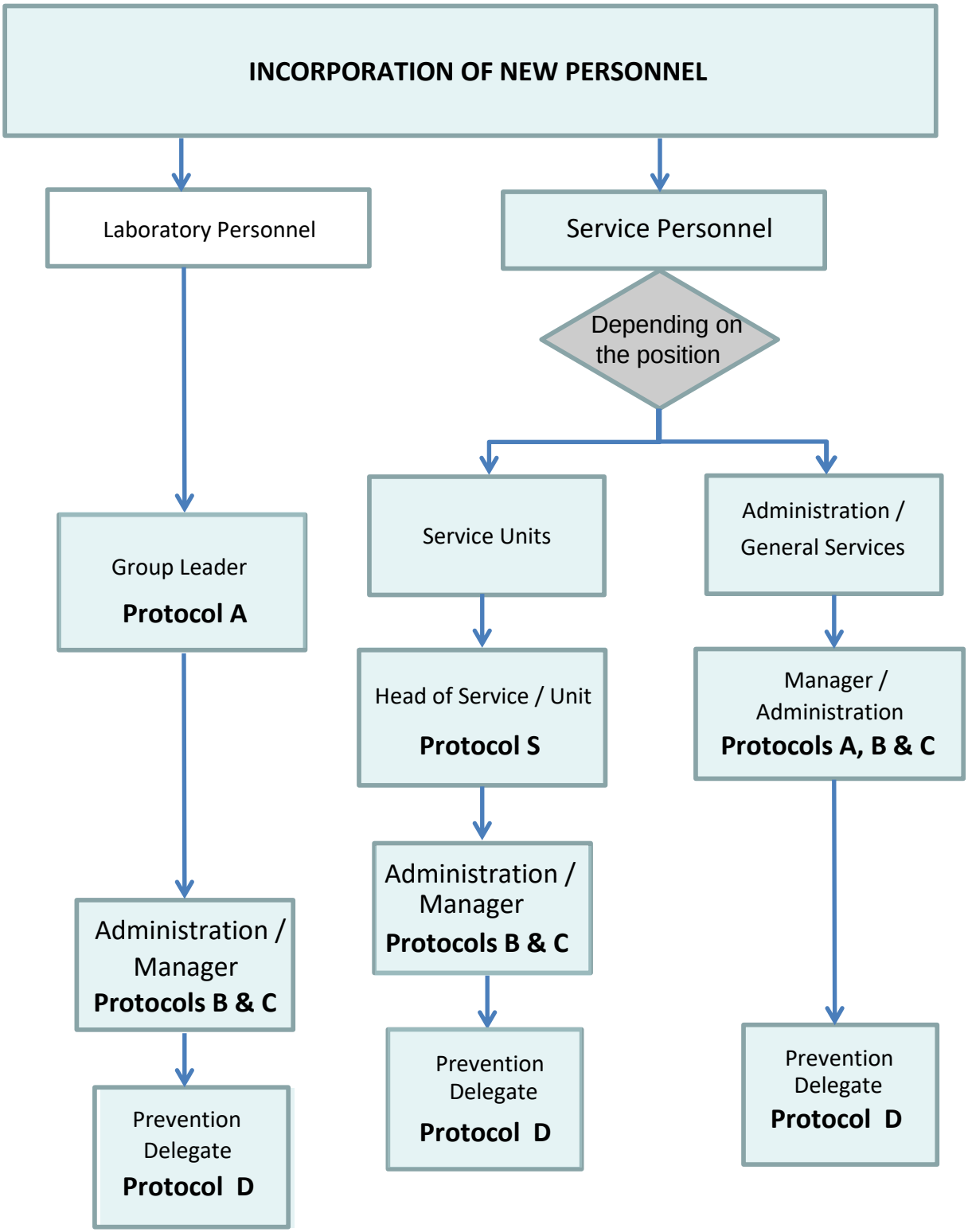
This document will be updated and kept up-to-date. The the Health and Safety Commission will continue working on its improvement and updating.

This tool will be available on the Intranet of the Institute, in order to make it easier, safer, and more efficient the stay at the Center of all its present and future members.

THE HEALTH AND SAFETY COMMISSION

OF THE CAJAL INSTITUTE

PROTOCOLS OF ACTION



PROTOCOL A: WORKING PLACE

GROUP LEADER or HEAD OF SERVICE

Aim:

Presentation of the new personnel to the Laboratory or Service in which he/she will carry out his work. Show the working place, the people with whom he/she is going to work and specific information about the work he/she will perform in order to facilitate his/her integration in the Institute.

Interview

- ✓ Assignment of a person responsible for him/her, who will be in charge of his/her proper training.

Inform

- ✓ Description of the tasks to be carried out in the Institute.
- ✓ Information about prevention rules to follow:
  - Risks of the workplace and preventive measures that must be adopted .
  - Guidelines for emergency situations.
  - Established work procedures.
  - Personal protection with Personal Protection Equipment (PPE), if applicable.
  - Signed reception of PPE delivered.
  - Safety sheets for chemical products used in the laboratory.

Show

- ✓ Dependencies of the laboratory or service, location of the equipment, the common and shared areas.
- ✓ Locate working devices.
- ✓ Show facilities that will be used.

PROTOCOL B: INSTITUTIONAL GENERAL INFORMATION

ADMINISTRATION

Aim:

Inform of the existence of a Welcome Plan document for new personnel that must be read. Then new personnel has to respond to a questionnaire present in the Intranet of the Cajal Institute. This is absolutely required to get access to the Cajal Institute.

The document shows

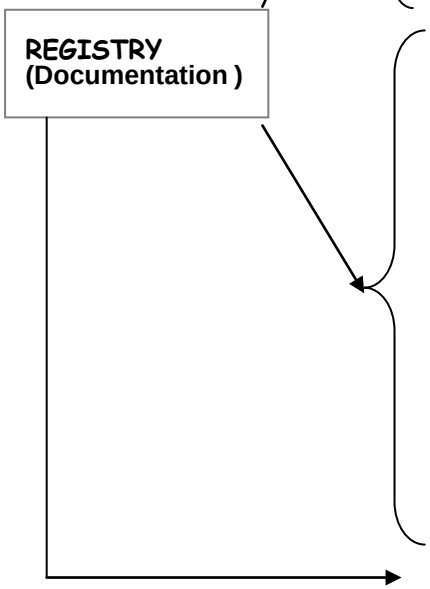
- ✓ Location of Common Services.
- ✓ Specific services: Scientific-technical research facilities, maintenance service, gas storage, chemical products warehouse, animal house, etc.
- ✓ Code of Good Scientific Practices.
- ✓ Emergency plan and building plan.

PROTOCOL C: ADMINISTRATIVE DOCUMENTATION

MANAGER

Aim:
Register the new personnel and provide him / her with the necessary information and documents for the administrative relationship derived from the contractual relationship that has been initiated.

Register



STAFF OFFICIAL / LABORAL

Taking up office
Register in the Social Security system
Opening of administrative file
Documentation archiving
Documentation sending to CSIC
Access card
E-mail account
Parking permit (if required)
Data collection form
Incorporation in database
Explanation of the salary

HIRED OR GRANTEE

Contract or Scholarship Processing
Register in the Social Security system
Contract or scholarship signing
Collection of bank details
Documentation sending to CSIC
Documentation archiving
Open vacation cover
Access card
E-mail account
Data collection form
Incorporation in database
Explanation of the salary

STAY PERMIT

Inform

- ✓ Social-labor rights
- ✓ Remuneration, advances, subsistence allowance, insurance
- ✓ Social Action and Training Courses
- ✓ Rules of internal regime (Calendar, holidays, permits, hours, presence control, communication of absences, leave, etc.).

PROTOCOL D : PREVENTION OF OCCUPATIONAL HAZARDS

PREVENTION DELEGATE

Aim:
Register the new personnel and give the documentation on Prevention of Occupational Risk, and inform him / her of the legislation on Occupational Health.

Inform

- ✓ Inform about the existence in the Institute of Prevention Delegates, of the Committee of Security and Health, and of the Service of Prevention and Occupational Health of the CSIC
- ✓ Inform about the Guide of Prevention, Safety and Occupational Health.
- ✓ Present the components of the teams of first intervention, second intervention, and alarm and evacuation, from his / herr immediate work area.
- ✓ Inform about the Emergency Plan of the Cajal Institute.

Evacuation routes

- ✓ General lines of the Emergency Plan
- ✓ Show the evacuation routes and emergency exits
- ✓ Locate emergency showers, eyewashes, fire blankets, breathing equipment, first aid kits
- ✓ Locate the fire fighting equipments
- ✓ Locate first aid kits, medical services, rest rooms, etc..
- ✓ Explain the meaning of emergency signs

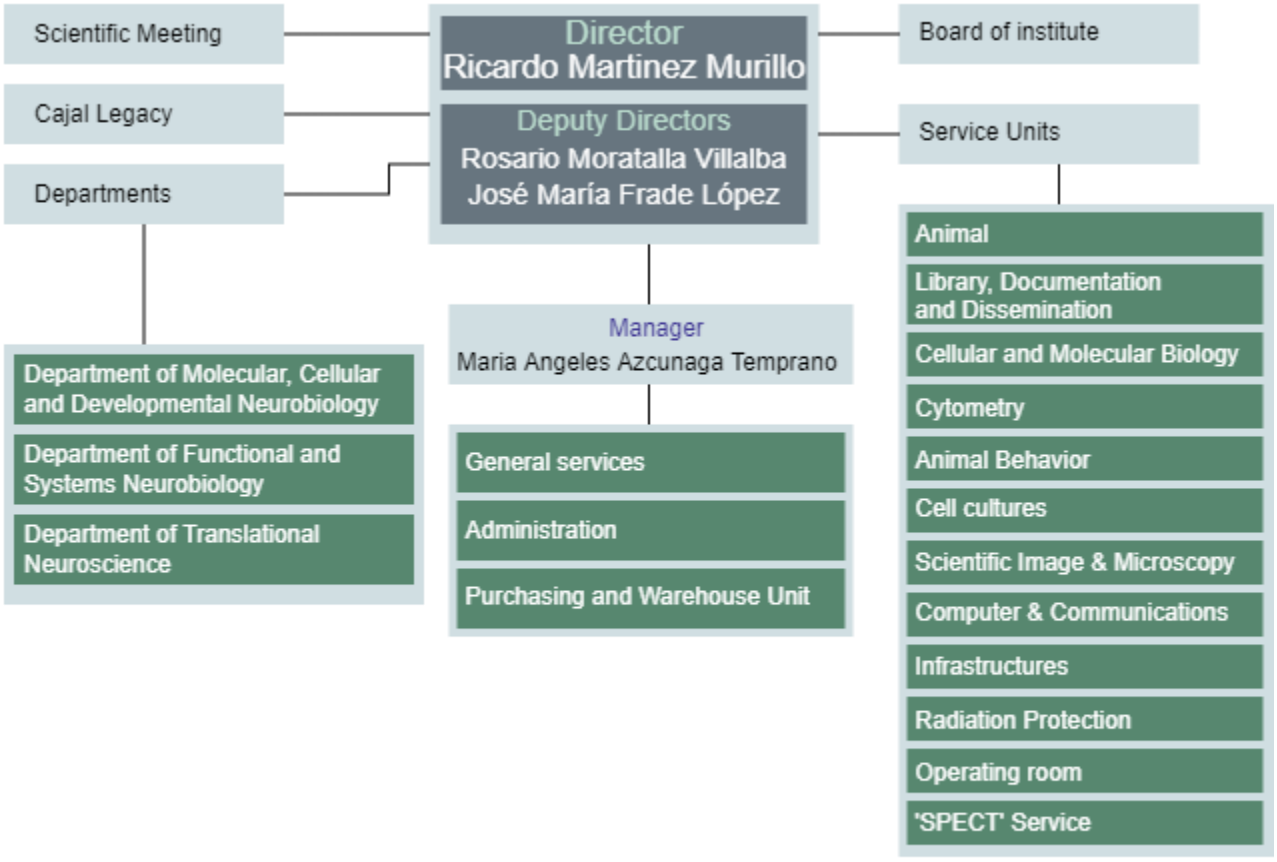
Fill in the QUESTIONNAIRE ON-LINE located in the Intranet, print it, sign it, and submit it to the Administration to have access to the resources of the Cajal Institute:

STANDARDS OF USE AND SAFETY FOR SUPPORT UNITS AND FACILITIES

STANDARDS OF USE AND SAFETY FOR SUPPORT UNITS AND FACILITIES

CAJAL INSTITUTE

CAJAL INSTITUTE



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ANIMAL HOUSE FACILITY

INTRODUCTION

The Animal House Facility aims to cover the needs of the researcher with respect to animal experimentation.
From the breeding and maintenance of various animal species, the researcher can access the type of animal necessary for experimentation.
It also seeks to control animal production to the maximum, to avoid unnecessary slaughter, as well as to carry out exhaustive control over environmental conditions and other factors that may cause stress to the animal, thus fulfilling the basic foundations of the Ethics in Animal Experimentation.

FUNCTIONS

FUNCTIONS: Breeding and maintenance of "wild type" Rats (Wistar strain), of "wild type" Mice (strains: C57BL6, CD1) and 2 transgenic strains (GFP green and Rosa26) for the common use of users.
Also, breeding and maintenance of genetically modified mice, belonging to specific research groups.
The breeding of both species includes from the production of embryos to the delivery of adult animals.
The maintenance of a maximum of 6 hamsters is also carried out in Conduct room No. 2, with a special fridge to provoke hibernation.

OPERATING PROTOCOL

1. ANIMAL HOUSE FACILITY USERS.

- Users can be any person authorised by the Cajal Institute.
- **Access cards will be** provided **to users, upon written request** to the Institute's Administration Department.

2. SERVICE REQUEST.

- Only Animals Lab users can request animals; For this purpose, the order form must be filled in well in advance (available on the intranet or in the Animal House Facility itself). Regarding any modification, extension or cancellation of orders, the Animal House Facility will be notified, as soon as possible.
- The expenses incurred by each group will be invoiced monthly (delivery of animals and stabling), whether or not the animals requested are used, unless notice is given sufficiently in advance.

3. USER TRAINING.

- The use of any type of laboratory animal is forbidden for people who have not been previously instructed.
- New users who join a line of research of the Institute and need to work with laboratory animals, should be instructed in the management of them, as well as correctly knowing the different accesses to the Animal House and the clothing and protection that should be used in each case.
- To do this, the PI must inform the new user of his group that, before starting to work with animals, the Animal House Facility must be contacted so that the personnel of the same can carry out the training, or a competent person from his own laboratory.

4. USE OF LABORATORY ANIMALS.

- The animals that are delivered to the user are moved to the rooms in the experimental area, whether they are rats or mice. Each group is assigned a number of spaces in the different rooms.
- The light-darkness cycle of the Animal House is from 7:30 am to 7:30 pm.
- When an animal is returned to its housing, after carrying out the corresponding experiment, it must be checked that the animal has feed, a bottle with water (or medication, if applicable) and that the cage is closed and identified correctly.
- It should also be checked that the doors of the rooms are closed once the experiment is finished.

5. MATERIALS FOR WORKING WITH ANIMALS.

- In the Surgery, the user will have the basic material that they will need for their experiment, such as: syringes, needles, containers, bags, etc.
- If at any time any material is depleted, the user is requested to notify the Animal House staff for its replacement.
- The most difficult materials (some anaesthetics, antibiotics, etc.), upon request, can be obtained through the facility's line manager (Laude).

6. SACRIFICE OF ANIMALS.

- The user will define the form of euthanasia of the animals once the experiment is completed within the permitted euthanasia procedures (Royal Decree 53/2013, of 1 February).

The following methods are advised:

- **Rats**: CO_2
  Anaesthesia overdose
  Guillotine (previous sedation)

- **Mice:** CO_2
  Anaesthesia overdose
  Cervical dislocation
  Guillotine (previous sedation)

- Once the animals have been slaughtered, they will be placed in a plastic bag (which can be obtained in the Operating Room), closing it correctly and depositing it in the corpse freezer, located at the exit of the Animal House.
- It is forbidden to introduce objects such as syringes, needles, sharp objects, etc. into these bags, as they can cause injuries to personnel who will handle these bags for their removal.

7. VISITS TO THE ANIMAL HOUSE:

- Outsiders of the Animal House of the Cajal Institute should not visit the same.
- If for some specific reason a visit from outsiders is necessary, you should ask the person in charge of the installation.
- The animals can only be observed through the "portholes" of the doors, avoiding entry into the barrier area (clean area).

8. GENERAL RULES FOR THE USE OF THE ANIMAL HOUSE FACILITY

- If it is essential to enter the Animal House outside of the daylight hours (7:30 a.m. to 7:30 p.m.), red light timers can be found to the left of the doors of each room, to avoid disturbances to the animals.
- No entry into the barrier area (Ventilated Racks) is allowed to any person that has not been previously authorised.
- Smoking, eating or drinking is not allowed in the Animal House.
- No loud noises should be made.
- It is obligatory for all the personnel that enter the Animal House, to use the gowns and shoe covers placed at the entrance of users. The use of a mask is also recommended.
- Any animal that leaves the facility can only re-enter in the Quarantine area, upon request to the person in charge of the facility.
- The entry of new animals will not be allowed without the authorisation of the Veterinarian of the facility, upon request to the person in charge, with sufficient advance notice.
- Any materials in which animals have been located that have left the premises, should be washed, disinfected and then sterilised before moving to any room.

- Any experiment that involves the use of radioactive isotopes, will have to follow the Institutes specific standards of work with radioactivity, previously notifying the Animal House Facility.
- **Surgery and Conduct rooms**: Once the experiment is finished, the user should leave everything used completely clean and tidy. The countertops, after cleaning with soap and water, should be wiped with alcohol (there are dispensers for this purpose).

9. RULES OF ACCESS FOR USERS.

- The user staff will only be able to access the Animal House through the entrance prepared for that purpose, where they will find the necessary material for their correct entry.
- There are gowns (blue customised or disposable), shoe covers, masks and caps.
- Customised blue gown: when a user considers that, due to the time that their experiment will entail, they need a gown of this type, they must notify the staff of the Department (as well as for its and replacement).
- Caps and masks: if work is to be carried out for a long time with the animals, it is advisable to use both.
- From the user's entrance, the Experimental Hall is accessed, where the rooms of the experimental animals, fish tanks, and Surgery and Conduct rooms are located.
- **Dirty materials**: The typical dirty materials from the animals (cages, grids, drinking bottles ....), generated from an experiment, should be taken to the Wash room for treatment (do not leave them in Surgery or Conduct rooms).
- **Access to Ventilated Racks (barrier area)**: The entrance to this area will be as restricted as possible and only authorised users may enter; it will be entered through the airlock passage located at the end of the Experimental Hall, where the user will dress with previously sterilised materials: gown, shoe covers, mask, cap and sterile gloves.
  Access in the morning should not be made before 11:30 am, as the Animal House staff is performing cleaning functions.

EQUIPMENT

The Animal House Facility has a Surgery Department and Conduct Department. Animal materials: in addition to the basic materials (cages, grids, drinking bottles, ...), the animal cages are located either in Conventional Racks or in Ventilated Racks equipped with a unit that controls the microclimate of the cages (used for transgenic mice in a barrier area).
Lavaracks are located in the wash room for washing and disinfecting all types of material as well as the autoclave for sterilisation.

PERSONNEL

- Animal Welfare Manager: Pilar Sánchez Blázquez.
- Designated Veterinarian: José Mª Orellana (external veterinarian).
- Technical manager: Laudelina Martín Garmendia
- Interim technician: Mario Berrocal Herrera
- External Company Personnel "Vivotecnia": 5 workers.

PHONE: 91 585 47 46 / 871075

EMAIL

cea@uah.es (Jose Mª Orellana)
laude@cajal.csic.es (Laude)

LOCATION

Basement of the Cajal Institute.

SURGERY

INTRODUCTION

This is a room inside the Animal House enclosure, **to which authorised persons have access.**
To be able to make reservations, it is necessary to request authorisation from the person in charge of the surgery.

FUNCTIONS

In the surgery, surgical operations, implantation of electrodes, animal sacrifice and dissection, perfusion, extraction of fluids (blood, cerebrospinal fluid ...) are carried out.
When the light is turned off, ultraviolet light is automatically turned on.

OPERATING PROTOCOL

- The equipment to be used in the reservation sheets will be reserved in advance
- Access to the surgery is performed with the clothing used for access to the Animal House (shoe covers, cap, robe etc. ...)
-The use of surgical gloves is recommended
-The room must be left tidy and cleaned after use

-To access different commonly used equipment, you must request the keys of the cabinets containing it
-The surgical material is from each laboratory
-The sharps material (scalpel blades, needles) is removed via containers for this effect
-It is essential to know the operation of the equipment before its use

EQUIPMENT

Several tables are available, including one specially designed for animal perfusion; surgical microscopes, stereotaxic devices (one of them digital); inhalation anaesthesia systems (oxygen and isoflurane); nanoinjection system; peristaltic pump for infusions; cold light sources, centrifuge; scales; there is a variety of sterile and / or disposable material for use in procedures (syringes, needles, gloves, etc.); drugs (anaesthetics, saline solution, heparin ...); sacrificial chamber with CO_2

PERSONNEL

MANAGER: María López de Ceballos
PHONE: 91 585 4716 / 871037
Email: mceballos@cajal.csic.es

LIBRARY, DOCUMENTATION AND DISTRIBUTION UNIT

INTRODUCTION

The Library of the Cajal Institute, considered by the national and international scientific community as one of the most complete in Neurosciences, especially for the documentary collection of international publications from the late nineteenth and early twentieth centuries, in addition to being a Cajal Institute Support Unit, whose main objective is to offer bibliographic resources to its researchers as well as to distribute, control and preserve the bibliographic and documentary collection it houses (Royal Decree 582/1989 of 19 May), is part of the Library Network of the Superior Council of Scientific Research. This implies that the assigned personnel must manage, process and participate in all the processes of said network, whose function is to give the scientific community a better service by taking advantage of all the technical, economic and human resources.

FUNCTIONS

The UBDD of the Cajal Institute, in addition to being a Cajal Institute Support Unit, whose main objective is to offer bibliographic resources to its researchers as well as to distribute, control and preserve the bibliographic and documentary collection it houses (Royal Decree 582/1989 of 19 May), is part of the Library Network of the Superior Council of Scientific Research. This implies that the assigned personnel must manage, process and participate in all the processes of said network, whose function is to give the scientific community a better service by taking advantage of all the technical, economic and human resources.

OPERATING PROTOCOL

Acquisition, registration, cataloguing and computerisation of journals, monographs, reprints, etc., both digitally and on paper.
Registration, cataloguing and computerisation of donated material.
Access to electronic resources.
Access to documents (personal loan, interlibrary loan).
Documentation on the special "Cajal" resource, upon request.
DIGITAL.CSIC: the institutional repository of the CSIC.
Information on the processes for new incorporations to the Cajal Institute.
Statistics.
Courses, conferences, congresses.

TECHNICAL PROCESSES

Acquisitions:

- Journals: These are processed annually, determined by our Researchers, according to the administrative guidelines that the CSIC, through the Library Coordination Unit, marks.

Registration and cataloguing:

- The new resources acquired, in any medium (paper, CD, online), are registered and catalogued in the Computerised Catalogue of the CSIC Libraries Network, using the subject headings, assigning a location to each physical copy and assigning a bar code to each document, this bar code uniquely identifies said copy within the Network Catalogue.
- The same process is followed for material that is donated to us. Being one of the most complete libraries in Neurosciences, in recent years, we have received donations from private collections of scientists, from this area, national and international.

AVAILABLE SERVICES

Direct access to resources (Monographs and Periodicals).

On the WEB of our Library, in the Bibliographic Catalogue link of the CSIC (access to the Computerised Catalogue of the CSIC Libraries Network), there are both our resources and those of the rest of the CSIC Libraries, which contain existing copies and their location in the deposits.

Access, upon request to the staff of the Library, to the special "Cajal" resource.

This collection consists of the publications by Santiago Ramón y Cajal and the most outstanding of his disciples.

Access to electronic resources:

- Through the WEB of our Library, by accessing the computerised Catalogue and the CSIC Libraries Network page, all the existing ones can be consulted.

Access to Documents:

Loan from our resources:

1. - The monographs, except old resources, manuals and dictionaries, can be borrowed by the personnel of our Centre (staff, scholarship holders and contracted personnel). Previously they will have arranged a loan account and a card that will also allow them to borrow from the CSIC Libraries that have this service in their regulations. The user card and loans are managed through the "loan module" of the CSIC Library Network, which allows the timely control of this service.

2. - Periodicals are not available on loan. In exceptional cases, they can be removed from the premises for a short period of time, notifying the Library staff who will take note of this fact.

Interlibrary loan:

- The Library locates the publications that users need and that are not in our resources or in the electronic resources of the CSIC Libraries Network, making the request for the document both to CSIC Libraries and to external Libraries. This process is carried out through the "interlibrary loan module" of the CSIC Library Network. Delivering the document to the user, most of the time in an electronic version. In the case of monographs, a loan of the original can be requested. It is currently managed through the GTib program.

- The Library facilitates the documents that are requested of its resources in paper and of the electronic resources that it has contracted, as much to Libraries of the CSIC as well as to other institutions. An important number of these requests corresponds to the resources of Journals that are exclusively in the Cajal Institute within the national territory. According to the support of the document, it is sent photocopied, digitised, etc. In the case of monographs, provided that this availability is previously established, if required, the original can be loaned for a few specified days. It is also managed through the GTBib program.

DIGITAL.CSIC: the institutional repository of the CSIC

On 18 January 2008, this was presented by the President of the CSIC, the presentation at the Cajal Institute was on day 24, and therefore, we are in the process of putting it into operation

REOORGANISATION OF DEPOSITS

Due to the growth of publications, even if the electronic resource is available, they oblige us to keep paper copies and due to a lack of space, periodically it is necessary to restructure the deposits, a task that involves the physical transfer of the material.

COURSES, CONFERENCES, CONGRESSES:

The Library staff, due to the continuous changes that new technologies require, participate and attend courses, conferences and congresses in the speciality.

SPECIAL CAJAL RESOURCE

This resource is treated in accordance with the provisions of Law 16/1985, of 25 June, the Spanish Historical Heritage and the Laws in force on Intellectual Property.

THE MAJORITY OF THE ACTIVITY OF THE LIBRARY IS REFLECTED IN THE CSIC LIBRARIES COORDINATION UNIT, SINCE THE PROCESSES OF CATALOGUING, LOAN, INTERMITTENT LOAN, ACQUISITIONS, ETC. ARE AUTOMATICALLY MANAGED BY THE ALPEH 500 PROGRAM (Automated Library Expandable Program Hebrew). IN THE WEB PAGE OF THIS UNIT, IN THE STATISTICS SECTION, YOU CAN FIND THE DATA ON EACH LIBRARY.

PERSONNEL

Carmen Domínguez

PHONE: 91 585 4747 / 871057
Email: biblioteca@cajal.csic.es

WORKING HOURS

HOURS: 8:00 to 14:30

LOCATION

Ground Floor

MOLECULAR AND CELLULAR BIOLOGY UNIT (UBMC)

INTRODUCTION

The UBMC is a Research Support Unit both for equipment for different experimental tasks and for the realisation of "a la carte" experimentation work with total flexibility and adaptability to the needs of each user.

FUNCTIONS

1.1 RESEARCH SUPPORT SERVICES.

The Molecular and Cellular Biology unit performs the following tasks:

1. EXTRACTION OF NUCLEIC ACIDS.
   A) Extraction of plasmid and genomic DNA (mini, midi, maxi, giga).
   B) Total RNA extraction from tissue / cell cultures.

2. QUANTIFICATION AND PURITY OF NUCLEIC ACIDS AND PROTEINS WITH NANODROP ND-1000.

3. AGAROSE GELS / GELRED FOR THE VISUALISATION OF NUCLEIC ACIDS.

4. AMPLIFICATION OF DNA FRAGMENTS BY PCR AND SUBSEQUENT PURIFICATION. Includes advice on the choice of primers, PCR reaction and development.

5. GENOTYPING
   This includes:
   -Development.
   -Genomic DNA purification of mouse tails or other tissue.
   -Quantification / purity of DNA
   -Amplification of the DNA fragment / s by PCR reaction that determines the genotype to be analysed with its corresponding controls.
   -Agarose Gel / GelRed and Marker optimised for the size of the expected DNA fragment.
   -Acquisition of the images of said gel and analysis of the results.

6. REAL TIME PCR
   Designs and implementation of protocols.
   Theoretical and practical training in Real time PCR (Cajal Institute only)
   Training in the use of the Primer Express Software.
   Design of primers from the sequence of the gene provided by the user.
   Analysis of data.

7. DNA bank. Long-term preservation of plasmid DNA (glycerol) for the user or for conservation in the UBMC.

8. MYCOPLASMA TEST: Cell contamination of the Mycoplasma contamination is checked by PCR using a cell culture supernatant.

1.2 TECHNICALSUPPORT SERVICES.

1. ADVICE ON THE USE OF UNIT EQUIPMENT. Initial basic training for new users. Solution to problems with the sample. Preparation of Manuals and Quick Guides for each equipment. Support in the design of protocols and possible applications.

2. ENSURE THE CORRECT FUNCTIONING OF ALL THE EQUIPMENT BELONGING TO THE UBMC. Carrying out of maintenance, calibrations, verifications and equipment cleaning periodically by the UBMC personnel or by the specialised Technical Department for each equipment.
   Processing and solution in the shortest possible time of breakdowns that may arise.

3. UPDATING THE SOFTWARE OF THE DIFFERENT EQUIPMENT.

4. CONTROL OF SPARE PARTS AND CONSUMABLES OF SUCH EQUIPMENT, taking into account the most susceptible failures of the equipment in order to have in stock the appropriate part so as to avoid times without being able to use the equipment.

1.3 CONSULTING SERVICES AND EXPERIMENTAL DESIGN.

- This includes: Design of Molecular Biology protocols.
  Consultations on problems with experiments in progress.
  Consultation about products from commercial houses and applications.

EQUIPMENT AND ITS LOCATION

The UBMC is a General Service with a series of equipment and support facilities.

1 EQUIPMENT LOCATED IN THE LABORATORY OF THE UBMC (COMMON)

1. Spectrophotometer **ND-1000 Nanodrop** (Thermo Scientific)

2. System **7500 Real Time PCR System** PCR Quantitative (Applied Biosystems)

3. Two thermal cyclers **PCR 2720** (Applied Biosystems).

4. **Verity 96-well** Thermal Cycler (Applied Biosystems)

5. **Minicentrifuge for plates of 96 wells** (qPCR) of Axygen.

6. Cryostat **CM1900** and **CM1950** (Leica Microsystems).

7. Image acquisition equipment for agarose / DNA gel and **BioDoc-iT** proteins **from** UVP.

8. Sample concentrator-evaporator **SPD1010** (Thermo Scientific).

9. Absorbance reader for 96-well plates **Multiskan KII Plus** (Titertek)

10. Mini Robot **MiniQG-80** for nucleic acid purification in columns without centrifugation: Plasmid DNA and genomic / RNA total of cell cultures and tissue.

11. Automated robot to perform Hybridizations in situ and immunodetections in situ: **InSituProVS** (Intavis).

12. Near infrared fluorescence image detection system (membrane, plate): **Odissey CLX** from Li-COR. *Image Studio Lite 5.2* quantification software.

12. AUXILIARY EQUIPMENT

- ✓ 2 Refrigerated microcentrifuges 5415R (Eppendorf)
- ✓ Vortex Stirrer VX200 (Labnet)
- ✓ Mixing Thermal Block MB-102 (Bioer)
- ✓ 2 Power sources of electrophoresis 3000Xi and PowerPac 300 (Bio-Rad)
- ✓ 3 DNA electrophoresis cuvettes: Wide Mini Sub Cell GT (Bio-Rad)
- ✓ Gas extraction hood (Captair)
- ✓ Refrigerator-freezer (Liebher)
- ✓ Scale Fx-3200 (A & D Company) and precision scales LF series (Vibra)
- ✓ Optical Microscope (Zeiss).

3.2 EQUIPMENT LOCATED IN THE ANTEROOM OF THE UBMC LAB ON THE RIGHT

(IT Unit corridor)

1. **Sirius** tube luminometer (Berthold).

2. Absorbance, fluorescence and plate luminescence reader: Fluorimeter **FLUOstar OPTIMA** (BMG Labtech).

3. Scanner-Densitometer **GS-800** (BioRad). **Quantity One** software.

3.3 EQUIPMENT LOCATED IN THE VIBRATOME-SPECT ROOM

The vibratome room is located at the end of the main hall on the ground floor on the left and it contains the following equipment:

Three Vibratomes of the Leica Microsystems: two VT1000S and one VT1000M sliding Microtome HM450 by Microm.

4. GENERAL RULES OF THE DEPARTMENT.

4.1 RULES FOR THE USE OF EQUIPMENT

New user:

- **Any user wishing to use any of the equipment of the UBMC must have previously submitted the Request for a New User of the Service to the UBMC and read and accepted the Welcome Plan and Rules of said Service.**

- **Do not use any equipment if you do not know how to use it. The staff of the UBMC will teach you how to use the equipment and how to improve the performance of use for your experiment.**

- **Once used, the equipment and adjacent areas should be perfectly clean and the equipment turned off.**

Reservations:

- The BioDoc iT, Multiskan Ascent and Nanodrop equipment are not reserved due to their short duration of use.

- The equipment that is in the UBMC except that previously mentioned will be reserved in the sheets that are on the board located at the entrance of the laboratory on the left.

- In the Vibratome Room in front to the left there is a cork board with the reservation sheets for said equipment. The reservation sheet of the Displacement Microtome is located on the table of said equipment.

- In order to use any auxiliary equipment of the Unit, it is necessary to ask the personnel of the Unit for its use.

- **You always have to sign up (Name, laboratory and extension) in the equipment reservation and use sheets. The maximum reservation time per laboratory is two daily shifts of 2 hours. If the demand for the equipment is high this time will be restricted to 2 hours per day per laboratory.**

- The reservation sheets for the following week will be placed on the Thursday of the current week in the early morning.

Manuals:

- The Manuals and Quick Guides of the different equipment are available to users in *pdf* format on the main computer screen corresponding to each equipment.

- In the areas adjacent to each equipment there is a quick guide as well as the rules and / or recommendations for use. In some cases there is also a copy of the user manual.

Records of use of equipment:

- On the main screen of each of the computers there is an Excel file called "Equipment Use Record". Users must register each time they use a computer associated with that computer by filling in the corresponding template correctly.
- In the case of the *Bio Doc iT* equipment, the record will be performed on the sheets that are located next to the equipment,

User Results Files:

- **USB PENDRIVES MUST NEVER BE USED IN THE COMPUTERS OF THE UBMC.** To export files, the internal network of the "Urano2" centre will always be used. The IP must communicate to the user its "user" and "password" in order to access said network.
- The **7500 Real Time PCR System** from qPCR cannot be networked. To be able to export the files, a pendrive has been enabled. For its use it is necessary to register in the use sheets and once it has been used it will be returned to the UBMC *formatted.*

- Once the files have been exported, they will be deleted by the user from the UBMC computer.

- Non-deleted files will be deleted by the UBMC on the 30th of each month.

User service hours:

- The user service hours are from 8:00 to 15:00. It is advisable to make an appointment within the scheduled hours with the head of the Unit if you are going to learn to use equipment for the first time or for Consulting and experimental design services

- If any material or reagent is needed from the UBMC refrigerator from 16:00, the keys are at reception: key no. 61 fridge, key no. 62, freezer. Once used, the fridge must be left perfectly closed and the keys returned to reception.

Incidents:

- Cleanliness, tidiness and respect for the rules of use of the equipment are required. The misuse of the same will generate an "Incident Report" that will be communicated to Management.

- In case of any problem with the equipment, please notify the UBMC staff immediately. If it occurs in the afternoon hours, stop using the equipment and put up a "Do not use" or similar notice.

4.2 RULES FOR THE APPLICATION FOR SCIENTIFIC SUPPORT PROVISIONS OF THE UBMC

New user:

- **Any user wishing to request any of the provisions of the UBMC must have previously submitted the Request for a New User of the Service to the Unit and read and accepted the Welcome Plan of said Service.**
-

General Rules:

1. Before requesting any of our provisions for the first time, talk to us in order to achieve the most efficient organisation possible.

2. In order to request a Provision, it is necessary to submit a duly completed Work Order Application Form:

   - Task to be performed (1 provision -1 work order).
   - Number of samples and identification of the same.
   - User requesting the work, laboratory and extension.
   - Signature of the head of the applicant laboratory (or authorisation *by order*).

   Any work order that is not correctly completed will not be accepted.

3. Once the User is registered, the UBMC will send the work orders for the application of the various services to the user's email in zip format. All the applications can be downloaded from the Intranet of the Cajal Institute:
   https://intranet.cajal.csic.es/

4. The Provisions will be carried out in order of arrival and therefore their completion time will depend on the number of previous requests.

5. Any repetitions, modifications, adjustments to each Provision will be invoiced.

6. Once the work is done, the UBMC will deliver a detailed report that will be sent by email to the user and to the IP as well as the costs of the requested service.

7. Each month a detailed summary of the billing of the use of equipment and services of the UBMC will be sent to the user and to the IP.

MORE INFORMATION AND PRICES:

-The prices broken down for each provision are indicated in each Request for a Provision.
- The official prices of each service and the use of billable equipment (with a maintenance contract) can be found in the Corporate Applications of the CSIC intranet:

➔ Intranet CSIC / Corporate Applications / Scientific Activity / Services of my Molecular and Cellular Biology Unit Centre:

https://apps3.csic.es/grupos/pages/servicio/edicionServicio.html?idGrupo=823552

PERSONNEL

MANAGER: **Silvia Fernández**

LABORATORY TECHNICIANS: Andrea Collazo
María José López Campos

PHONE: 91 585 4737 / 871063 (Office) / 871064 (Lab)
Email: sfdez@cajal.csic.es

USER SERVICE HOURS

HOURS: 8:00-15:00

LOCATION

Ground floor laboratory A16

FLOW CYTOMETRY AND CELLULAR SEPARATION UNIT

INTRODUCTION

The Flow Cytometry and Cellular Separation Unit became operational in 2008 and is part of the Research Support Units of the Cajal Institute (CSIC). The purpose of this Unit is to provide support in carrying out the research studies carried out by the different groups that make up the Institute or other Research Centres, through scientific advice, sample analysis and presentation of results in the field of Flow cytometry.

The primary mission of the Unit is to provide an efficient and quality service in order to enhance and develop the research activity.

FUNCTIONS

- Development, optimisation and updating of protocols for different flow cytometry techniques.
- Carrying out maintenance work on the equipment, including quality controls, reagent control and repair management in case of failure.
- Reservation management and user administration.
- Scientific advice, analysis of samples and presentation of results to the research groups that make up the Institute as well as other research centres that require their services.
- Maintenance of the equipment database and making backup copies of the generated files.
- Management of billing to users.

The Catalogue of Service Provision includes:

1) Identification of cell populations by marking intra or extracellular antigens (phenotyping).
2) Cell viability studies through the use of vital dyes.
3) Measurement of cellular apoptosis by using Annexin-V / Propidium Iodide.
4) Studies of oxidative stress through the use of fluorescent probes.
5) Study of the different phases of the cell cycle.
6) Determination of the cell proliferative index by using labelled nucleotide analogues (BrdU).
7) Gene expression studies guided by GFP.
8) Intracellular signalling studies.
9) Identification of phosphorylated signal transduction proteins.
10) Quantification of cytokines.
11) Mobilization studies of intracellular Ca2 +.
12) Cell separation (sorting).

OPERATING PROTOCOL

GENERAL RULES OF THE DEPARTMENT.

1. Before requesting any of our provisions for the first time, please speak to the Manager in order to achieve the most efficient organisation possible. The Cytometry Unit will provide information regarding the type of test, experimental design, how samples are prepared, waiting time, etc., especially when new users are involved. This consultation can be done by contacting the person in charge of the Unit, by telephone, by email or in person at the Cytometry Unit. In some cases it may be necessary to evaluate the feasibility of the trial or, eventually, to develop specific methodologies. The Service will provide detailed protocols for each particular trial.

2. To carry out any test in the Unit, whether it is analysis or sorting, it is necessary to fill in a duly completed work order, describing the tasks to be performed and signed by the person in charge of the requesting laboratory. This request can be delivered directly to the Service or via email.
Application forms and rates are available in the Unit or through the intranet of the Cajal Institute (http://intranet.cajal.csic.es/?q=node/5)

3. Any repetitions or modifications in each trial will be billable except if there has been an error made by the Cytometry Unit.

4. It is very important to take the utmost care with all the parts and accessories of the equipment to prevent them from being lost or damaged.

SPECIFIC RULES FOR THE FACSAria EQUIPMENT (Sorter).

1. The provision of services will be carried out through the reservation calendar of the Cajal Institute and therefore its organisation will depend on the users themselves. A priori there will be no restriction of hours. Even if reservations are made on the calendar, a work request must be submitted to later be able to invoice the tests.
(http://reservas.cajal.csic.es/roschedule.php?scheduleid=sc15885f53c07270). Users cannot cancel or modify a reservation in progress, they must notify the Unit.

2. Except for some users authorised by the Unit, the FACSAria equipment CANNOT be used without the presence of the Manager of the Unit. Once the samples have been prepared, they will be delivered to the Cytometry Unit, where the Manager will pass them through the cytometer and present the results to the user.
During the working hours of the Unit, only the users authorised who have carried out the training will be able to pass the samples through the cytometer, and may consult the Manager of the Unit regarding any problem, doubt or incident.

3. After the working hours of the Unit, the users who have carried out the training will be authorised by the Unit, to be able to use the FACSAria equipment without the presence of the Manager of the Unit.

4. It is very important for the autonomous user to carry out the post-wash after finishing the test, in order to avoid contamination to other users. The last user must perform the post-wash and turn off the equipment.

5. It is very important to take the utmost care with all the parts and accessories of the equipment to prevent them from being lost or damaged.

6. The results files will be sent through the internal network of the Cajal Institute (Urano2) or through email by SEGA-CSIC. The use of USB memory sticks is PROHIBITED.

7. There is the possibility of installing the computer software to perform analyses on computers located in your laboratory. These computers must have Windows XP installed or a virtual machine with Windows XP. To use this software you need a key (USB) that will be available to users in the Cytometry Unit. You have to sign up in the Use / Reservation form.

EQUIPMENT

The Flow Cytometry Unit consists of flow cytometer:

- FACSAria of BD Biosciences with a Sorter module with 2 lasers, one is an Argon of 488nm capable of detecting up to five different fluorochromes and the other is a Helium-Neon laser of 633nm with a detection capacity of two different fluorochromes, which together allows for an analysis multiparameter of up to seven colours together with the two scatter parameters (cell size and complexity).

Laser	PMT	BP filter	BP Filter Range (nm)	Examples of Fluorochromes / Dyes
488	FSC	488/10	483-493	-
	SSC	488/10	483-493	-
	FL1	530/30	515-545	FITC, Alexa Fluor-488, EGFP, EYFP, DiOC 6, Acridine Orange, Fluo-3, Fluo-4, FDA, H2DCFDA, HE, JC-1, CFSE
	FL2	585/42	564-606	PE, IP, MitoSOX Red, JC-1, DsRed
	FL3	616/23	605-628	PE-Texas Red, IP, MitoSOX Red, Vybrant Dye Cycle Orange
	FL4	695/40	675-715	PercP, PE-Cy5, PercP Cy5.5
	FL5	780/60	750-810	PE-Cy7
633	FL6	660/20	650-670	APC, Alexa Fluor-647
	FL7	780/60	750-810	APC-Cy7, DRAQ5, Vybrant Dye Cycle Ruby

The Sorter module supports high-speed cell separation of up to four different populations in supports for various types of tubes, including 5 and 15 ml tubes.

The analysis of the results is done through the FACSDiva 6.1.3 program from BD Biosciences.

The Flow Cytometry and Cell Separation unit, through the intranet of the Cajal Institute, provides users with information related to fluorochromes, analysis programs, bibliography, publications or links of interest.

PERSONNEL

MANAGER: **D. Jose Luis Martínez San Martín**

PHONE: 91 585 4727 / 871059
EMAIL: citometria@cajal.csic.es
jlmsanmartin@cajal.csic.es

WORKING HOURS

HOURS: 09:30 to 17:00

LOCATION

Flow Cytometry Unit Equipment: Ground floor next to the Laboratory of the Molecular and Cellular Biology Unit.
The office shared with other units and is located on the Ground Floor next to the Confocal Microscopy and Image Analysis Unit.

CELL CULTURE UNIT AND PREPARATION OF MEDIA

INTRODUCTION

Cell cultures consist of the set of techniques that allow the maintenance of the cells "in vitro" maintaining their physiological, biochemical and genetic properties. Depending on the degree of preservation of the structure of the tissue or the organ of origin and its duration, we will talk about different types of cultures: of organs, explants, primary or secondary.

The technical advances and the appearance of commercial companies supplying media, serums, equipment and cell lines have made these techniques a technology with good reproducibility allowing great advances in the understanding of the mechanisms involved in the intracellular and intercellular processes.

FUNCTIONS

Since 1987 the Cell Culture Unit has been composed of three rooms where cells obtained from multicellular organisms, especially neurons, astrocytes and oligodendrocytes obtained from animal brains, are generated "in vitro". The basic functions are referred to below:

- Management, cleaning and maintenance of the three rooms.
- Information to users.
- Calibration and sterility of incubators.
- Coordination and monitoring of the correct use of the equipment.
- Sterilisation of solid and liquid material.
- Preparation of reagents and media according to needs.
- Testing of Foetal Serums for batch purchases.
- Filling and maintenance of liquid nitrogen drums.
- Control and monthly distribution of the expenses of the Service according to the hours of stay in the rooms.

Since the year 2000, the possibility of implementing reagents, media, buffers, agar plates and competent bacteria has been incorporated into the Service in order to facilitate conventional work for users.

According to Royal Decree 664/1997 of 12 May, *on the protection of workers against the risks related to exposure to biological agents*, the management of these cultures requires 2 different levels of security (level of containment):

- **Containment level 1:** in the Cultures and Established Lines Room. Required for the cultivation of non-transformed non-primate animal cells. With 4 horizontal laminar flow cabinets for preferential protection of the samples and another 3 vertical laminar flow cabinets that provide protection to the operator as well as the sample.
- **Containment level 2:** in Rooms P2-A and P2-B where primate cell cultures are generated (tumoral or non-tumor), non-interfered human cell lines, non-primate virus-producing cell

cultures, manipulation of non-infectious biological agents to through the air (retroviruses) and the use of genetically modified organisms (mouse, viral vectors). There are 2 biosafety cabinets that guarantee protection to the operator and provide protection to the sample as well.

OPERATING PROTOCOL

1- The Cultures Service is of **restricted use**. In order to access the rooms, it is necessary to fill in a Request for Service Use Form that will be authorised by the Management and by the person responsible for the Service. In the case of the P2 rooms, a specific medical device will also be recommended. After this process, a personal access card will be provided (and non-transferable) and you will be included in the list of users displayed in the anteroom of the unit.
2- Smoking, eating and drinking are forbidden, as well as storing food or drinks, within the Service.
3- Do not use pipettes with your mouth. There is a mechanical pipettor available in each booth for this purpose. Remember that you should never allow the medium to pass to the filter of the pipette.
4- Any sharp material used should be discarded as soon as possible after use in the yellow containers that are available under each booth. Do not use above the filling limit.
5- Whenever there is danger of splashing, safety glasses, and / or FFP2 masks, available in dark blue containers, should be used in each of the rooms.
6- Extend cleaning precautions at all times to maintain the sterility necessary for handling.
7- It is absolutely necessary to clean hands and forearms with water and disinfectant soap, and then spray them with 70% ethanol or Fagescrub Lotion solution.
8- Clean all surfaces used (booths, microscopes, centrifuge ...) before and after use with soap and / or 70% ethanol, and each time a spill occurs. Avoid bleach on metal surfaces.
9- Discarded material (plates and flasks with cell debris) will be sprinkled with sodium hypochlorite solution for 30 min. before throwing in the bin. Liquids, once inactivated in this way, will be eliminated down the sink. In P2 rooms, hazardous waste containers are available.
10- Restrict the passage to the rooms as much as possible (hence the need for authorised access cards) and avoid people being there who are not working.
11- Make sure that clothing is not a source of contamination. It is forbidden to enter the rooms with clothes and street objects such as handbags or coats.
12- Exclusive gowns should be used for work in the rooms. Disposable gowns (white for P1, green for P2) are available to users.
13- Do not introduce live cages or animals into the Cultures Service. Slaughtered animals, especially if they have hair, will be introduced submerged in ethanol. The remains of animals are confined in a freezer chest in the hall of the basement for its subsequent periodic withdrawal by the City Council.
14- The equipment (centrifuges, agitators, magnifiers ...) of the rooms is for the exclusive use of the Service. It shall not be removed from its usual place without the permission of those responsible and with the obligation of returning it exhaustively clean.

15- In order to get more life from the microscope lamps, they will be turned off after being used.
16- The opening time of incubators should be minimal, since both the temperature and the % of CO2 become unbalanced each time the door is opened. For this same reason it is very important to always make sure that the two doors of the incubator are properly closed.
17- Each user laboratory will have a space-drawer where it will keep its material (sterile or not) in order not to introduce germs from the outside. Likewise, you will be given a place in the refrigerators and freezers of the Service where your media will be located.
18- Only current experiments, properly labelled, specifying, as a minimum, the content, date, name and laboratory of the user can be introduced into the incubators. Anything that is inside an incubator and that is not a trial in process or that is not properly labelled, will be thrown away by the personnel in charge of the maintenance of the room.
19- All staff must wash their hands before leaving the rooms.
20- When the work is finished in the booth, it should always be collected, perfectly cleaned, disinfected, with the ultraviolet light on. It is very important to make sure that the pipettor is left charging and that the suction pump has been turned off.
21- Pipettors, lighters or lamps that do not work, will be left in the lobby of the anteroom, so that the staff of the Service takes care of putting them back into use.
22- At the end of the day, the last one to leave will check that the devices are switched off (especially suction pumps, microscopes and bathrooms) and turn on the ultraviolet lights on the ceiling of the rooms.
23- The recommendations for safe operations and good laboratory practices that are included in this Regulation must be followed.

SPECIFIC RULES FOR BIOLOGICAL CONTAINMENT LEVEL 2.

In addition to that previously specified:

1- Access is restricted and controlled, and denied to people who are immunosuppressed or who have a high risk of infection. They must have a specific prior examination, where they will also be properly vaccinated.
2- During handling, the doors of the room must remain closed.
3- Personnel must wash their hands after handling biological material and before leaving the room. The use of appropriate gloves is mandatory during the performance of work that involves the risk of direct accidental contact with the biological material.
4- It is recommended you use safety glasses, masks or other protective devices, especially with tasks performed outside the biosafety booth that may generate aerosols.
5- This room must be accessed with an exclusive green coloured gown that will remain in the anteroom after its use.
6- Contaminated waste, solid or liquid, must be inactivated with sodium hypochlorite solution for at least 30 minutes. The inactivated liquids are poured down the sink, while the solids are deposited in a biosanitary waste container (black) located inside a refrigerated container at 4ºC (refrigerated only in P2A).

7- Accidents that may lead to obvious exposure to infectious agents should be reported immediately to the person responsible for the Service and to the Health Surveillance Unit.

EQUIPMENT

- 4 horizontal flow booths.
- 5 vertical flow booths.
- 2 biosafety booths type II-A
- 9 incubators with pre-set temperature and CO2.
- 5 refrigerators.
- 1 electroporator to transfect cells.
- 2 orbital agitators.
- 4 centrifuges.
- 4 inverted phase microscopes.
- 1 inverted fluorescence microscope.
- 4 magnifiers for surgical handling and their corresponding illuminators.
- 3 dips.
- 2 liquid nitrogen tanks for the storage of established lines.

The Cell Culture Service has 2 conventional autoclaves where both solid and liquid materials are sterilised at 120º.

PERSONNEL

MANAGER: **Sonia Martínez Alonso**

PHONE: 91 585 4706 / 871062
Email: sonia.martinez@cajal.csic.es

WORKING HOURS

HOURS: 07:30 to 15:00

LOCATION

- Rooms B-8, B-9, B-10, B-11 and B-12 on the 1st floor, left corridor.
- Ground floor next to Administration and Management.

MANAGEMENT AND ADMINISTRATION UNIT

INTRODUCTION

The Management of the Institute is a one-person body for the direction, management and advising of the Institute, together with the Direction and Vice-Direction, as the case may be, and the Heads of Department. Without prejudice to the functions assigned to the Director and under his/her orders, he/she will be responsible for:

a) The economic and budgetary management as well as purchases and contracting of external works and services.
b) The administrative organisation of the Institute.
c) The head of personnel in regard to its administrative regime and the supervision of all the units of administrative and technical services.
d) The heritage of the centre, as well as the care and control of the proper use of the facilities.
e) The internal regime.
f) Maintenance and general services.
g) The economic and personnel management of the projects or contracts under way, without prejudice to the attributions of the principal investigators of the same.
h) The secretariat of the Board of the Institute.

The Manager of the Institute is appointed by the President of the CSIC, after hearing the Director of the Institute and the Secretary General of the CSIC, through the procedure of free appointment.

FUNCTIONS

Apart from other functions of coordination and internal organisation, as well as relations with the central organisation of the CSIC, the Management and Administration develop in general lines the following functions:

I. <u>HUMAN RESOURCES AREA.</u>

- Labour contracting and management of calls for proposals.
- Presence control (downtime, vacations, permits and licenses).
- Access of the personnel to the Services of the Institute.
- Personnel management, Social Action, Training.
- Stays.
- Prevention of occupational risks and occupational health (accidents at work and occupational diseases).

II. **<u>AREA OF ECONOMIC-FINANCIAL AND BUDGETARY MANAGEMENT</u>.**

- Budgetary management.
- Treasury and payments.
- Budgetary and analytical accounting (internal).

- Travel and diet management.

III. RECRUITMENT AND HERITAGE AREA.

- Control of minor purchases.
- Centralised acquisition of goods.
- Acquisition of goods and services through a contract file.
- Heritage and inventory of goods.
- **PURCHASES AND STORAGE DEPARTMENT** : Management of external orders and internal ordering of products of direct acquisition to the Warehouse of the Institute

IV. AREA OF MANAGEMENT OF PROJECTS AND CONTRACTS.

- Information on calls for proposals.
- Help in submitting applications to these calls and in the preparation of budgets for contracts and agreements.
- Registration of projects and contracts.
- Monitoring of projects and contracts.
- Scientific-technical and economic justification of projects and contracts (follow-up reports and final justifications).

V. INTERNAL SYSTEM AREA.

- Room reservations.
- Seminars and conferences.
- Messaging and mail.
- Control of access and use of rooms and equipment.

PERSONNEL

MANAGER: **María Ángeles Azcúnaga Temprano.**
Telephone: 91 585 47 53 / 871068
Email: gerente.ic@csic.es.

AUTHORISED PAYMENT MAKER: Ana María Sainz-Pardo Rubio.
Ángeles de la Iglesia
Yago Rodríguez Cela
Mª Luisa Molinero
Yago Rodríguez
Isabel Calzada
Concha Arroyo
Fernando Sánchez
M. Jesús Jaro

Telephones 91 585 47 48/49 / 871069 (Protocol) / 871070 (Payments) / 871071 (Human Resources) / 871072 (Projects)

HOURS

Morning: from 09:00 to 14:30 (preferred service to the public).
Afternoon: from 15:30 to 17:30

LOCATION

Office of Management, Direction and Administration (Ground floor).

RECEPTION

FUNCTIONS

- Attention and welcome to the public
- Access control for visitors
- Control of staff access to seminars
- Telephone service (switchboard)
- Fax handling (orders and processing)
- Delivery of correspondence from laboratories
- Transfer of internal and external mail
- Control of keys (of ordinary use and emergency)
- Control of the pointer for presentations
- Control of vehicle entry and parking
- Control and production of records books
- Handling photocopiers and binder

PERSONNEL

External company
Tel. 915854750 / 871001
Fax: 915854754
e-mail: recepción@cajal.csic.es

PURCHASING AND STORAGE

INTRODUCTION

The Purchasing and Storage department is in charge of guaranteeing the sufficient supply of articles and products, as well as the adequate handling and custody of the stocks of chemical substances, laboratory materials, and other products. It performs the verification of the accuracy of the registration of goods, materials and supplies, as well as the integration of the data that makes up the catalogue of products handled by the different laboratories and Units, such as the information that makes up the detail of their inventories.

FUNCTIONS

- Maintenance of the stock of the warehouse and delivery of the material. Verification of the physical stock of goods, materials and supplies, re-conciliating balances with the records to maintain sufficient stock of each.
- Requesting prices, budgets, negotiating discounts with suppliers etc.
- Management, monitoring, control, and delivery of orders. Receipt of goods, materials and / or supplies, checking quantity, features and quality.
- Providing information to users about material, catalogues, commercial providers, etc.
- Updated record of commercial providers, indicating postal addresses, email, fax, and name of managers. Storage and archiving of catalogues of commercial providers. Update of said file.
- Scheduling, directing and controlling the activities of reception, dispatch, registration and control of the goods destined for the use and / or consumption of the common Units of the Centre.
- Annually draw up the physical inventory of fixed assets and stocks in established warehouses.

OPERATING PROTOCOL

Before placing any order, you must be registered in the centre's database and be authorised by the person in charge of your laboratory or department.

- **External orders:** These are used to order from suppliers directly, a voucher will be completed and delivered to the storage department, once revised, a number will be assigned and processed. There are order forms to fill in through the following link

http://intranet2.cajal.csic.es/OrdenPedido/(optimised for Chrome)

In order to rationalise the operation of the Institutes Purchasing Department, a time limit is set for receiving orders and they must processed on the same day as they are received.
(Orders that have not been completed and those that lack information for processing are excepted)

The deadline for receipt of the order forms will be at 12:00 and any forms that are received later will be processed the next day.

In order to avoid the orders being delayed in their processing due to not providing the necessary information, the fields must be filled out with the following mandatory data:

DATE

PROVIDER DATA:

Brand and / or product supplier.
Telephone and fax.

REQUESTER DATA:

Name
Account number and Project (PN, EU, Contract, Agreement ...)
Laboratory
Name of the laboratory manager or, where appropriate, the authorised person.
Signature of the manager or authorised person.

REQUESTED MATERIAL:

Quantity or presentation of the product
Description
Reference
Amount without VAT

Type of Material (Description of supply): Antibodies, antibiotics, mice, cables, Screws...

- **External orders:** used for the removal of material from storage.

For this process you have to fill out a voucher using the warehouse computer application. http://pedidos.cajal.csic.es/

It is compulsory to deliver the voucher with the products that are going to be removed, being able, in specific cases, to place the order directly through the warehouse computer.

In no case will material be supplied without the voucher signed by the person collecting the material.

EQUIPMENT

- 2 Safety cabinets for solvents.
- 1 Refrigerators

PERSONNEL

Fernando Sánchez
Tel. 915854745 / 871055
Fax. 915854358
E-mail. Compras-almacen@cajal.csic.es

WORKING HOURS

HOURS: From 08:00 to 15:00 hours from Monday to Friday.
The schedule of dispatch of material unless in unforeseen circumstances will be from 09:00 to 14:30 hours.

LOCATION

Basement S-02

SCIENTIFIC IMAGE AND MICROSCOPY UNIT

INTRODUCTION

The Scientific Image and Microscopy Unit was created in 1995 and is part of the Support Units and Installations of the Cajal Institute (CSIC). The main objective is to offer support and technical assistance to research groups in the study, detection and identification of molecules and cellular structures in tissue sections and cell cultures by using fluorescent markers, using Confocal, Fluorescence, and Microscopy techniques and processing, analysis and 3D reconstruction of the images acquired in said equipment.

FUNCTIONS

1. Techniques of confocal microscopy, fluorescence microscopy, in vivo microscopy, light field microscopy.
2. Image processing and analysis techniques with specific programs.
3. Control of service equipment, cleaning, adjustments and calibration for optimal use, in addition to contacting the maintenance and repair departments.

OPERATING PROTOCOL

RULES COMMON TO ALL UNIT EQUIPMENT

a) **New users** must appear in the Unit accompanied by a Manager and must fill in the application form for the use of the equipment. **No new user can use the equipment without completing this form.**
They must inform the Unit of the equipment they will use in order to be registered in the corresponding Schedules and they will be informed of how to use each piece of equipment.
It is necessary that **students are supervised at all times**, both by technicians, during service hours, or by a person in charge of their laboratory.

b) **Before using a device, you should read the specific rules of use**, as well as the safety regulations.

c) **Before using unit equipment,** it must be taken into account whether its technical features are adapted to the user's experimental requirements. The user can be advised through the available manuals and / or by consulting the technicians of the Unit.

d) **User service hours:** The schedule of the pieces of equipment that require use or advice from the technicians will usually be from **08:30 to 15:00** from Monday to Friday. In situations where this schedule is modified, it will be notified in advance.

e) **Reservations:** The **CONFOCAL MICROSCOPY UNIT** schedule can be found on the Intranet of the Institute*http://reservas.cajal.csic.es*. It is recommended you make the reservation well in advance. Each piece of has its own schedule with its specific restrictions.

f) **Cancellations:** users are asked to cancel a reservation as soon as possible so that other users can use the equipment.
Users cannot cancel or modify a reservation in progress, they must notify the Unit.

g) **Manuals:** These are available in the Unit and also on the Intranet of the Institute within the Unit's page: *http://intranet.cajal.csic.es/?q=node/1*

h) **Data:** Users is responsible for saving their data, copying it and deleting it from the equipment. Files can be deleted due to technical requirements without prior notice. Exceptionally, the confocal microscope files will be kept for 1 month.

i) **Work control:** Users must fill in the data on the **record sheet** and note any incident.

j) **Post-processing tasks:** The tasks of processing and analysis of the images acquired in the microscopes of the Unit, must only be performed on the PC identified with the label "IMAGE ANALYSIS PC", located in the Confocal M. Unit.

k) **Usage fees:** Available on the Intranet, on page of the Unit. (Also in the attached Table)
By default it will be invoiced with the internal fee, if the user needs to bill a European Project he/she must inform the Unit in advance in order to apply the corresponding rate.

l) **Services for users of other Centres:** The only services for external users are those of confocal microscopy, but users of the Cajal Institute will have preference of use.
Consult the *CSIC's Catalogue of Services* on the CSIC Intranet.

EQUIPMENT

1. CONFOCAL MICROSCOPE LEICA SP-5 DIRECT
2. CONFOCAL MICROSCOPE LEICA SP-5 INVERTED TIME-LAPSE
3. LEICA TIME-LAPSE AF 7000 FLUORESCENCE MICROSCOPE
4. LEICA DMI 6000 FLUORESCENCE MICROSCOPE
5. NIKON MICROSCOPE WITH NEUROLUCIDA
6. LEICA MICROSCOPE WITH COLOUR CAMERA
7. MULTIMEDIA EQUIPMENT:
    - 7.1. COMPUTER WITH SCANNER
    - 7.2. COMPUTER FOR PROCESSING AND IMAGE ANALYSIS
    - 7.3. OTHER EQUIPMENT: JVC VIDEO CAMERA AND NIKON DIGITAL PHOTOGRAPHIC CAMERA.

PERSONNEL

TECHNICAL MANAGER: Carmen Hernández

TECHNICIANS: Belén García and Carmen Hernández

PHONE: 91 585 4751 / 871060
Email: mconfocal@cajal.csic.es

HOURS:

USER SERVICE HOURS: 08:30 to 15:00 from Monday to Friday

LOCATION

Ground floor, Administration hall:
Confocal Microscope Room and Microscopes Room

ELECTRONIC MICROSCOPY UNIT

ELECTRONIC MICROSCOPY

FUNCTIONS

- User Support
- Cutting of samples for users
- Information and technical advice to users
- Maintenance of the service equipment

OPERATING PROTOCOL

ELECTRONIC MICROSCOPE

Its use will be performed exclusively by the managing technician or under the direct supervision of the latter.

ULTRAMICROTOMS AND BLADES CUTTER

Its use will be carried out by the managing technician or by the users who are duly authorised for its use. The authorisation will be given by the person in charge of the service, this an essential condition for the handling of the equipment.

REQUEST FOR SERVICE OR RESERVATION OF HOURS

For the use of any of the services provided by this Unit, contact the person in charge: in person, by telephone or by e-mail.

NOTE: The costs of materials used will be borne by the users.

EQUIPMENT

120 kV transmission electron microscope:
JEOL JEM-1200 EXII
MEGAVIEW III ANALYSIS

Ultramicrotomes: REICHERT-JUNG ULTRACUT E
LEICA EM UC6

PERSONNEL

MANAGER: **Martin Ian Maher**

PHONE: 91 585 4356 / 871058
Email: martin@cajal.cisc.es

WORKING HOURS

HOURS: 09:00 to 16:00 hours.

LOCATION

Semi-ground floor

INFORMATICS AND COMMUNICATIONS UNIT

INTRODUCTION

The objective of the Informatics and Communications Department (**SIC**) is to ensure an Informatics infrastructure that facilitates the realisation of the basic missions of the Institute, such as research and administrative tasks.

FUNCTIONS

Among others, it is worth mentioning:

- Supervision of communications, network electronics, Internet access, local network, WIFI, perimeter and internal security.
- Planning, implementation and maintenance of internal services (web, intranet, file server, DHCP, DDBB, logs, updates, etc.)
- Management of accounts and mailing lists.
- Attention, support and advice to users.
- Purchase, installation and maintenance of microcomputer equipment.
- Applications development

OPERATING PROTOCOL

The rules that any user must follow if they want to use the Informatics resources and the network infrastructure of the Institute, as well as the procedures to request assistance from the **SIC,** are summarised below.

These rules and procedures are part of the "Policies for the use of Informatics resources and the network infrastructure of the Cajal Institute". These will be published on the page of the Department, on the Centre's intranet.

- **DEFINITIONS**

  - **SIC:** *Informatics and Communications Department of the Cajal Institute.*
  - **Users:** *Any person who uses the resources managed by the SIC.*
  - **Resources managed by the SIC:** *Personnel of the Service, communications infrastructure, informatics infrastructure and services executed or hosted by said infrastructure.*
  - **Administrative Manager:** *This is the person responsible for the computer equipment installed in a Centre or Institute, this responsibility is limited to authorising the installation of the same, the people who can use them and what use is made of them. The* ***Administrative manager*** *of an*

*informatics system is **responsible for the Group or Service**, although, ultimately, this responsibility falls on the Director of the Centre or Institute or the person delegated by him/her.*

- **Systems Administrator:** *He/she is responsible for the management and administration of computer equipment and for monitoring compliance with the policy for using it. They will normally be the IT staff of the Centre or Institute.*
- **Institute Equipment**: *These are all the informatics equipment that, independently of the form in which they have been acquired, use or will make use of the **resources managed by the SIC**. These resources include support for users, access to the internal network (wired or wireless), and access to the Institute's servers.*

This excludes equipment that may be in the Institute that does not need to have access to the resources (human and / or technical) of the Institute. This equipment can access the Internet via the WIFI connection to the network as "guests".

- **RULES**

1. **New equipment.** The installation and commissioning of informatics and communications equipment in the Institute, will be carried out by the staff of the SIC or under its supervision.

2. **Equipment administration**. In ALL the equipment of the Institute, an account with administrator privileges will **ALWAYS** be enabled so that the SIC can access the equipment to perform support and / or maintenance tasks.

   The equipment purchased in a particular way, even if it is used for daily work in the Institute, is excluded from this rule.

3. **Connection of network equipment**. Under no circumstances is the connection of equipment to the Institute's network permitted without the authorisation and supervision of the SIC.
4. **Inventory of equipment***. The SIC needs to have knowledge of the equipment present in the Institute, of the hardware it is made up of, as well as of the software installed in it. It is therefore necessary that **ALL** the *equipment of the Institute* is inventoried and that the information related to it is updated regularly.

**For this purpose we have opted for the use of a client-server solution called the OCS Inventory. This solution consists of an "agent" that is installed on the client computer and that regularly sends an inventory of the equipment to a "server" that stores in a database the hardware and software of the equipment in question, as well as the time that the last inventory was performed. IN NO EVENT SHALL PARTICULAR DATA OF THE USER BE SENT OUT.*

5. **Antivirus. ALL** the **equipment of the Institute** with the Windows operating system must have installed the antivirus considered official by the SIC, the SIC being the one in charge of installing it and configuring it in the equipment. Currently this is F-Secure.

6. **Installation and use of software**. The installation of software considered to be "critical" such as the operating system, antivirus software or anti-malware, is of the exclusive competence of the SIC**.**

   The rest of the applications can be performed by the user. Although it is recommended as far as possible that the SIC is the one that performs them.

7. **Copy and software licenses**

   - The copying of licensed software from Cajal is not permitted without the express consent of the SIC.
   - The installation and use of software without a license will not be allowed.
   - All unlicensed software installed on any *equipment* of the Institute will be the responsibility of the owner of the same or, failing that, of the **Administrative manager** thereof.

     The SIC reserves the right to assist with equipment that it considers affected by problems generated by the use of illegal software.

IMPORTANT

Failure to comply with the rules listed above may result in the denial of support by the SIC and the disconnection of the network of the equipment in question (temporarily or permanently).

- **PROCEDURES**

.- Application for assistance from the SIC (work orders)

Steps:

a) Fill in the **work order** specifying the date, laboratory, description of the problem and equipment to which it refers. This work order must be signed by the **Administrative Manager** or authorised laboratory / service person.

b) Deliver the **work order** to the SIC staff for processing. *If the request made in the **work order** is **a request for computer equipment** or if for the realisation of the work **some equipment** had to be used, it will be specified by the technicians of the Service in the section "materials used" and its cost will be charged to the laboratory or service that needed it.*

*The **execution** of the **work order** will be carried out by any of the SIC technicians, the Service itself being the one that decide on the person or persons who will carry it out. For none of the tasks to be carried out will it be necessary to expressly address a specific person.*

IMPORTANT

Requests made via different means will NOT BE ADDRESSED under any circumstances.

EQUIPMENT

Not applicable.

PERSONNEL

Angel Alcañiz Carmona **(MANAGER)**

Juan Gabriel López Alonso

PHONE: 91 585 4871 / 871065 (Ángel) / 871066 (Juan)

E-MAIL: sic@cajal.csic.es, tic@cajal.csic.es

SERVICE HOURS

08:30 - 17:00

LOCATION

. Ground Floor

RADIOLOGICAL PROTECTION AND CHEMICAL SAFETY UNIT

INTRODUCTION

The Cajal Institute has a Radioactive Installation **IR / M-469/90 IRA-1783** for Research / Teaching for which authorisation for start-up through the Directorate General of Energy dates from 4 March 1991 and the last modification (MO- 7) of 6 February 2012.

This installation is a category 2, in accordance with the provisions of Art.34 of the Regulation on Nuclear and Radioactive Facilities, and it authorises the "possession and use of radioactive material and ionizing radiation generating equipment in the field of neurobiological research." In February 2012, the commissioning of a computerised tomograph by the emission of photons (SPECT) was also authorised to perform brain imaging studies.

The materials authorised are the following:

- Non-encapsulated radionuclide	Maximum activity	
	mCi	MBq
Hydrogen-3	50	1,850
Carbon-14	10	370
Sulphur-35	50	1,850
Calcium-45	1	37
Sodium-22	1	37
Sodium-24	1	37
Phosphorus-32	50	1,850
Iodine-123	19,46	720,02
Iodine-125	25	925
Iodine-131	1	37
Rubidium-86	1	37
Phosphorus-33	50	1,850
Chrome-51	1	37
Technetium-99m	19.46	720.02

- An encapsulated source of Caesium-137 of 30 uCi (1110 KBq) of activity belonging to a liquid scintillation counter.
- An internal encapsulated source of Europium-152 of 20 uCi (740 KBq) of activity, belonging to a liquid scintillation counter.
- An encapsulated source of Caesium-137 of 5.55 MBq of activity used to calibrate the activimeter.

- X-ray equipment from the ANDRÉS firm, SMART model of 200 KVp and 4.5 mA of maximum intensity.

- CT equipment, X-ray emitter, integrated in the SPECT equipment, 400 mA maximum and 45 kV.

FUNCTIONS

Currently, there is a Supervisor with the regulatory license for non-encapsulated sources that is in charge of programming and supervising all operations with radioactive materials, being locatable and available during the operation of the installation and dealing with the following functions:

1.- Marking the areas of the installation according to the Regulation.
2.- Carrying out dosimetric control and health surveillance of exposed workers.
3.- Updating the dosimetric and medical records of the personnel in question.
4.- Concluding the management of personal dosimeters with a Personal Dosimetry Service expressly authorised by the Nuclear Safety Council (CSN); exactly by the Carlos III Health Institute.
5.- Referring the health surveillance to the Prevention Services or Specialised Medical Services. In the case that concerns us, this is the Service of Prevention of Occupational Risks and Health Surveillance of the CSIC.
6.- Following the relevant complementary instructions of the CNS for the best compliance and verification of the safety conditions of the installation.
7.- Sending within the first quarter of each calendar year to the General Directorate of Industry, Energy and Mines of the Ministry of Economy and Technological Innovation of the Community of Madrid and to the CNS **a report**, which contains a summary of the Operations Journal from the previous year, the inventory of equipment and radioactive materials present in the facility indicating their situation and operating status, as well as the cumulative dose of each of the workers of the facility in said period.
8.- Acquiring radioactive material only through authorised entities for commercialisation in the national territory. Only the owner of the facility can import directly according to the legally established procedures (EURATOM Regulation 1493/1993).
9.- Having at least one radiation detector appropriate for radiological surveillance. A programme of calibrations and verifications of radiation detection and measurement systems is established, where aspects such as recommendations of the manufacturer, recommendations of the calibration laboratory that carry out the same, results of periodic verifications, amplitude and severity of use, environmental conditions, accuracy sought in the measure, etc. are established, prevailing among all the criteria applied the recommendations of the legally accredited calibration laboratory (CIEMAT).
10.- Through the Basic Manual of the Facility, the personnel will learn and comply with what is established in the Operational Regulation and the Internal Emergency Plan of the same.

11.- Having an Operations Log where the following data will be recorded:

- Relevant data on the operation of the installation indicating any type of incident that occurs in the installation.
- Operations of entry and exit of radioactive material, discharges of radioactive effluents and disposal of waste.

12.- The holder will make records of the following aspects:

- Inventory of radioactive material.
- Results of the checks and calibrations of the radiation detection and measurement equipment.
- Data related to the control of radiation levels and pollution in the premises of the facility.
- Checks on the suitability of the biological shields and safety systems of the installation, under normal operating conditions.
- Staff dosimetry (TLD)

13.- Storing and properly controlling the radioactive material in order to prevent possible handling by unauthorised personnel. There will be means to guarantee the physical safety of the installation.

14.- Applying the Internal Emergency Plan in case of any anomaly or event that implies radiological risks for the personnel of the installation or the general public. Notifying according to the Complementary Technical Instruction of the CSN / SRO / CIRC and communicating it to the Directorate of Industry, Energy and Mines of the Ministry of Economy and Technological Innovation of the community of Madrid and to the CSN.

15.- Having available fire extinguishing means, located in places of easy access, which must be operative at all times and the management of which is learned by all personnel.

16.- Having available adequate systems for the management and storage of radioactive waste.

17.- Evacuating the radioactive effluents from the facility as regulated. Said discharges to the public sewer system shall meet the following requirements:

- The material released will be in water soluble form, or it will be easily dispersible biological material. Non-soluble material or mixed residues of H-3 and C-14 will be collected through Enresa.
- The total activity of radioactive material discharged to the public sewer in one year shall not exceed 10 GBq of 3-H, 1 GBq of 14-C and the sum of the activities of the remaining radionuclides will be less than 1 GBq.
- If more than one radionuclide is discharged, the sum of the fractions obtained by dividing the concentration value of each radionuclide by the corresponding concentration limit shall not exceed one unit.

18.- Arranging the collection of solid radioactive waste and contaminated solid materials with a legally authorised entity (ENRESA).

19.- Have adequate means for radioactive decontamination of surfaces and people, the location of which and instructions for use must be known by all licensed personnel.

20.- The transfer of radioactive material between the premises that constitute the facility will be done with prior knowledge of the supervisor, it must be done with the appropriate safety measures and radiological protection, according to the type of radioactive material to be moved and based on the route to continue, considering the presence of people outside the radioactive installation

21.- The radiological surveillance of the contamination will be carried out, at the end of the working day, for which equipment of the appropriate type and sensitivity will be available. For those radionuclides for which detection by direct measurement with the monitors available to the installation is not feasible, indirect methods (smears) should be used.

22.- Carrying out the quality control of the X-ray equipment and monitoring the radiation levels in the work stations, at least annually, and whenever the usual work conditions are modified or any irregularity is detected that affects the radiological protection.

At present, there is also a Supervisor with a Nuclear Medicine license who acts as substitute for the licensee, and an Operator in the same speciality.

OPERATING PROTOCOL

ORDERS OF RADIOACTIVE MATERIAL:

To place orders for radioactive material, fill out the order form of the institute with the order data (there are no specific sheets for radioactive material) and deliver it to the supervisor of the radioactive facility.

The authorised orders will be registered in the Operations Log, numbered and sent to the provider. The interested party will be sent a copy of the order, where the delivery date of the order will be indicated.

ARRIVAL OF RADIOACTIVE PRODUCTS TO THE INSTITUTE:

The supervisor of the radioactive facility will receive any request for radioactive material that enters the centre. In cases of failure or absence, it can also be performed by the operator. They will carry out the corresponding controls and will immediately inform the applicant of the material about the delivery of the order who will sign the delivery note and a copy of said document will be delivered.

RADIOACTIVE PRODUCTS STORAGE:

In principle, they will be stored in the hot chamber (radioactive room on the 1st floor) at the appropriate temperature in each case, under lock and key, except for the storage temperature at -80ºC which will be kept in the respective freezers of the applicants, provided that they do not exceed the maximum authorised activities contemplated for laboratories marked as monitored areas (consult supervisor).

USE OF THE RADIOACTIVE CHAMBER OR ROOM:

The operations will be carried out in the radioactive chamber or room on the 1st floor, where there are work areas adequately conditioned for these types of compounds, especially if they are volatile (display cabinets with forced extraction with active carbon filters, pollution monitors, screens, etc.).

It is advisable to use the hot chamber with low activities whenever possible, bearing in mind that the operation that entails greater risk will always be a priority.

To use this chamber, it is essential to sign up on the reservation sheets provided by the person in charge of radioactivity. This person will deliver the key of the chamber to the user when he/she has signed in the Operations Journal of the Hot Chamber and has delivered the detailed protocol of the experiment to be performed, specifying the devices to be used inside and outside the chamber.

After the operation, the user will check for contamination and return the key to the person in charge of radioactivity, who will supervise the status of the chamber and the devices used.

In the period during which a group has reserved the chamber or radioactive room, the Group Manager will be solely responsible for any incidents that occur.

During weekends, the radioactive chamber may only be used by a group, and only for routine operations.

The monitors of the Radioactivity Department will not leave the chamber or radioactive room in any case. Outside this chamber, checks will be made with the monitors corresponding to the work areas of each laboratory.

EQUIPMENT

1.- PORTABLE MONITORS

Two groups of monitors are established, those that are of use for control of the Radioactive Facility and those of use in ordinary laboratories.

1.1.- MONITORSFOR THE CONTROL OF THE RADIOACTIVE FACILITY.

- Multisensor surface contamination monitor, **LAMSE** brand
Model MS6020. Calibrated in Bq / cm2, with a beta-gamma sensor
Model CT115-BG. The detector is a proportional counter. Useful for detecting superficial contamination produced by any isotope of the facility except H-3 (in this case smears are made and counted in the liquid scintillation counter).

- Radiation monitor or radiometer: Brand **FAG FH 40, model F-2**. Calibrated in mSv / h. The detector is a Geiger surrounded by a glass capsule. Useful for assessing the dose due to electromagnetic radiation (gamma or X braking).

1.2-. EXISTING MONITORS IN THE CONVENTIONAL LABORATORIES AND RADIOACTIVE ROOM.

IN THE HOT CHAMBER:

- Portable beta contamination monitors:

  - **Brand Mini Instrument 900 Series** model **E.** Geiger-Müller detector, calibrated in cps.

  - **Brand Mini Instrument Series 900** model **EP15**. Geiger-Müller detector, calibrated in cps.

  - **Rotem brand**, **Ram Gene** model. Equipped with Geiger-Müller sensor, calibrated in cps.

- Gamma contamination portable monitor:

  Brand Mini Instrument, 900 series 44A probe. Calibrated in cps and equipped with a solid crystal scintillation detector from INa (Tl).

- Digital dosimeter type **EPD Siemens brand**.

- Portable beta / gamma contamination monitor:

  Berthold Brand, model **LB 1210D**. Calibrated in Bq / cm2, provided with a beta-gamma sensor. The detector is a proportional counter. Useful for detecting superficial contamination produced by any isotope of the facility except H-3 (in this case smears are made and counted in the liquid scintillation counter).

IN THE SPECT ROOM:

- Area Monitor brand LAMSE Mod. RM 1001B-RD with external sensor mod. RD2L, n/s 35055.

2. SCINTILLATION COUNTERS:

2.1. LIQUID SCINTILLATION:

- **Beckman** brand**,** model **LS 6500.** Dating from January 2004. It has an encapsulated source of Cs-137 of 30 mCi activity.

- **Wallac** brand, **Microbeta** model. Dating from 1995.

2.2. SOLID SCINTILLATION:

- Brand **LKB-Pharmacia,** model **Compugamma cs1282-003 LKB Wallac, series 2820818.**

  Acquired in 1989. It has an external source of verification of activity I-129 0.023 mCi, presented in crystalline form. Preserved at 4ºC in the refrigerator of the radioactive room.

3. REST OF EQUIPMENT

- "Speed vac" located on the 2nd floor (intended for radioactive and non-radioactive material, gloves must be used in both cases).
- Operations with animals (Leaded cabinet in SPECT room).
- Signposted booths and incubators located in the cultures room (inform the cultures manager).
- Hybridisation oven located on the 2nd floor.
- Gel dryer located on the 1st floor.
- Gel Centrifuge located on the 1st floor.
- Laboratory P-2.
- Freezer chest for corpses of contaminated animals.

PERSONNEL

MANAGER / SUPERVISOR: **Sonia Martínez**
SUPERVISOR: Maria L. de Ceballos
OPERATOR: Sonia Díaz Pacheco

PHONE: 91 585 4706 / 871062
Email: sonia.martinez@cajal.csic.es

WORKING HOURS

HOURS: 08:00 to 15:00

LOCATION

- Hot Chamber. Premises located in the centre right of the 1st Floor between the Centrifuges Room and the Cold Chamber.
- Work station Head of Services Office. Ground floor, left corridor, next to Administration.
- SPECT Room: Located on the ground floor of the building, at the end of the left corridor. Next to the materials washing room.
- Waste storage. Located in the loading dock of the building.

TECHNICAL SERVICE UNIT

INTRODUCTION

The Technical Service Unit will be made up of a multidisciplinary team of an eminently technical nature, aimed at the following purposes:

- Conducting a systematic inspection of all facilities and equipment to detect any wear or tear.
- Permanently keeping the equipment and facilities in the best condition to avoid downtime.
- Carrying out the necessary repairs in order to prolong the useful life of the equipment and facilities
- Design, construction and supervision of new facilities.

FUNCTIONS

Headquarters and Administration of the "Technical Service" Unit.

- Organisation and coordination of the human team of the Unit, without prejudice to the powers of the Management
- Support, supervision and coordination of the work carried out by the Unit.
- Organisation and coordination of the companies that sporadically carry out various repairs, including budget review and billing.
- Supervision and control of the works carried out in the Centre.
- Supervision of compliance with maintenance contracts with external companies for various facilities and devices as well as supervision of compliance with contracts with external companies, without prejudice to the powers of Management.
- Analysis of the needs of general use equipment.
- Execution of technical documents and reports.
- Advice on technical aspects for Management and research groups.
- Management of the Centre’s telecommunications, in collaboration with the IT Department
- Feasibility analysis for the installation of equipment and infrastructures.
- Control of orders and management of purchases of the Service.
- Management and planning of the revision of laminar flow cabinets, autoclaves, X-ray equipment, etc.

Maintenance and Facilities Service.

- Management and maintenance of the medium voltage shed. Inspection, maintenance and repair of electrical installations, as well as the installation of new power lines and the repair of electrical appliances.
- Maintenance and repair of lighting boxes, cold rooms and bells.
- Installation of IT networks and installation and repair of telephone lines.
- Revision, maintenance and repair of the plumbing, natural gas and CO2 installations, masonry and painting works, and carpentry.
- Inspection and review of water purification facilities, fire protection systems, freezers and ultra-freezers.
- Monitoring of pest treatments (pest control and disinfestation).
- Supervision, maintenance and repair of water treatment equipment, cleaning and disinfection for the prevention and control of legionellosis in showers, faucets, emergency eyewash stations and the cooling tower.
- Monitoring of the air conditioning and steam system. Cleaning and disinfection in hot water storage tanks, fire tank, water tank, human consumption and cold water sources.
- Assistance in the revision, repair and maintenance of laboratory equipment and general services.
- Support tasks in the coordination of those companies that carry out various repairs.

OPERATING PROTOCOL

- To request support from technical services, users must fill in a Service order.
- Urgent appointments on telephone 4755

PERSONNEL

MANAGER: **José María Sorribas**
PHONE: 91 585 4757 / 871061
Email: sorribas@cajal.csic.es
TECHNICIANS:
José Luis Brea
Raúl Muñoz

WORKING HOURS

HOURS: From: 08:00 - 22:00 - There is a 24 service for emergencies, contacting reception on PHONE: 91 585 4750 / 871056

LOCATION: Basement

BRAIN IMAGING UNIT

DESCRIPTION

Single-photon emission computed tomography (SPECT) is a nuclear medicine tomographic imaging technique using gamma rays, which are captured by a gamma camera. Imaging in general, and Brain Imaging in particular had become a widely used technique in Molecular Medicine, and, with the advent of preclinical equipments, it allows to perform studies in experimental animals in vivo.
The technique requires the delivery of a gamma-emitting radioisotope (a radionuclide) into the subject under study, normally through injection into the bloodstream. Occasionally, the radioisotope is a simple soluble dissolved ion. However, in general, a radioisotope is attached to a specific molecule to create a radioligand, whose properties allows binding to certain types of tissues.

To acquire SPECT images, the gamma camera is rotated around the subject to obtain 3D images. Projections are acquired at defined points during the rotation, typically every 3–6 degrees. In most cases, a full 360-degree rotation is used to obtain an optimal reconstruction. The time taken to obtain each projection is also variable, and related with the characteristics of the radioligand.
The Cajal institute Brain Imaging Unit has acquired an Albira SPECT (Oncovision, Spain) that allows the study of different functions. It is equipped with a computerized tomographer (CT), that allows anatomical imaging.

We are focused on the development of methods to assess different brain functions. For instance, cerebral blood flow to be assessed with 99mTc-HMPAO (hexamethylpropylene amine oxime), a parameter that may be changed in neurodegenerative disorders, tumours etc...Dopamine transporters could be labeled with DatScan (123I-BICIT), an application useful in Parkinson's disease models where those transporters are reduced. Neuroinflammation is present in the majority of the disorders of the brain, and anti-inflammatory molecules are actively studied for those conditions, therefore we intend to image neuroinflammation by means of 123I-PK11195.

SERVICE CONDITIONS

The user will contact the Brain Imaging Unit requesting the studies to select the most appropriate radioligand for SPECT images acquisitions. The animals should be housed in the quarantine room in the animal house of the IC, since they will return to that room following the experiments. In case the service would be requested by a researcher from other Institute/Center a veterinary report will be required before the admission to the facilities.
The price of each study will depend on the price of the radioligand dose for each animal. A price list of the services is available. Following the image acquisitions, they will be reconstructed, analyzed and a report will be delivered.

PERSONNEL

Unit responsible: Dr. María L. de Ceballos
Unit technician: Sonia Díaz Pacheco
PHONE: 91 585 4716 / 871037 / 871209 (lab)
E-MAIL ADDRESSES: mceballos@cajal.csic.es / soniadiaz@cajal.csic.es

LOCATION: Ground floor

WORKING HOURS: From 9:00 to 18:00h.

PRICES AND BOOKINGS: For more information contact the Unit

CODE FOR GOOD SCIENTIFIC PRACTICES FROM CSIC

PREAMBLE

It would be difficult to imagine the actual world without the current levels that have been achieved in science and technology, as our life is now highly dependent on technological products. All scientific areas, both the natural and social sciences have contributed greatly to the advancement of knowledge and to improve the quality of life. However, we should not forget that science, as any other activity, must be based on sound ethical principles. These principles inspire the following Code of Good Scientific Practices, designed to provide an ethical basis for all scientific activity of CSIC.

The first of these principles is to consider freedom and autonomy of research. Science will be always under a particular human interest and always serve the welfare of mankind; the scientist and the science policy administrators are obliged to morally justify aims and priorities.

The second principle is respect to human dignity, particularly when human beings are the targets of the research. Whenever their health and rights are involved, it will be necessary to have a voluntary informed consent, with clear information about the risk and possible consequences of a wrong use of science.

The third one is the acceptance of responsibilities towards society, during scientific activity. Furthermore, the scientist is also responsible of his/her actions in relation to any living organism and the environment, avoiding any unnecessary damage and being aware of the integrity and correct function of our Earth System. This generation is responsible to the next ones, about the situation of the world, taking especially care to promote ethics, and allow that what derives from scientific research will contribute to improve life conditions in the near future.

The fourth principle is that research against human health or dignity including racism, holocaust denial or terrorism apology should not be supported, either in natural science or humanities. Although scientists or their institutions will not be directly responsible of the use that could be made of the knowledge they generate, they should reject to participate in projects and in the spreading of information to be used with awkward ends.

The fifth is that research must be transparent. The scientist should always be ready to answer about his/her work, understanding the importance of peer review research evaluation and the social impact of his/her scientific activity.

All mentioned above indicates that scientific activity will be necessarily submitted to good practices. The scientists are obliged to adapt their activities to ethical principles. Good practices should involve procedures and results. The actual scientific development requires scientific teams, human and material resources, infrastructures and project management and programs with specific duties and responsibilities for each scientist. The honesty of the scientist, his/her vocation or own inventiveness is not enough to achieve good practices. Always observing the value of liberty and individual creativity, the full acceptance of good practice rules must be unequivocally explicit in the institution research contracts where they develop their research and with society that supports them.

The goal of CSIC is the acquisition of knowledge and the social welfare derived. Therefore, all its activities, rules and internal function of the Institution, should be focused, at all levels, to enhance scientific development. This mission should be done following the legality and the criteria of this good practices manual as defined in this Code, which should be updated or corrected, according to the experience developed from its application or to any new circumstance.

In this context, the CSIC Presidency, commissioned the Ethics Committee to design this Code of Good Scientific Practices, bringing together a set of rules, principles, compromises, declarations and/or recommendations applicable to any research kind. This Code calls for basic moral principles, helping its development and achievement. The Good Practices Code should be the instrument to generate and guarantee the integrity and ethical quality of scientific research developed in the CSIC.

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1. PRINCIPLES OF RESEARCH WORK

1.1. Exercising methodical doubt. Checking hypotheses

The basis of scientific knowledge is the capacity for wonderment or questioning about the reasons for facts or situations hitherto unsolved or not investigated. Science aims to attain objective knowledge we can assume to be true. To achieve this we follow a two-step process of reflection: methodical doubt and justification of an explanatory hypothesis. Methodical doubt implies independent opinion and not accepting any idea, from the scientific point of view, as absolute or definitive. This questioning attitude, which is the starting point of all scientific endeavour, must always stay with the investigator, because if the human capacity for wonder is endless, so is also the extent of possible knowledge, and so our certainty at any moment can only be provisional.

Likewise to justify a hypothesis we need tests or arguments to validate it and the researcher must always assume the mentioned attitude.

1.2. Designing good experiments

Observation and experimentation in the laboratory or in the natural environment must provide us with the right answers to scientific questions. Therefore, research must be performed following well-designed protocols that can be examined and understood by any expert researcher on a given field. Experiments and observations must be carefully designed in order to make the best use of the available resources and taking into account specific rules. More care and attention is needed when the object of research are human beings or their personal data, laboratory animals, or when human safety or the environment are at risk.

1.3. Managing data and resources

Experimental data and observations, and the materials used, are the basis of results and scientific research publications. So in case of doubt, others should be

able to repeat and understand our experiments. The experimental protocols and the original data must be kept by the researcher, the research team and the institution for at least five years.

The data remains the property of the Institution in which the scientific work has been carried out, so its source should be clearly cited.

In orden to allow any expert in a certain field to understand and reproduce an experiment, the Institution must provide researchers and trainees with suitable equipment to store the information.

1.4. Proper use of funding

The material and economic resources must be used effectively and efficiently, and carefully managed. This is especially important because economic and material resources are limited.

Consequently, the Institution's personnel must use resources responsibly, efficiently and economically, follow health and safety procedures and respect the environment. Government assets must always be managed in an austere way.

1.5. Misconduct in research activity

Science as the search for knowledge is by its very principles the enemy of fraud. Nevertheless, researchers may be tempted to stray from this in seeking undeserved credit, or financial gain either personally or for the Institution.

This sort of deviation is the biggest threat to good scientific practices and if it happens, the researcher is held accountable for it. Misconduct includes:

- Exaggerated interpretation of data.
- Falsification of data or tests to fit a hypothesis.
- Fabrication of data and discoveries. – Plagiarism of the work of others.

Effective mechanisms for fighting this include:

– Requiring the researcher to submit any new contribution to peer review so other colleagues can check results.

– Disapproval and fight against fraud by the scientific community.

– Coordination among all stakeholders involved in scientific research to ensure the effectiveness of the fight against fraud.

2. THE RESEARCHER AS A SCIENCE PROFESSIONAL

2.1. Leadership and cooperation in the research team

The complexity of current scientific research requires working in teams and the use of shared methodologies, human resources and infrastructures such as projects or research programs.

The researcher who intends to lead a team must assume the responsibilities of leadership. These responsibilities and the composition of the research team should remain clearly established in the financial documents and be fulfilled by every member of the team.

The scientific work of other teams must not be hindered. The scientist must accept the critique, queries and comments of other colleagues.

2.2. Training and testing

Every researcher must take responsibility of educating and training other researchers.

④ Obligations of directors and tutors include:

– Providing trainees with resources and a proper scientific environment. Be aware of their needs and avoid undue pressure.

– Providing information about safety and accident prevention rules that must be followed.

– Encouraging them to observe the Code of Good Scientific

Practices and to maintain a critical mind.

- Ensuring that his/her own work is an example to be followed by the trainee.
- Being an expert in his field in order to educate and train others.
- To introduce the trainee to forums and scientific meetings, provide advice about the future.
- To recognize the trainee's work and to be rigorous and fair in authoring publications.

④ Trainee's obligations include:

- Compromise to work on the assigned research project.
- Follow the tutor's advice and recommendations, and to inform him/her about initiatives and relevant new results. Any difficulties encountered when carrying out the work must be reported promptly.
- Be aware of the observance of the safety rules and procedures, and the fulfillment of the Code of Good Scientific Practices.
- Take part in scientific activities, forums, seminars, etc., relevant to his/her work.
- Give credit for the tutor's contribution in oral or written publication of results.
- Respect and value the work of management, and make good and careful use of materials and facilities.

2.3. Evaluation and appraisal

④ Researchers are often called on to take part in evaluation of projects, publications and groups. In these activities it is important to consider:

- The evaluation must be declined when there is a conflict of interest between the expert and the subject of the evaluation.

- The evaluation shall be confidential and not be used for any purpose other than the evaluation itself. Internal deliberations of a given committee shall also be treated as confidential.
- Information made available to committees shall not be disclosed or shared without previous and express written authorization of the owner.

④ Acceptance of the appraisal must be made known to the institution and regulated by a formal agreement. This ensures that the researcher has the required knowledge and experience and avoids conflicts of interest.

2.4. Disclosure

A free society is one that has a high level of knowledge and a critical mind for making decisions, therefore the scientists have to:

- Disclose and communicate to society the results of their research, in order to contribute to the advancement of culture, the spread of knowledge, and to account for the resources involved.
- Make an effort to provide the public in general with the proper level of the knowledge and to avoid the premature disclosure of unconfirmed results to the media.

Criteria of truthfulness and scientific proof shall always be required.

2.5. *Curriculum vitae*

A *curriculum vitae* is a record of research work but must never be the aim of the researcher's endeavors.

It must document certain personal information about education and professional experience. Accuracy and clarity are essential.

The content of the *curriculum vitae* is the responsibility of the researcher.

All pages should be signed.

2.6. Collaboration with public and private entities. Contracted research. Conflict of interest

The public researcher should be willing to answer any factual questions posed to the Institution by either public or private entities.

Any collaboration with the different public or private entities which require written agreement shall be supervised and signed by the Institution´s legal representative, so that all terms and conditions ruling the interests of the parties can be clearly stated. Furthermore, all adopted agreements entered into by the entity soliciting the work and the representatives in charge of the execution of the research shall be included in the abovementioned agreements.

Conflicts of interest must always be avoided whilst negotiating the agreements and/or during the publication and exploitation of the work done in collaboration with private entities.

2.7. Data protection management. Intellectual property, industrial property, Know-How

The Institution must foster and promote the suitable management of its results establishing guidelines for the correct implementation of intellectual and industrial property policies to allow its effective valuation, protection, appraisal and commercialization. Likewise, measures should be taken to increase the awareness and training of the researchers on intellectual and industrial property and its exploitation.

R&D projects developed either in collaboration or under contract, should safeguard all previous knowledge, information and know-how property of the Institution. Researchers will sign the contractual documents in which the different interests, tasks and contributions will be adequately defined. Furthermore, undisclosed and confidentiality obligations, the property in the results achieved during the course of the project, the likelihood of their legal protection and the conditions under which they can be exploited shall be stipulated.

If the results obtained are liable to legal protection due to commercial interest, these must remain undisclosed during their valuation process. Nonetheless delay in disclosure shall be maintained at the bare minimum.

3. SCIENTIFIC PUBLICATIONS. ORAL AND WRITTEN COMMUNICATION

Publication of all results obtained with the aid of public funds is a fundamental activity of any research work since it is the only way to submit the findings to the international scientific community for review.

3.1. Publication of results

- Researchers shall always make an effort to publish their results and their possible interpretations in an open, honest, transparent and exact manner. This includes the publication of those results not in line with the given hypothesis.
- Publications of fragments of the work or part of the work separately is only acceptable if the publisher so requires or by reason of extensions.
- Researchers shall not unduly withhold the publications of any finding from projects financed with public aid unless this can be justified by commercial arrangements or by the nature of its legal protection.
- Research results obtained under an agreement shall be published in accordance with the terms contained therein.
- Verbal communications of results shall follow the same rules as for publications, avoiding in each case to overstate the importance and practical applications of the results.
- In case an error is detected in a publication, it must be revealed in publications of the same standard and if serious, the publication must be withdrawn.
- The “open access” would take the same criteria than other kind of publications, but always in accordance with institutional policy. In this

regard, in 2006, the CSIC joined the Berlin Declaration for the "open access" to knowledge (Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities), which favours and promotes the open access to scientific and academic output.

3.2. Authorship of publications

- In order to be credited as author of a publication the researcher in question needs to either (i) have participated in the proposal and work design, and/or (ii) have carried out the experimental part, and/or (iii) analyzed and interpreted the results and its debate on whether it is state of the art.
- All researchers who have participated significantly in the research work must appear as authors of the publication.
- All authors of a publication, unless otherwise specified, must know the text and be responsible for its content.
- The order of the mentioned authors shall be decided in accordance with the guidelines normally accepted in their field of work and must be known to all of them.
- The work and contribution of collaborators and technical staff contributions must be properly acknowledged.
- Besides the authors, the institutions or centers in which the research has been executed or those they belong to, must be mentioned. Grants, financial support or sponsorships must also be declared and thanked, except when declined.
- Likewise, any conflict of interests must be known.

3.3. Previous authors recognition

- The authors must mention and make reference in their publications to all the previous literature connected with such publications.

– Previous publications which are not essential for the research shall not be included.

3.4. *Peer review* of scientific publications

Peer review is a method used to validate written research in order to evaluate its quality and scientific rigor. This method opens the work to scrutiny, annotation or edition by other authors with similar knowledge to that of the researcher. Currently, scientific publications are only accepted for publication in scientific journals, after *peer review*.

– The scientist, as reviewer or publisher, must avoid any kind of conflict of interest (personnel, academic, commercial, etc.). Likewise, evaluations, reasonings and opinions must be clear and accurate, and subject to enough discussion in order to be impartial.

  The evaluation process must remain strictly confidential. Reviewers and publishers must not use the information which they might have accessed without previous, specific and express authorization by the author.

4. INSTITUTIONAL FRAMEWORK

4.1. Information on research conditions

– Institutions must stimulate scientific collaboration and the quality of the research. Likewise it must recommend models for the organization of research and encourage the relationships between the economic and social agents, and in particular offer its advise and experience in those research activities.

– The Institution must guarantee that all researchers have access to the Code of Good Scientific Practices of CSIC as well as to the updated legislation applicable to the different fields of science. Documents gathered in a specific document ("ad hoc") will be edited at CSIC´s web. In addition, the Institution will endeavour to make researchers aware of good research

practice by means of giving adequate information through specific courses, leaflets and others. To this end and by virtue of what is stipulated in the statute, the Presidency set up an Ethics Committee.

– Researchers must make compatible the intellectual freedom with the engagement and loyalty to the Institution that provides them with the framework to develop their research efficiently. Researchers must get involved with the CSIC and know well all the activities that the Institution carries out as well as its role of service to society.

4.2. Evaluation criteria and promotion of personnel and units

– The Institution must establish clear evaluation and personnel promotion procedures, set clearly-defined criteria, and make them known in advance.

The mentioned criteria shall be objective, clear, impartial and lasting and reflect the quality of the performed work.

– In order for any evaluation to be fair, it has to be objective. The evaluators shall make an effort to know well every candidate's capacity and interpret properly each and every document they submit. If the evaluation process includes a personal interview, this one must be stated in writing.

– Evaluators shall avoid any conflict of interest that might be related to kinship, friendship, enmity, professional implication or any other similar condition; the evaluators always have to be unbiased.

4.3. Non-discriminatory conditions

In accordance with the current regulation, the Institution will promote equal opportunities and prevent any discrimination on the basis of age, race, sex, religion, marital status, sexual orientation, opinion or any other condition or social circumstance, and mainly in relation to the:

– Access to training activities.

– Access to (i) become a member of the examining board and (ii) enter the personnel recruitment processes at all levels as well as any promotion competition and free access to job openings of different grade such as directive or management positions.

Furthermore, CSIC shall take all necessary measures in order for its workers not to be subjected to labour harassment, promote work conditions based on fair treatment and respect and ensure the implementation of instruments to detect and solve any potential desviation.

ANNEX I: LEGAL TEXTS

A. Research with human beings

- Ley 14/2007, de 3 de julio, de Investigación biomédica.
- Ley 14/2006, de 26 de mayo, sobre técnicas de reproducción humana asistida.
- Real Decreto 1301/2006, de 10 de noviembre, por el que se establecen las normas de calidad y seguridad para la donación, la obtención, la evaluación, el procesamiento, la preservación, el almacenamiento y la distribución de células y tejidos humanos y se aprueban las normas de coordinación y funcionamiento para su uso en humanos.
- Real Decreto 65/2006, de 30 de enero, por el que se establecen requisitos para la importación y exportación de muestras biológicas**.**
- Real Decreto 223/2004, de 6 de febrero, por el que se regulan los ensayos clínicos con medicamentos.
- Real Decreto 120/2003, de 31 de enero, por el que se regulan los requisitos para la realización de experiencias controladas, con fines reproductivos, de fecundación de ovocitos o tejido ovárico previamente congelados, relacionadas con las técnicas de reproducción humana asistida.
- Ley 41/2002, de 14 de noviembre, básica reguladora de la autonomía del paciente y de derechos y obligaciones en materia de información y documentación clínica.
- Ley 30/1979, de 27 de octubre, sobre extracción y trasplante de órganos
- Declaración de Helsinki de la Asociación Médica Mundial (Principios éticos para las investigaciones médicas en seres humanos).
- Convenio del Consejo de Europa relativo a los derechos humanos y la biomedicina, ratificado por España el 23 de julio de 1999.
- Declaración Universal de la UNESCO sobre el Genoma Humano y los Derechos Humanos.

B. Animal research

- Ley 32/2007, de 7 de noviembre, para el cuidado de los animales, en su explotación, transporte, experimentación y sacrificio.

  Real Decreto 65/2006, de 30 de enero, por el que se establecen requisitos para la importación y exportación de muestras biológicas.

④

④ Real Decreto 1201/2005, de 10 de octubre, sobre protección de los animales utilizados para experimentación y otros fines científicos. ④ Ley 8/2003, de 24 de abril, de sanidad animal.

C. Workers' protection

④ Ley 7/2007, de 12 de abril, del Estatuto Básico del Empleado Público.
④ Ley 54/2003, de 12 de diciembre, de reforma del marco normativo de la prevención de riesgos laborales.
④ Ley10/1998, de 21 de abril, de Residuos.
④ Real Decreto 665/1997, de 12 de mayo, sobre la protección de los trabajadores contra los riesgos relacionados con la exposición a agentes cancerígenos durante el trabajo.
④ Real Decreto 664/1997, de 12 de mayo, sobre la protección de los trabajadores contra los riesgos relacionados con la exposición a agentes biológicos durante el trabajo.
  ⊛ Guía técnica para la evaluación y prevención de los riesgos relacionados con la exposición a agentes biológicos.
④ Ley 31/1995, de 8 de noviembre, de Prevención de Riesgos Laborales.

D. Environment protection

④ Ley 42/2007, de 13 de diciembre, del Patrimonio Natural y de la Biodiversidad.
④ Ley 30/2006, de 26 de julio, de semillas de vivero y de recursos fitogenéticos.
④ Real Decreto 178/2004, de 31 de enero, por el que se aprueba el Reglamento general para el desarrollo y ejecución de la Ley 9/2003, de 25 de abril.
④ Ley 9/2003, de 25 de abril, por la que se establece el régimen jurídico de la utilización confinada, liberación voluntaria y comercialización de organismos modificados genéticamente.
④ Ley 43/2002, de 20 de noviembre, de sanidad vegetal.

④

Real Decreto 58/2005, de 21 de enero, por el que se adoptan medidas de protección en la introducción y difusión en el territorio nacional y en la Comunidad Europea de organismos nocivos para los vegetales o productos vegetales, así como para la exportación y tránsito hacia países terceros.

④ Real Decreto 39/1998, de 16 de enero, por el que se modifica el Real Decreto 401/1996, de 1 de marzo.

④ Real Decreto 401/1996, de 1 de marzo, por el que se establecen las condiciones para la introducción en el territorio nacional de determinados organismos nocivos, vegetales, productos vegetales y otros objetos, con fines de ensayo, científicos y para la actividad de selección de variantes.

④ Convenio sobre la Diversidad Biológica – Protocolo de Cartagena sobre Seguridad de la Biotecnología del Convenio sobre la Diversidad Biológica.

④ Tratado Internacional sobre los Recursos Fitogenéticos para la Alimentación y la Agricultura.

④ Tratado Antártico sobre Protección del Medio Ambiente (Protocolo de Madrid, BOE de 18 de febrero de 1998).

E. Personal Data protection

④ Real Decreto 1720/2007, de 21 de diciembre, por el que se aprueba el Reglamento de desarrollo de la Ley Orgánica 15/1999, de 13 de diciembre.

④ Ley Orgánica 15/1999, de 13 de diciembre, de Protección de Datos de Carácter Personal.

F. Other legal texts

④ Constitución Española de 1978.

④ Ley 30/1992, de 26 de noviembre, de Régimen Jurídico de las Administraciones Públicas y del Procedimiento Administrativo Común.

④ Ley Orgánica 3/2007, de 22 de marzo, para la igualdad efectiva de mujeres y hombres.

④ Real Decreto legislativo 1/1996, de 12 de abril, por el que se aprueba el texto refundido de la Ley de Propiedad Intelectual.

④

Real Decreto 1730/2007, de 21 de diciembre, por el que se crea la Agencia Estatal Consejo Superior de Investigaciones Científicas y se aprueba su Estatuto.

Remark

As the above mentioned legal texts do not constitute a complete clearly-defined list, other rules could be enforced. The list of regulations issued by local and autonomous regions is extremely long and detailed and so has been omitted.


GOBIERNO
DE ESPAÑA
MINISTERIO
DE CIENCIA
E INNOVACIÓN


CSIC

MANUAL FOR THE PREVENTION OF OCCUPATIONAL HAZARDS

Dear Friend,

The Law 31/1995, of November 8th, on the Prevention of Occupational Risk (LPOR) aims to ensure the safety and health of workers in their relationship with the work they do. The LPOR proclaims the basic right of workers to participate in the adoption and execution of preventive measures that must be carried out. This participation is through two different ways:

- Individual action. "*Prevention Delagates"*
- Collective action. "*Committees of Security and Health",*

with specific competences and attributions for each action.

The LPOR establishes the figure of the Prevention Delegates as workers' representatives, chosen by and among the personnel representatives, with specific functions in matters of prevention of occupational risks. The LPOR regulates the functions and competences of the Prevention Delegates, as well as their number in each Center, training needs, etc. More information can be found on the CSIC Intranet (https://intranet.csic.es/_delegados-de-prevencion).

The scope for exercising the function of representation in preventive matters is the staff of each center.

<u>Competencies and faculties of the Prevention Delegates (art. 36, LPOR)</u>

- Collaborate with the Administration in the improvement of preventive action.
- Promote and encourage cooperation of workers in compliance with the Regulations on Prevention of Occupational Risks.
- Supervisory and control work on compliance with regulations.
- Provide support to the technicians in preventive evaluations.
- Accompany the Labor Inspectors in the visits.
- Promote the adoption of the agreement for the suspension of activities in which there is a serious or imminent risk to the workers' representative body.
- Assume the powers of the Health and Safety Committee, if this does not exist.
- Go to the Labor and Social Security Inspectorate.
- To be consulted by the Administration: To be consulted, prior to its execution, about the decisions referred to in article 33 of the LPOR.
- Have access to information and documentation.
- To be informed by the Center's authorities about the damage caused to workers' health.

- Make visits to workplaces: Monitoring and control functions on compliance with the Prevention Regulations. It is important to highlight that within these functions, the Prevention Delegate can access work places in order to:

  - Accompany the technicians in the risk assessments they carry out.
  - Collect the necessary information when damage to health occurs.
  - Monitor and control the status of working conditions.

For all the above, I remain at your entire disposal with the request that you do not hesitate to contact me in cases that you think may affect or put at risk the health of the working personnel of this Institute

With my best regards,

Ricardo Martínez Murillo
Prevention Delagate
Cajal Institute
r.martinez@cajal.csic.es
Phone: 91 5854714
December 26th, 2017

WASTE MANAGEMENT MANUAL

INSTITUTO CAJAL CSIC

08012018

WASTE MANAGEMENT

CSIC – INSTITUTO CAJAL

INDEX

1- INTRODUCTION

Bio-sanitary, cytotoxic and hazardous waste in general pose a risk, both to the environment, especially in relation to air, water and soil, and to people directly exposed to them.

Cajal Institute is registered in the Community of Madrid as a small producer of hazardous waste, with the number Q-28 / 18002D / MD54 / 2003/6985.

This Manual is intended to ensure a correct practice of segregation, storage and transport of waste generated, prioritizing the protection of health, public and workers of Cajal Institute, and the Environment.

2- SCOPE OF APPLICATION

Aimed at all workers of Cajal Institute who carry out research activities, waste handling, segregation and subsequent final storage, and delivery to waste manager (Servicios Integrales Sanitarios Madrid S.L.).

3- WASTE MANAGEMENT

The person in charge of the proper functioning of the Waste Management Plan at Cajal Institute is:

- Sonia Martínez Alonso (Ext. 4706)

All the staff of Cajal Institute is responsible for the proper segregation and preparing of waste at origin.

Waste management outside the production center is carried out by Servicios Integrales Sanitarios Madrid S.L., according to the established standards in art. 18 of RD 83/1999; It includes:

- Control of segregation, packaging and labeling.

- Collection and Transportation.

- Disposition in plants for the corresponding treatments.

Its importance is:

- Minimize the possibility of contamination

- Prevent certain waste from receiving inappropriate treatment

- Prevent occupational and environmental risks arising from incorrect management.

TYP	DESCRIPTION	PACKAGING	LABELING
GROUP III	-Biosanitary Special: *Sharp objects.*	Yellow approved packaging, opaque, resistant, non-perforable and waterproof of 1 or 5 liters; specific in its form for sharp objects.	Specific signage with biohazard pictogram.
	-Biosanitary Special: *Others*	Black colour approved packaging, opaque, resistant, non-perforable and waterproof of 60 liters; specific in its form and opening system.	Specific signage with biohazard pictogram.
GROUP V	-Chemical waste	SOLIDS: Black colour approved packaging (same as for Biosanitary, but properly labeled). LIQUIDS: 10 or 25L carafes, properly labeled.	Original labels, or laboratory data and product name.
GROUP IV	-Citotoxic	Blue colour approved packaging, opaque, resistant, non-perforable and waterproof of 60 liters; specific in its form and opening system.	Specific signage with biohazard pictogram.

4- PROTOCOLS OF WASTE MANAGEMENT:

The protocols for management of biosanitary, cytotoxic and chemical waste in this center are detailed below. In this way, each worker knows the properties of each waste. The rules of action in case of accident, are contained in the document *Rules of action in case of accident of Cajal Institute* (located on Intranet > Unidad de Cultivos Celulares).

When mixtures of different compounds are produced, they will always be segregated as the most dangerous of its components, according to this order:

CITOTOXICS> CHEMICALS> BIOLOGICAL

4.1 INTERNAL MANAGEMENT OF BIOLOGICAL WASTE.

All biological waste must be decontaminated before disposal, and all regulations on waste management must be followed (Law 22/2011, of 18 July, on Waste and Contaminated Soils and Law 5/2003 of Residues of the Community of Madrid BOCM March 31, 2003).

This type of solid waste is collected in 60L BLACK COLORED CONTAINERS, which are found in the Cold Rooms of the 2nd and 3rd floors. Sharp materials such as needles, scalpel blades, broken glass debris, etc., that have been in contact with blood and biological fluids, material from microbiological activities or chemicals are collected in 5L YELLOW CONTAINERS, found below each laminar airflow hood, and are also available for their use in the laboratories. This special waste must be accumulated separately from all other waste types. These containers are for single use and once they are closed, cannot be reopened. They must be kept intact and under lock until they are collected, avoiding pressures and impacts that could affect their integrity during storage or transport. Its final disposal must be done by an authorized entity.

The liquid biological waste is inactivated with domestic bleach (10% sodium hypochlorite) for 30 minutes, and they can be eliminated by the drain. It should be specified that the indiscriminate use of bleach can cause environmental contamination. The domestic bleach solution indicated here is enough; no more concentrated solutions should be used.

4.2- INTERNAL MANAGEMENT OF CITOTOXIC AND CYSTOSTATIC RESIDUES.

4.2.1.- DEFINITION OF CYTOTOXIC AND CYTOSTATIC RESIDUES

For its handle, cytotoxic and cytostatic waste is subject to special requirements, both inside and outside the generating center.

They are essentially the remains of cytotoxic or cytostatic drugs and all the material that has been in contact with them. They have carcinogenic, mutagenic or teratogenic properties. The cytotoxic or cytostatic nature of a compound can be verified through its safety sheet, which must be provided by the supplier or found in the supplier website.

They come mainly from:

- Remains containing cytotoxic drugs, either remnants or expired cytotoxic products, and all the material that has been in contact with them.

- Ethidium bromide, and anything containing or being in contact with this compound.

- Formaldehyde and Paraformaldehyde.

- Toluen.

- Hormones.

- Immunosuppressants.

- Alkylating agents.

- Other products: the condition of cytotoxic / cytostatic is indicated in the MSDS provided by the supplier, as well as by the R and H phrases specified in the labeling of the original product.

They will be collected in rigid containers of material that does not emit toxic gases during their incineration, with hermetic closure, and identified with the label "Cytotoxic". They are BLUE COLORED, with a volume of 60L and they are placed in the cold chamber of the 2nd floor.

It is important to keep in mind that treatment of this type of waste is different from that of biosanitary waste, so it is essential to segregate them correctly. In case of mixturing different compounds, the rule is to segregate as the most dangerous of its components.

4.2.2.- TREATMENT OF CITOTOXIC AND CITOSTATIC WASTE:

• All material used in the processes related to cytostatic and cytotoxic products must be disposable and must be removed and disposed according to the established procedure.

• They will be collected in rigid containers of material that does not emit toxic gases in their incineration, with hermetic closure, and identified with the label "Cytotoxic". They are blue coloured and located in the cold chamber of the 2nd floor.

• The final storage (temporary) will be done in the same way as a container with biohazardous waste, always under lock.

• During the entire process of collection and transfer of the waste containers, it is necessary to ensure the minimum contact of staff with the contents of these containers. Therefore, they must use adequate means of protection to avoid risks arising from the handling of this waste.

4.3- PROTOCOLS TO HANDLE CHEMICAL WASTE.

General considerations about chemical waste:

- Chemical residues generated in the laboratory should not be removed by the drain without inerting, even in small quantities.

- Information and instructions should be available for the disposal of waste generated in the laboratory.

- Do not keep empty bottles uncovered.

- Do not throw chemicals or remains impregnated with such products into the wastebaskets.

- Do not accumulate waste of any kind in places not intended for this purpose.

4.3.1.- RECOMMENDATIONS FOR HANDLING CHEMICAL WASTE:

Staff in charge of handling chemical residues should follow these general instructions:

• Before adding any type of waste to a container, make sure that the container is proper and correctly labeled.

• Chemical containers must always remain closed, excepting for adding more content.

• If there is any doubt in the classification of any residue, as well as possible reactions, place it in a separate container. If you have any doubt, DO NOT MIX.

• Pouring waste into the corresponding containers must be carried out slowly and under a hood. This operation will be interrupted if any abnormal phenomenon is observed, such as the production of gases or an excessive increase in temperature. Once the operation is finished, the container should be closed until the next use. This will reduce the exposure to the generated waste, as well as the risk of possible spills.

• Chemical containers should not be filled more than 80% approximately of their capacity, in order to avoid splashes, spills or overpressures. Once filled up to 80%, close and transfer to the collection point, placed at the loading dock (basement). Staff in charge will take it to the temporary warehouse. There it will remain under lock, until it is collected by the management company.

• Chemical containers will be placed on the ground to prevent falling. The containers in use will never be left in walking areas or places that may cause stumbling, and will always be kept away from any source of heat. Chemical containers will be placed in trays to collect accidental spills and avoid overturning.

• Direct contact with waste should always be avoided, using the individual protection equipment appropriate to its hazardous characteristics.

• Wastes whose properties are unknown should be considered as hazardous, taking the maximum precautions.

• It is recommended not to handle waste alone.

• Do not mix liquid waste whose subsequent treatment does not coincide. When in doubt, do not mix.

• Solid waste will never be compacted.

• The transport of containers will be carried out in a trolleys, located in the loading dock (basement), to avoid risks of breakage and spills, as well as physical injuries caused by overexertion.

• The storage period (intermediate storage) should not exceed 6 months for this type of waste.

4.3.2.- INTERNAL MANAGEMENT OF CHEMICAL WASTE:

We will always keep in mind the recommendations set forth above. The key points are:

• Correct choice of container.

• Correct labeling.

• Do not mix residues without being sure that they do not produce a reaction, and that it does not hinder their subsequent treatment.

• Handle with the appropriate personal protection equipment, described below.

Chemical residues will be placed properly packaged and labeled into a trolley specific for this purpose, located in the loading dock (basement). Removal of these residues by the staff in charge takes place on Fridays before 2:30 p.m. It is important that users respect this schedule to avoid the accumulation of waste in the loading dock.

If not possible, it is recommended to use the original containers of the product for the waste, keeping the labeling.

If this is not possible, packaging and labels are available, which should be requested from the staff in charge of waste management. They are described below:

PACKAGING:

The containers for waste, are manufactured mainly of thermoplastic materials, with different additives. Due to this reason, they are very resistant to chemical attacks.

The most suitable containers are determined according to the nature and characteristics of the waste:

LIQUID CHEMICAL RESIDUES (acids, bases, solvents, development liquid, etc.)

High density and high molecular weight polyethylene carafes (White color, red cap, 10 and 25L).

SOLID CHEMICAL WASTE:

Total opening containers of high density polyethylene and high molecular weight. High density polyethylene lid. Hermetic closing. (Black packaging of 60L).

SHARP WASTE

Rigid polypropylene containers. Resistant to shocks, perforations and solvents. (Yellow color 5L). Label and close correctly.

LABELING:

Containers with hazardous waste must be clearly, legibly and indelibly labeled.

Preferably, the original labeling of the product should be retained. If this is not possible, staff in charge of waste management will provide stickers to identify the waste.

The label should include:

- The complete chemical name of the waste it contains.
- Laboratory and telephone source of waste.
- Date of closure of the waste.
- Volume of the container.

ANNEX

GROUP V: CHEMICAL WASTE

For the segregation and subsequent waste treatment, the compounds are classified in the following groups according to the chemical and physical properties:

Group I: Halogenated solvents.

Group II: Non-halogenated solvents.

Group III: Aqueous solutions.

Group IV: Acids.

Group V: Oils.

Group VI: Solids.

Group VII: Specials.

Therefore, as waste producers, we can mix residues of the same nature within this classification, ONLY IF we are sure that this mixture does not produce different phases, nor any reaction. When in doubt, do not mix and segregate them separately.

GROUP I: HALOGENATED SOLVENTS.

It is understood as such, any organic liquid products that contain more than 2% of some halogen. Examples: dichloromethane, chloroform, carbon tetrachloride, tetrachloroethyl, bromoform.

These are products with diverse toxicological characteristics, and specific effects on health. Mixtures of halogenated and non-halogenated solvents are also included in this group, provided that the halogen content of the mixture is greater than 2%.

GROUP II: NON-HALOGENATED SOLVENTS.

Organic liquids containing less than 2% halogen are classified here. These products are flammable and toxic, and among them, we can mention:

- Alcohols: methanol, ethanol, isopropanol.

- Aldehydes: formaldehyde, acetaldehyde.

- Amides: dimethylformamide.

- Amines: dimethylamine, aniline, pyridine.

- Ketones: acetone, cyclohexanone.

- Esters: ethyl acetate, ethyl formate.

- Glycols: ethylene glycol, monoethylene glycol.

- Aliphatic hydrocarbons: pentane, hexane, cyclohexane.

- Aromatic hydrocarbons: toluene, o-xylene.

Avoid mixtures of solvents that are immiscible, since the appearance of different phases makes subsequent treatment difficult and, of course, those that react with each other. When in doubt, DO NOT MIX.

GROUP III: AQUEOUS SOLUTIONS.

This group corresponds to the aqueous solutions of organic and inorganic products. It is a very large group, and therefore, it is necessary to establish divisions and subdivisions, as indicated below. These subdivisions are necessary, either to avoid reactions of incompatibility, either by request of their subsequent treatment:

a) Inorganic aqueous solutions:

- Basic aqueous solutions: sodium hydroxide, potassium hydroxide.

- Acid aqueous solutions of heavy metals: nickel, silver, cadmium, selenium, fixatives.

- Acid aqueous solutions without heavy metals (less than 10% by volume of acid).

- Aqueous solutions of chromium (VI).

- Other inorganic aqueous solutions: developers, sulphates, phosphates, chlorides.

b) Organic aqueous solutions or high OCD:

- Aqueous solutions of dyes: methyl orange, phenolphthalein.

- Solutions of organic fixatives: formalin, phenol, glutaraldehyde.

- Water / solvent mixtures: chromatography eluents, methanol / water.

GROUP IV: ACIDS.

This group corresponds to inorganic acids and their concentrated aqueous solutions (more than 10% by volume). It must be taken into account that its mixture, depending on the composition and concentration, can produce a dangerous chemical reaction with release of toxic gases and increase of temperature.

To avoid this risk, before making mixtures of concentrated acids in the same container, a test should be carried out with small amounts and, if no reaction is observed, carry out the mixing. Otherwise, the acids will be collected separately.

GROUP V: OILS.

This group corresponds to the mineral oils derived from maintenance operations.

GROUP VI: SOLIDS.

Chemicals in the solid state, both of organic and inorganic nature are classified in this group. Obsolete pure reagents in solid state (group VII) do not belong to this group. The following classification subgroups are established within the group of solids:

- Organic solids: chemical products of organic nature, or contaminated with organic chemical products, such as active carbon or silica gel impregnated with organic solvents.

- Inorganic solids: chemical products of inorganic nature. For example, salts of heavy metals.

- Disposable contaminated material: to this group belongs material contaminated with chemical products.

Classification subgroups can be established, by the nature of the material and the nature of the contaminant, taking into account the requirements set by the authorized manager: glass, gloves, filter paper, rags, etc.

- Broken glass contaminated with chemical products (pipettes, test tubes, glasses and other laboratory material in general), presents risks linked to the intrinsic nature of the chemical products impregnated and, in addition, the risk of parenteral damages, due to cuts or punctures. This glass should not be deposited in a conventional glass container (green), among other reasons, because it should not undergo the usual compaction process, but should be deposited in rigid yellow containers for sharp waste, properly labeled.

Never mix each other.

GROUP VII: SPECIALS.

To this group belong the chemical products, solid or liquid, which, due to their high dangerousness, should not be included in any of the other groups, as well as the pure reagents obsolete or expired. These products should not be mixed with each other or with waste from the other groups. Examples:

- Strong oxidants - oxidizers (peroxides).

- Pyrophoric compounds (metallic magnesium powder).

- Very reactive compounds [fuming acids, acid chlorides (acetyl chloride), alkali metals (sodium, potassium), hydrides (sodium borohydride, lithium hydride), compounds with active halogens (benzyl bromide), polymerizable compounds (isocyanates, epoxides), peroxidable compounds (ethers), unknown reaction residues].

- Very toxic compounds (benzene, osmium tetraoxide, chromic mixture, cyanides, sulfides, mercury, asbestos, etc.).

- Unidentified or unlabelled compounds.

In general, hazardous chemical waste will be separated according to the physical and chemical properties:

- LIQUIDS
  - Organics
    - Halogenated
    - Non-Halogenated
    - Laboratory waste
    - Oils
  - Inorganics
    - Acids
    - Basics
    - Salts
- SOLIDS
  - Organics
    - Halogenated
    - Non-Halogenated
  - Inorganics
    - Metals
    - Sulphates
    - Carbonates, etc

It is necessary to avoid mixtures that hinder management, such as formation of several phases, and even belonging to the same group, substances that can react between them will be separated into different containers. If there are any doubt, do not mix and pack separately.

It is very important to read the labeling of a product, as well as its R and H statements and its safety sheet, to know how to classify the waste. The manufacturer or supplier must provide all this information.

The labeling of a product implies the assignment of defined and pre-established danger categories based on physicochemical properties, toxicological properties, specific effects on human health and on the effects on the environment, identified by pictograms and symbols of dangerousness.

5- SUMMARY FOR USERS.

BIOLOGICAL WASTE	SOLIDS	60L black containers	Placed on 2nd and 3rd floor cold chambers.
	LIQUIDS	Inactivate with domestic bleach at 10%, 30 min.	Remove by the drain.
	SHARP	Yellow 5L containers (ask staff in charge). Available in 4L and 1L in Institute warehouse.	Once full, notify to staff in charge of waste so that it can be moved to the temporary warehouse.
CITOTOXICS CYTOSTÁTICS*	ALL	60L Blue container.	2nd floor cold chamber.
CHEMICALS	LIQUIDS	Better in the original container. If the nature of the waste allows it, use white carafes of 25 and 10L. They must always be correctly labeled. Ask staff in charge.	Deposit in the trolley labeled for that purpose, located in the loading dock, basement floor. Staff in charge of waste removes the containers deposited there on **Fridays at 2:00 p.m**. It is important to keep this in mind, so that the waste will spend as little time as possible on the loading dock. Always label correctly, you can request labels for chemicals from the staff in charge.
	SOLIDS	Better in the original container. If the nature of the waste allows it, use white 10L carafes, or black 60L containers. They must always be correctly labeled.	
	SHARP	Yellow containers 1 and 5L (ask staff in charge). Available in 4 and 1L in Institute warehouse. Label correctly.	
	BATTERIES	Specific container (yellow color) Located in 1st floor, attached to wall.	Withdrawn periodically by staff in charge.

* Most common CITOTOXICS in IC: Toluene, Ethidium Bromide, Formaldehyde and PFA.

GOOD WORK PRACTICES

- ✓ Avoid heating the bottle..
- ✓ Never lay down the bottles for use.
- ✓ Before using a bottle of dissolved liquefied gases, make sure they are in an upright position and secure to prevent them from falling.

- ✓ The tap on the bottle will open slowly. The exit of the same will be placed opposite to the position of the operator and never in the direction of other people.

- ✓ Other tools than those provided or recommended by the supplier will not be used.

- ✓ Lubricants will never be used.
- ✓ Do not disassemble
- ✓ Take care of valves and never grease them.
- ✓ Do not use a bottle such as anvil, roller or chock.
- ✓ Place a fixed fastening system to prevent from falling.

- ✓ Do not use the bottle to prime an electric arc.
- ✓ Do not handle a bottle by holding it by the hood.

BOTTLE STORAGE

The prohibition of smoking or of entering with any type of flame must be clearly indicated in the bottle storages. Do not expose them to high temperatures. The bottles will not be stored near substances easily inflammable as oil, gasoline, waste ...

Storage rooms must be dry and well ventilated. Storage in underground rooms without ventilation is prohibited. The temperature in the storage room must not exceed 50°C.

WHAT TO DO IN CASE OF FIRE?

In case of fire and / or heating:

- ✓ Call the fire department.
- ✓ Without material protection: do not approach the bottle, do not move it.
- ✓ Extinguish the fire (if necessary), and then water it with plenty of cold water for one hour.

MORE INFORMATION...

- ✓ RD 769/1999
- ✓ NTP´s: 198, 209 y 397.
- ✓ ITC MIE APQ 5

Prepared by the Occupational Health and Safety Service of Madrid - spsl.madrid@csic.es

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CONSEJO SUPERIOR DE INVESTIGACIONES CIENTÍFICAS

GAS CYLINDER

Occupational Risk Prevention Area of CSIC
C/ Serrano 113 posterior, 28006 Madrid - Area.prl@csic.es

DEFINITION AND CLASSIFICATION

Gases under pressure: Gases under pressure are those in a container at a pressure of 200kPa (indicator) or higher, or that are liquefied or liquefied and refrigerated. Compressed, liquefied, refrigerated and dissolved liquefied gases are included.

Compressed gases: Gas that, when packed under pressure, is totally gaseous at -50° C. This group includes all gases with a critical temperature < -50°C.

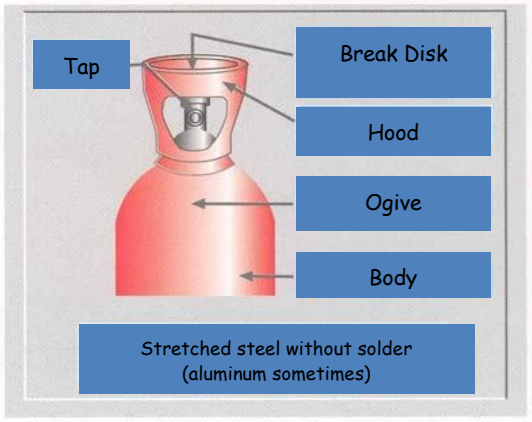
Liquefied gases: Gas that, when packed under pressure, is partially liquid at temperatures above -50° C. It is necessary to distinguish between:

✓ High pressure liquefied gas: a gas with a critical temperature between -50° C and + 65° C

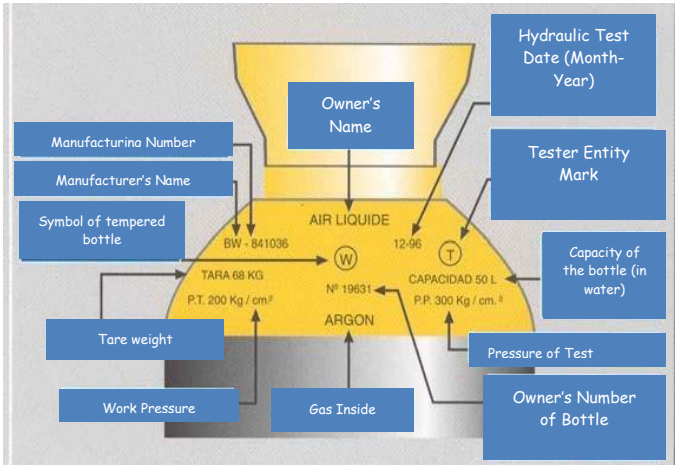
✓ Liquefied gas at low pressure: a gas with a critical temperature above + 65° C.

Dissolved gases: gases, which cannot be compressed without undergoing polymerization, so they are dissolved and then introduced into the bottle that has a porous filling mass to prevent polymerization.

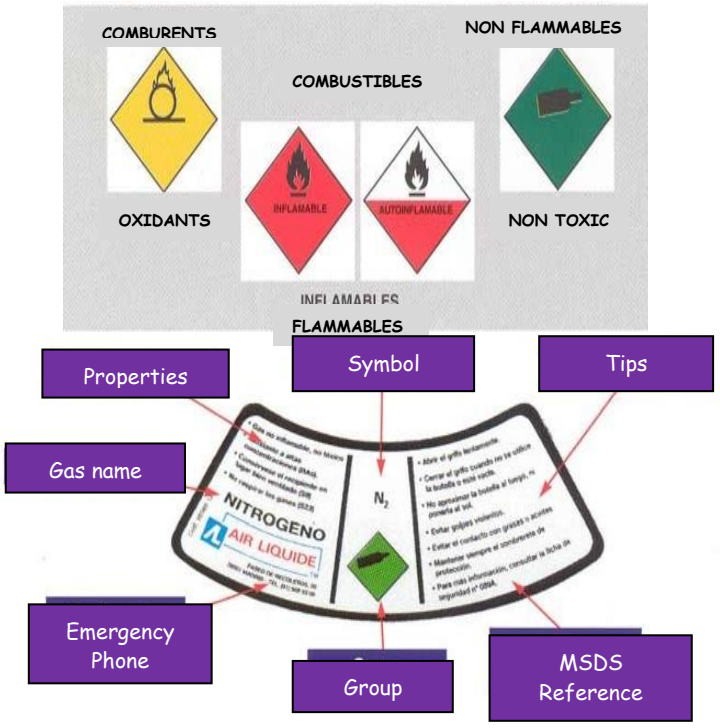
BOTTLE ELEMENTS



BOTTLE IDENTIFICATION

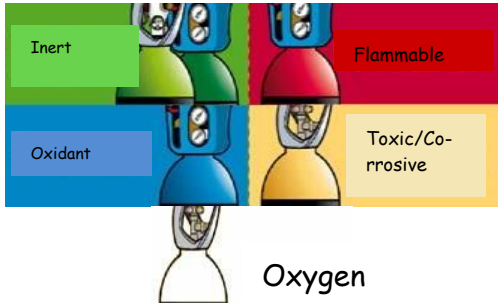


GAS LABELING



IDENTIFYIN COLORS OF OGIVES

General Rule		
Color	**Old System**	**New European Code**
Toxic/Corrosive	Green	Yellow
Inert (Argon and mixtures)	Yellow or mix of colours	Light Green / Dark Green
Flammable	Red	Red
Oxidant	White	Light Blue



Lo que cambia					
Gases Industriales					
	Antes	*Después*		*Antes*	*Después*
Argón	Amarillo	Verde oscuro	Amoníaco Cloro Monóxido de nitrógeno Monóxido de carbono Arsina Fluor Fosfina Dióxido de azufre	Diversos colores	Amarillo
Kriptón Neón Xenón	Marrón	Verde intenso			
Acetileno	Marrón	Marrón teja			
Mezclas Industriales					
Mezclas tóxicas llevarán	Amarillo				
Mezclas inflamables llevarán	Rojo				
Mezclas Oxidantes llevarán	Azul claro				
Mezclas Inertes llevarán	Verde intenso				

Lo que no cambia			
Los gases habituales que no cambian son:			
Oxígeno	Blanco	Dióxido de carbono	Gris
Nitrógeno	Negro	Óxido nitroso	Azul
Hidrógeno	Rojo	Helio	Marrón

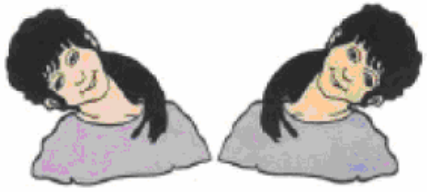
The risk color is collected in the upper part of the bottle (Ovija). The color of the lower part is freely applicable, which may be freely chosen by the manufacturer.

EXERCISES FOR MUSCLE RELAXATION

Inclinar lentamente la cabeza hacia atrás y bajar la barbilla hasta el pecho.

Girar lentamente la cabeza de derecha a izquierda.

Inclinar la cabeza lateralmente, de lado a lado.



Ponga sus manos en los hombros y flexione los brazos hasta que se junten los codos.

Siéntese en una silla, separe las piernas, cruce los brazos y flexione su cuerpo hacia abajo.

HEALTH SURVEILLANCE

Consult your Unit of Occupational Medicine in case you have symptoms or discomfort in the eyes or sight or if you have back pain..

In Madrid – CSIC Health Surveillance Unit:
915681931/32/33 v.salud@orgc.csic.es

In the rest of Spain - FREMAP: 902 16 61 61

FOR ADDITIONAL INFORMATION

- ✓ In the risk assessment of your job.
- ✓ In the different Prevention Services of the CSIC
- ✓ INSHT web page: www.insht.es
- ✓ RD 488/1997, Minimum safety and health provisions related to working with equipment that includes display screens.
- ✓ Technical guide of data visualization screens of the National Institute of Safety and Hygiene in the Workplace.
- ✓ RD 486/1997, Minimum health and safety provisions in workplaces.
- ✓ NTPs 232, 251, 252, 602, 678 y 694.

Fuente imágenes:

INSTITUTO NACIONAL DE SEGURIDAD E HIGIENE EN EL TRABAJO

Written by the Occupational Health and Safety Service of Madrid - spsl.madrid@csic.es

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GOOD PRACTICES IN WORK WITH DATA VISUALIZATION SCREENS

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RISKS FOR USERS OF DISPLAY SCREENS

- ✓ **Mental fatigue:** stress, work dissatisfaction, work overload, monotony,…
- ✓ **Visual fatigue:** ocular itching, flicker increase, tearing, heaviness in eyelids and eyes.

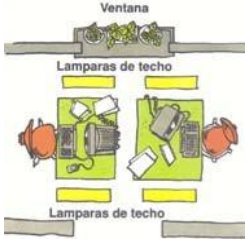
- ✓ **Musculoskeletal problems:** they are usually associated, among others things, to the maintenance of prolonged static postures together with the adoption of bad postures.

PREVENTION OF MENTAL FATIGUE

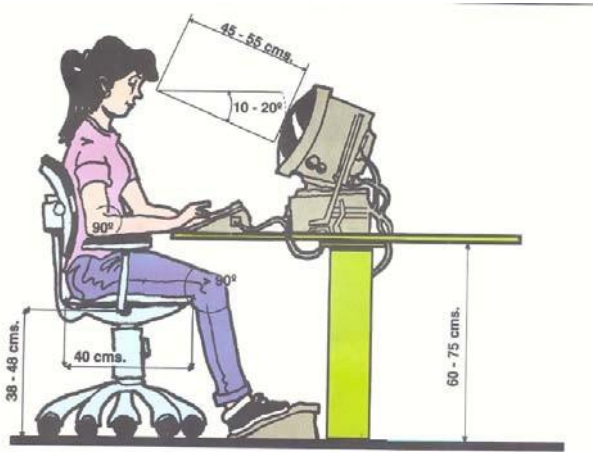
- ✓ Take advantage of the training activities to manage the programs or computer applications to be used in your work.
- ✓ Try to do varied work or alternate with other tasks that do not require the use of the display screen.
- ✓ Perform small periodic breaks to prevent fatigue (15 minutes every 2 hours).
- ✓ Contribute to the maintenance of a good working environment and take care of personal relationships with your co-workers.

PREVENTION OF VISUAL PROBLEMS

- ✓ Use a good quality screen and orient it so that it does not produce annoying reflections.
- √ Orient your position so that it is perpendicular to the windows.
- √ Use curtains or blinds correctly in order to obtain a comfortable light environment.



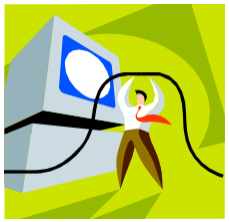
- ✓ Place the screen at the distance of your eyes that is more comfortable.
- √ Adjust the brightness and contrast controls.
- ✓ Adjust the size of the characters in the texts to get a comfortable reading.
- ✓ Keep the screen clean.
- ✓ Perform small periodic breaks to prevent visual fatigue.
- ✓ Perform eye relaxation exercises.



√

PREVENTION OF MUSCULOSKELETAL PROBLEMS

✓ Adjust the height of the seat, so that the elbows are at the height of the work plane. If you can not support the feet comfortably on the floor, adjust the height of the table or request a footrest



✓ Sit so that your back remains in contact with the back of the seat and adjust the height of the backrest adjusting it so that the prominence of the backrest is located at the level of the lower back.

- √ Place the keyboard so that there is a space in front of it on the table that serves as a palm rest.
- ✓ Enable enough space on the table to be able to operate the mouse with the forearm on the table.
- √ Bring the chair closer to the work table so that you do not have to tilt the trunk forward.
- √ Place the monitor in front of you or at an angle of 120° in the horizontal plane so that you do not need to repeatedly rotate the trunk or head to visualize it.
- √ Perform small periodic breaks to relax muscle tension and counteract postural stasis. During these pauses he performs movements that favor blood circulation: stretching, gentle neck movements, taking some steps…

CLASSIFICATION OF SUBSTANCES AND MIXTURES		SUMMARY
ASPIRATION DANGER		
Category 1 Danger H 304		
SEVERE EYE INJURIES (CATEGORY 1) OR EYE IRRITATION (CATEGORY 2)		
Category 1 Danger H 318	Category 2 Attention H 319	
MUTÁGENIC CANCERÍGENOS IN TOXIC GERM CELLS FOR THE REPRODUCTION		
Category 1A, 1B Danger Carcinogenic H 350 Mutagen H 340 Toxic reproduction H 360	Category 2 Attention Carcinogenic H 351 Mutagen H 341 Toxic reproduction H 361	
RESPIRATORY OR CUTANEOUS SENSITIZATION		
Respiratory sensitization Category 1 Danger H 334	Cutaneous sensitization Category 1 Attention	

Object

In order to homogenize different international criteria, the European Union elaborates the REGULATION CE / 1272 / 2008 CLP (Clasification, Lobeling and Packaging)

This regulation repeals the R.D. 363/95 and 255/2003 and modify the regulation CE/1907/2006.

The new Labeling and Packaging Classification criteria, known as CLP, are based on the Harmonized Global System (GHS) promoted by the United Nations to improve the protection of human health and the environment.

When does it take effect?

As of December 1, 2010, chemical substances must be labeled according to the criteria established in the CLP.

For the mixtures the new labeling system will come into force on June 1, 2015.

What happens with existing products?

For products that are already on the market on December 1, 2010, they can coexist with the old regulation, until December 1, 2012 for substances and until June 1, 2017 for mixtures

Additional information:

http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2008:353:0001:1355:ES:PDF
http://www.unece.org/trans/danger/publi/ghs/ghs_rev01/01files_s.html
http://www.unece.org/trans/danger/publi/ghs/ghs_rev01/01amend_e.html

Elaborado por Servicio de Prevención y Salud Laboral de Madrid - spsl.madrid@csic.es

CSIC
Consejo Superior de Investigaciones Científicas

NEW CLASIFICATION CRITERIA AND LABELING OF CHEMICALS

REGLAMENTO CE / 1272 / 2008 (CLP)

RD 363/95 RD 255/2003	REGLAMENTO CE 1272 / 2008 (CLP)
Warning letters *E- O- F - F⁺- T - T⁺-Xn - C - Xi*	**Warning letters** Peligro - Atención
PICTOGRAMS	**PICTOGRAMS**
"R" PHRASES (Danger indications) **FROM "R" 1 to "R" 68**	**"H" HRASES** **H EU 001** **Physical Hazards H200 a 299** **Health Hazards H300 a 399** **Environmental Hazards H400 a 499**
"S" PHRASES (Prudence Recommendations) **FROM "S" 1 to "S" 64**	**"P" PHRASES** **Prevention P200 a 299** **Response P300 a 399** **Storage P400 a 499** **Removal P500 a 599**

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CLASSIFICATION OF SUBSTANCES AND MIXTURES OF CHEMICALS Regulation CE 1272/2008 (CLP)

EXPLOSIVES

There is a Division 1.6 that does not have a pictogram, Attention or Hazard, or H phrases

Explosivo inestable	Div. 1.1	Div. 1.2	Div. 1.3	Div. 1.4	Div. 1.5
					—
Peligro	Peligro	Hazard	Hazard	Hazard	Hazard
H 200	H 201	H 202	H 203	H 204	H 205

LIQUID AND SOLID COMBINES

Categoría 1	Categoría 2	Categoría 3
		
Hazard	Hazard	Attention
H 271	H 272	H 272

SUBSTANCES WHICH, IN CONTACT WITH WATER, DISCHARGE FLAMMABLE GASES

Categoría 1	Categoría 2	Categoría 3
		
Hazard	Hazard	Attention
H 260	H 261	H 261

INFLAMABLES GASES

Category 1	Category 2
	—
Hazard	Attention
H 220	H 221

INFLAMABLES AEROSOLES

Category 1	Category 2
	
Hazard	Attention
H 220	H 221

COMBINES (Gases)

Category 1

Hazard
H 270

PYROPHORIC SUBSTANCES

Category 1

Hazard
H 250

CORROSION

For metals	Cutaneous	Skin irritation
Category 1	Category 1A, 1B, 1C	Category 2
		
Attention	Hazard	Attention
H 290	H 314	H 315

FLAMMABLE LIQUIDS

Category 1	Category 2	Category 3
		
Hazard	Hazard	Attention
H 224	H 225	H 226

ORGANIC PEROXIDES

Tipo A	Tipo B	Tipo C y D	Tipo E y F	Tipo G
				—
Hazard	Hazard	Hazard	Attention	—
H 240	H 241	H 242	H 242	—

ACUTE TOXICITY

Categoría 1	Categoría 2	Categoría 3	Categoría 4
			
Hazard Orally H 300 Transdermic H 310 Inhalation route H 330	Hazard Orally H 300 Transdermic H 310 Inhalation route H 330	Hazard Orally H 301 Transdermic H 311 Inhalation route H 331	Atención Vía oral H 302 Vía dérmica H 312 Vía inhalatoria H 332

SOLID FLAMMABLE

Category 1	Category 2
	
Peligro	Attention
H 228	H 228

SUBSTANCES THAT REACT SPONTANEOUSLY

Type A	Type B	Type C y D	Type E y F	Type G
				—
Hazard	Hazard	Hazard	Attention	—
H 240	H 241	H 242	H 242	—

SPECIFIC TOXICITY IN ORGANS, EXPOSURE

Unique			Repeated	
Category 1	Category 2	Category 3	Category 1	Category 2
				
Hazard	Hazard	Attention	Hazard	Hazard
H370	H 371	H 335 ó 336	H 372	H 373

PREVENTIVE MEASURES TO ADOPT

1. Replace them with less harmful ones or adopt the corresponding measures of prevention and reduction of exposure.
2. Work in completely closed and / or shielded systems.
3. Design work processes to avoid or minimize the training of agents.
4. The exposure level of workers will be as low as possible.
5. Limit agent quantities in the workplace.
6. Limit the number of exposed workers.
7. Evacuate agents, at source, by localized extraction, avoiding risks to public health and the environment.
8. Adopt collective protection measures or, measures of individual protection when exposure can not be avoided by other means.
9. Define risk areas, signal and restrict access only to authorized persons, in particular in radioactive facilities.
10. Properly and legibly label containers and containers containing this type of agents and place clearly visible danger signs in the affected areas.
11. Training and information for workers.
12. Health Surveillance.

HEALTH SURVEILLANCE

If you are pregnant or in a period of lactation, suffers some immunodeficiency, has been diagnosed with cancer or has some pathology / disease, go to your Unit of Occupational Medicine, appointment, for medical evaluation.

In Madrid – CSIC Health Surveillance Unit:
915681931/32/33 v.salud@orgc.csic.es
In the rest of Spain - FREMAP: 902 16 61 61

ADDITIONAL INFORMATION…

- RD 665/1997, on the protection of workers against the risks related to exposure to carcinogens at work, modified by the RD 1124/2000 and RD 349/2003.
- RD 783/2001, on sanitary protection against ionizing radiation.
- NTP 159, 245, 269, 303, 304, 353, 465 and 514 of INSHT.

Written by the Occupational Health and Safety Service of Madrid - spsl.madrid@csic.es

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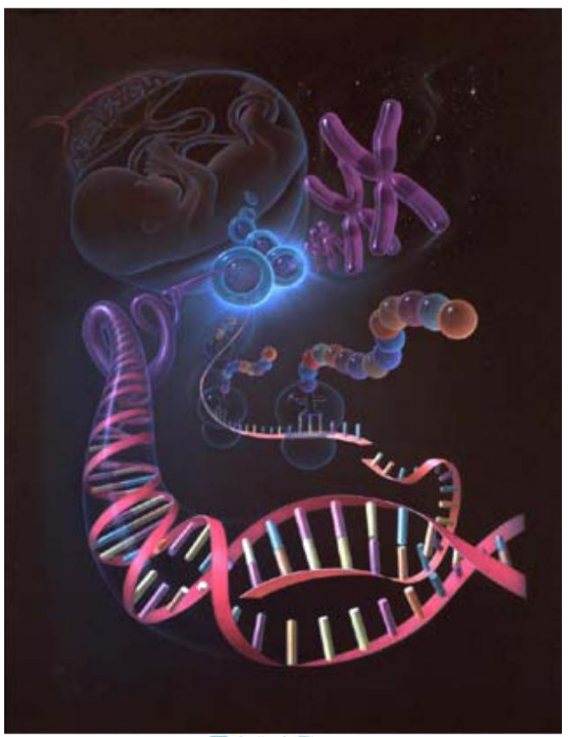
LABOR EXPOSURE TO CARCINOGENS



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Medicina y Humanidades

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CHEMICAL CARCINOGENIC AGENTS

Carcinogenic agent: any agent capable of giving rise to cancer in the body.

Categoría	Definición	Símbolo	Ejemplo	Frases R o H
1A	Substance that is known to be carcinogenic to humans		Benzene	H350
1B	Substance that is supposed to be carcinogenic to man		Acrylamide Chrome	
2	Substance that is suspected to be carcinogenic			

Mutagenic agent: substance or preparation that can produce alteration in the genetic material of the cells, which can be inherited genetic alterations, and also produce sterility.
Eg Acrylamide, potassium dichromate, ethylene oxide …

Toxic for reproduction: mutagenic agents capable of generating hereditary genetic alterations and producing an abortion or a malformation in the fetus. Teratogenic agents, capable of producing alterations in the fetus during intrauterine development.

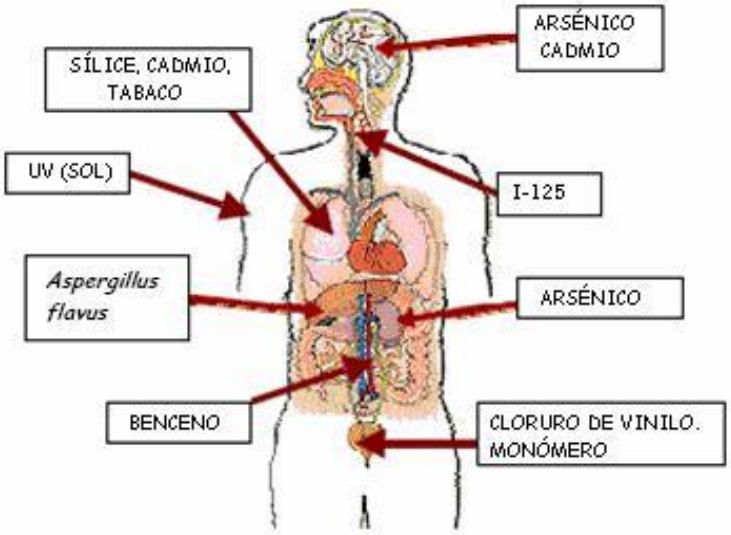
Cytostatic: are substances that due to their mechanism of action at the cellular level can cause mutagenic, carcinogenic or toxic effects for reproduction.

The classification into categories of mutagenic and toxic agents for reproduction follow the same criteria of evidence as for carcinogenic substances.

BIOLOGICAL AGENTS CANCERIGENOS

Tipo	Ejemplos
Virus	HIV (Human Immunodeficiency) HBV (Hepatitis B) HCV (Hepatitis C) EBV (Epstein-Barr)
Bacteria	Helicobacter pilory
Fungi	Aspergillus flavus (Aflatoxinas)

Non-exhaustive list



CARCINOGENIC PHYSICAL AGENTS

IONIZING RADIATION		
Type	Example	Target organ
α radiation	Uranyl Acetate	Whole body
β radiation	P-32 P-33	Bone Retina
	H-3	Whole body
	C-14	Whole body
	Ca-45	Bone Skin
	S-35	Testicles
γ radiation	I-125 I-131	Thyroid
	Cr-51	Whole body
	Rb-86	Pancreas Liver
	X-ray generating equipment (diffractometers, irradiators ...)	
neutron radiation	Nuclear reactors	Whole body
RADIACIÓN NO IONIZANTE		
Ultraviolet	Transilluminators Germicidal lamp Solar radiation	

Non-exhaustive list

PRECAUTIONARY MEASURES

- Use work equipment that generates low noise levels.
- Establish a periodical, preventive program for equipment maintenance.
- Mandatory use of Individual Protective Equipment, when necessary
- Limit exposure times.
- Limit the number of exposed workers.
- Design the work place properly.
- Locate noisy equipment in independent rooms.
- Maintain sources with higher noise levels away from work stations.
- Install shields and acoustic enclosures.
- Use personal protection equipment, earmuffs and plugs, that meet UNE EN 352-1 y 352-2 standards, respectively.

Hearing protectors protect the health of the pregnant worker but not the fetus

HEALTH SURVEILLANCE

If you suffer from any hearing disease (deafness or other ear pathologies), you are pregnant, suffer from some immunodeficiency, you are in medical treatment or have any pathology/ disease, go to your Unit of Occupational Medicine, appointment, for medical evaluation.

Exposure to noise during pregnancy can cause congenital deafness in the fetus .

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Rest of Spain – FREMAP 902 16 61 61

MORE INFORMACION…

- RD 486/1997 on minimum safety and health provisions in workplaces.
- RD 286/2006 on protecting the health and safety of workers against the risks associated with exposure to noise.
- NTP 252, 270, 287, 390, 503, 638 y 795.

Written by Prevention and Labor Health Service
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LABOR EXPOSURE TO NOISE

Area of Prevention of Occupational Risks (CSIC)
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EFFECTS ON HEALTH

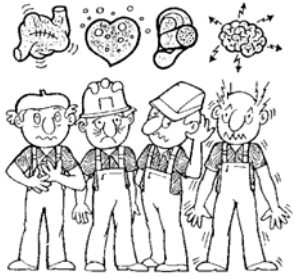
The effects on health can range from deafness or hearing loss due to prolonged exposure to high noise levels to psychological effects produced by moderate and constant noise levels.

Effects of noise on health:

- Hearing effects:
  - Professional deafness (Hipoacusia).
  - Nodules of the vocal cords cause of the sustained efforts of the voice by professional reasons.

Extraauditory effects:

- Physiological effects: affect the nervous system
  - Increase heart rate.
  - Vasoconstriction.
  - Acceleration breathing rhythm.
  - Decrease in the activity of digestive organs.
  - Reduction of brain activity.
  - Congenital deafness of the fetus
- Psychological effects:
  - Insomnia.
  - Behavior alteration.
  - Increased aggressiveness.
  - Increased irritability.
- Interferences with activity:
  - Difficulty in concentration.
  - Decreased attention.
  - Decreased performance.
  - Interference in communication.



SOUND INTENSITY

To limit occupational exposure to noise RD 286/2006 establishes reference values of sound intensity in workplaces.

Reference levels	Lower level of action	Higher level of action	Limit value
Average values (dBA)	80	85	87
Peak values (dBC)	135	137	140

The attenuation of hearing protectors should be considered for the application of the reference levels in the workplace.

It is recommended that in labs or workingplaces the level of sound intensity does not exceed 55 decibels (A), although there are other factors such as frequency or repetitiveness that can affect acoustic comfort.

Factors affecting the received sound intensity:

- Duration and frequency of the task.
- Characteristics of noise (frequency, repetitiveness ...).
- Conditions of the workplace (materials of the surfaces, furniture arrangement ...).

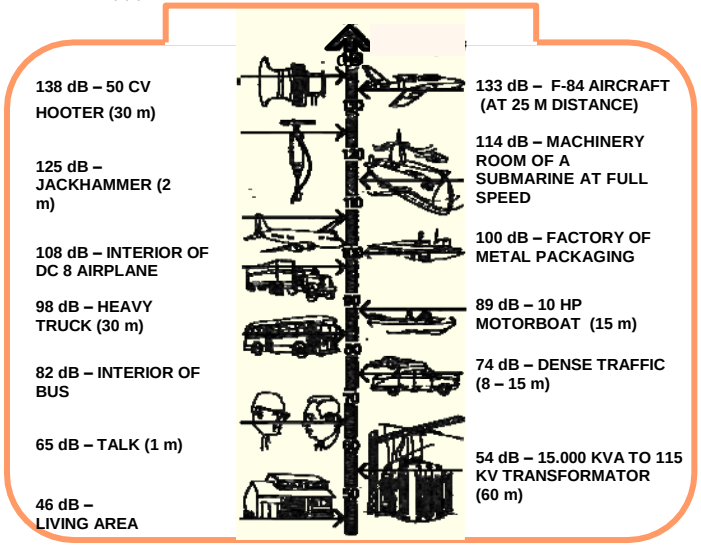
If the environment in your workplace is noisy, contact the Prevention Service for the evaluation of the job.

SOUND SOURCES

The presence of noise in the workplace is mainly due to equipment and facilities or the development of activities that generate it.

Example of noisy installations in the CSIC

How much noise does it generate ...?



GOOD WORK PRACTICES

Before working

- Perform a visual inspection to detect possible defects or anomalies.
- Check that the extraction system and flow indicator of the fume hood works correctly.
- Check that there are no doors or windows open in the environment that could distort the proper functioning.

During working

- Reduce the window opening to the minimum possible.

- Do not obstruct the passage of air to the fume hood by placing large appliances in front of the air deflectors.

- Do not use as a warehouse for chemical products.

- Locate the operations that generate pollutants at a distance not less than 15 cm from the opening plane of the fume hood.

- Limit the heat sources so that the temperature of 70° C inside the showcase is not exceeded, since these disturb the air currents.

- When a spill occurs, clean it as soon as possible.
- Keep the extractor in the hood running, at least for one minute after finishing the last test or activity.

If you detect any anomaly in the extraction or operation of the showcase, immediately inform your manager, and in case of incident, notify the Prevention Service.

FOR MORE INFORMATION…

- UNE-En 14175-2-3-4.
- NTP´s: 646, 672 y 677.

Written by Prevention and Labor Health Service from Madrid - spsl.madrid@csic.es

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OPERATION OF FUME HOODS

CSIC Occupational Risk Prevention Area
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DEFINITION

Protection device ventilated by an induced flow of air through an adjustable opening. It has an enclosure designed to limit the spread of contaminants present in the air to workers located outside. In addition, it provides mechanical protection against projections and / or splashes.

Types of fume hoods:

- Classic.
- Balanced or bypass system.
- Compensated or ADD AIR system.
- Variable air volume (VAV).

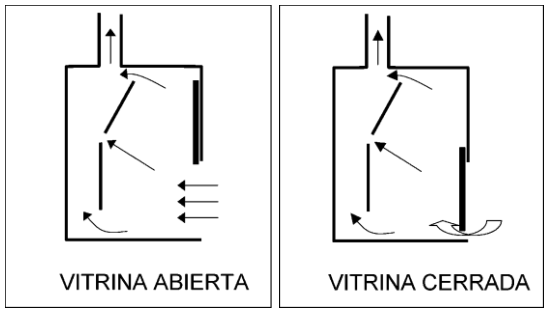
EFFECTIVENESS OF THE HOOD

The efficiency of the hood is defined as the ability to contain and extract the pollutants emitted in the work area of the showcases, as well as the ability to minimize the influence of possible disturbances.

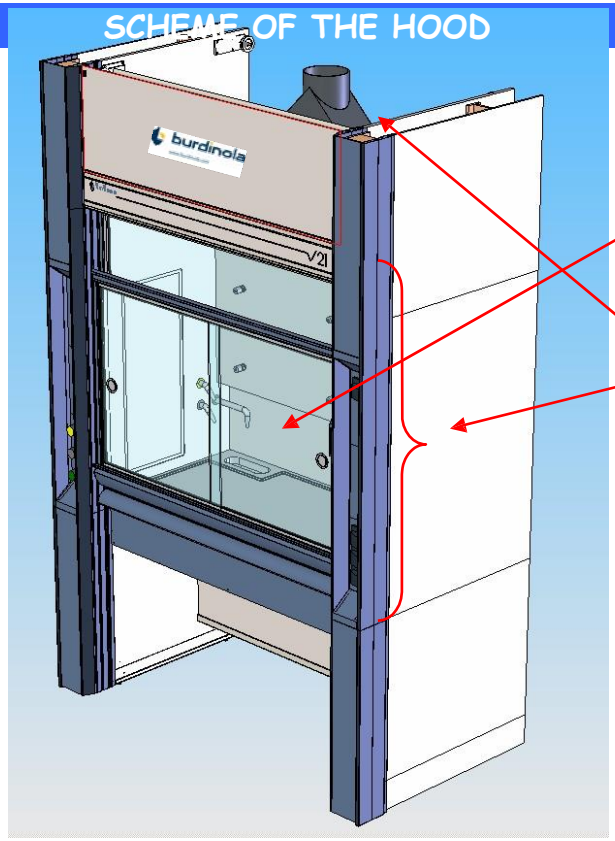
Effectiveness parameters:

- **Containment:** Pollutant retention capacity in the workspace.
- **Robustness (recapture):** Containment capacity of the fume hood for disturbances.
- **Efficiency:** ability to renovate the interior of the fume hood.

FUNCTIONING OF THE HOOD



SCHEME OF THE HOOD



To ensure the proper functioning of the showcase it is necessary to establish a preventive maintenance program

MAINTENANCE OF THE HOOD

- **Weekly:**
  - Control of flow rate and alarm indicator.
  - Cleaning inspection inside the showcase, usually with a damp cloth and neutral soap.

- **Semiannually:**
  - Cleaning the rear deflector.
  - General cleaning of the inside of the baffle chamber with a solution of diluted detergent.
- **Annually:**
  - General cleaning of the inside of the baffle chamber with a solution of diluted detergent.
  - Control of noise and lighting level.
  - Inspection of sedimentation in ducts.
  - Checking the saturation status of filters.
- **Every two or three years:**
  - Check the guillotine cable and counterweights.
  - Purge the extractor through the purge plug located on the lower part of the housing.

IF YOU ARE TRAPPED BECAUSE OF THE GREAT AMOUNT OF FIRE OR SMOKE

- Close doors and windows.
- Place wet towels or rags on the joints and bottom of the door, to prevent the entry of smoke.
- Let you know that you are trapped.

FIRE PREVENTION: GENERAL RULES TO AVOID FIRE

- Keep the place clean and tidy
- Properly signaling storages and containers with flammable materials.
- Avoid accumulations of potentially flammable material (eg paper, furniture, packaging)
- Check and maintain the electrical installation in good condition and prevent it from being a fire source.
- Restrict the use of extension cords.
- Control the welding work carried out in the Center.
- Caution in the use of chemical products that can generate exothermic reactions.
- Work with flammable products in ventilated areas.
- Store flammable products in safety cabinets, ventilated and away from work areas and heat sources.
- Use sealed containers, for storage of flammable substances.
- Read the fire precautions listed in the Chemical Product Safety Sheets.

ACTION IN CASE OF ACCIDENT

While the foreign aid arrives, the P.N.H. action will be applied.:

- **P** Protect the area of the accident and the injured.
- **N** Notify to the 112
- **H** Help the injured people

Anyone who has inhaled smoke or suspected inhalation should go immediately to study and medical assessment.

EMERGENCY NUMBER

112

Written by Prevention and Labor Health Service from Madrid - spsl.madrid@csic.es

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Consejo Superior de Investigaciones Científicas

OPERATION GUIDE

IN CASE OF FIRE

CSIC Occupational Risk Prevention Area
C/ Serrano 113 posterior, 28006 Madrid - Area.prl@csic.es

FIRE CLASSES

The fires can be of the following classes:

- **Class A:** Fire of ISOLD materials (Ej. Wood, paper, furniture)
- **Clase B:** Fire of **LIQUID** materials (Ej. Gasoline, kerosene, acetone.)
- **Clase C:** Fire of **GAS** materials (Ej. Butane gas, propane, hydrogen)

EXTINGUISHING MEDIA

The means of extinction for the use of the personnel of the center or institute are:

- **Fire extinguishers:** contains a pressurized extinguishing agent.
- **Bies:** Equipped fire hydrants or hoses.

TYPES OF EXTINGUISHERS

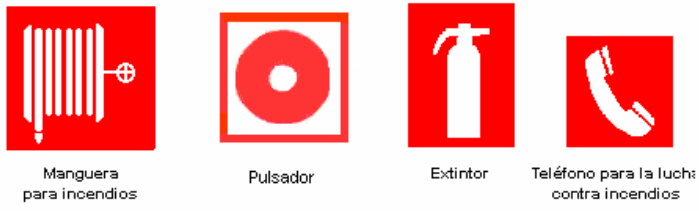
- **Water Extinguisher:** For class A fires
- **ABC Multi-purpose Powder Fire Extinguisher:** For the three types of fire A, B, C
- **CO_2 Extinguisher:** Class B and electric fires

EVACUATION PLAN

The SELF-PROTECTION PLAN organizes the actions of the personnel in case of fire

In the Self-Protection Plan, the people who make up the **intervention teams** (IT) and the **alert and evacuation teams** (AET) are appointed, led by the **chief of emergency** (CE) and **intervention** (CI). In case of evacuation, follow the instructions of the AET and, failing that, the emergency signage.

SIGNALING EXTINGUISHING MEDIA



VERY IMPORTANT

DO NOT EXPOSE HIMSELF USELESSLY

- Keep calm.
- Activate the alarm button and notify the control station.
- Follow the instructions of the AET staff.

HOW TO ACT IN CASE OF FIRE

- **If you discover a fire,** report the characteristics of the fire to the Control Center / Institute via telephone, alarm button or in person.
- **Confine the fire** by closing the existing doors to prevent their spread.
- **Return your position, stay in it** until you receive instructions by the system established in your center, siren, public address or verbal indications of your AET.
- In case of ordering the evacuation of the Center, you must leave **following the instructions** of the Alert and Evacuation Team.
- If you are accompanied by people from outside the Center, have them evacuate with you.
- **Keep calm,** do not run or shout and leave diligently, without going back to pick up something forgotten, moving on the right side of the road or staircase, not occupying the entirety of it to allow access by intervention teams.
- **Move to the Meeting Point** that corresponds to you and wait for instructions until the return to the job is authorized.
- **In case of smoke**, put on a wet handkerchief covering the entrance of the respiratory tract, trying to go crouched.
- **If the clothes are inflamed, do not run,** throw yourself to the floor, roll and ask for help.

LIGHTEN THE LOAD

Musculoskeletal disorders (MSDs) are the most common work-related health problem in the EU, affecting 53% of workers. In Spain, this percentage is even higher: 73.9% of workers complain of musculoskeletal pain or discomfort caused by the work they do..

Although musculoskeletal disorders mainly affect the back, neck, shoulders and upper extremities, they can also occur in the lower.

Usually, TMEs are not the result of a single risk factor. For example: disorders of the upper extremities are due to the combination of limb posture, strength performed, repetition and lack of adequate breaks. Many other factors can increase the risk of TME, such as heat or cold, and organizational or psychosocial factors, such as time pressure, command style or stress. Therefore, it is necessary to address the assessment of TME risks with a comprehensive model.

GENERAL IDEAS

Manual handling of loads shall be understood as any operation of transporting or securing a load by one or more workers, such as lifting, placing, pushing, pulling or moving, which due to its characteristics or inadequate ergonomic conditions entail risks , in particular dorsolumbar, for workers.

For practical purposes, objects weighing more than 3 Kg will be considered as loads. In general, the maximum weight recommended not exceeding is 25 Kg. In women, young or older: 15 Kg. In special circumstances, healthy and physically trained workers could handle loads up to 40 Kg., provided that the task is carried out sporadically and in safe conditions.

FOR MORE INFORMATION ….

- RD 487/97, of april 14, on minimum safety and health provisions relating to the manual handling of burdens entailing risks, in particular dorsolumbar, for workers.

Source of images: INSTITUTO NACIONAL DE SEGURIDAD E HIGIENE EN EL TRABAJO

Written by Prevention and Labor Health Service from Madrid - spsl.madrid@csic.es

CSIC
CONSEJO SUPERIOR DE INVESTIGACIONES CIENTÍFICAS

HANDLING OF LOADS

CSIC Occupational Risk Prevention Area
C/ Serrano 113 posterior, 28006 Madrid - Area.prl@csic.es

BASIC PREVENTIVE STANDARDS

Poor posture can cause spinal injuries. Only with a correct position of your column can you properly lift a load.

2

3

Keep your back straight

The handling and transport of loads are a specific problem that can cause discomfort or injury, especially in the back, being an important factor of muscle overload. Therefore, in manual handling operations, workers must use a lifting technique appropriate to this type of effort. The lifting techniques, have as a basic principle to keep the back straight and make the effort with the legs.

Keep your legs slightly apart to balance the body

Flexes the knees to facilitate the lifting of loads

HELPFUL TIPS

Do not turn the body if you hold a heavy load

Do not overload

Keep the load as close to the body as possible

Take advantage of the weight of the body effectively to push objects and pull them to lie

Do not lift a heavy load above the waist in a single movement

Keep arms as close to the body as possible

Do not hesitate to ask for help from a partner if the dimensions of the load make it advisable

HOW TO PRESERVE YOUR BACK

- Avoid going stooped.
- Do not bend down without bending your knees to lift an object, even if it is lightweight. Hold objects as close to the body as possible. Do not twist.
- Do not adopt a lax position when sitting or driving.
- Stay physically fit Exercise regularly Walking and swimming are good exercises.

POSITIONS AND HAZARDOUS MOVEMENTS FOR THE BACK

- Never turn your waist when you have a load in your hands.
- The lifting and transport of loads, push carts or containers, etc ..., should be done without bluntness and always avoiding the back bending of the back.
- Control the lifting of heavy loads, especially when it is done above the shoulders. Use mechanical means or do it between several people.
- Pre-check the route through which the cargo has to be transported; so there are no obstacles, unevenness, slippery areas, etc., that can unbalance us when we are loaded.

... And if you have symptoms of back problems consult the Health Surveillance Unit / Occupational Medicine.

PREVENTION MEASURES

General techniques to prevent external irradiation:

- Time: the longer the higher dose.
- Distance: the dose decreases with the square of the distance.
- Shielding: depending on the type of radiation.

General techniques to prevent pollution:

Surface contamination:

- Confinement of the source to avoid dispersion.
- Signaling the work areas properly.
- Avoid direct contact with the source, objects or contaminated surfaces.
- Handling products in trays on absorbent materials.
- Periodic cleaning of areas and equipment job.
- Individual protection equipment (gown, eye protection ...)
- Pollution control through monitors.

Personal contamination:

- In addition to all the previous measures to reduce the risk of internal contamination via dermal or by ingestion.
- Do not eat, drink or smoke (if swallowed)
- Have an appropriate ventilation system (via inhalation)
- Individual inhalation protection (masks, respiration equipment ...)

VIGILANCIA DE LA SALUD

If you are pregnant, breast-feeding or have any immunodeficiency, inform your supervisor and the Health Surveillance Unit of the CSIC and / or the Society of Prevention FREMAP, by appointment, for medical evaluation.

In Madrid - Health Surveillance Unit of the CSIC: 915681931/32/33 v.salud@orgc.csic.es
In the rest of Spain - FREMAP: 902 16 61 61

Workers exposed to ionizing radiation will be subject in addition to specific medical examinations depending on the dose received:

- **Category A:** Specific mandatory medical examination with minimum annual character.
- **Category B:** medical examination at the discretion of the doctor.

FOR MORE INFORMATION...

- Law 25/1964 of April 29, on Nuclear Energy and transpose the Directive 96/29 EURATOM of 13.5.96.
- Regulation on health protection against ionizing radiation (R.D. 783/2001) and last update of RD 1439/2010.
- Regulation on Nuclear Installations and Radioactive (R.D. 1836/1999)

Elaborado por Servicio de Prevención y Salud Laboral de Madrid spsl.madrid@csic.es

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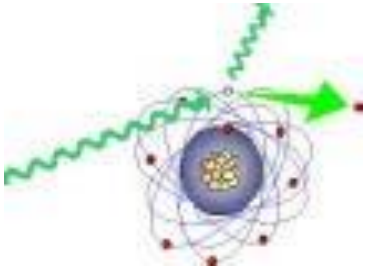
IONIZING RADIATION



Occupational Risk Prevention Area of the CSIC
C/ Serrano 113 posterior, 28006 Madrid - Area.prl@csic.es

DEFINITION AND CLASSIFICATION

Ionizing radiations are those that, when interacting with matter, produce ions.

Classification of ionizing radiation according to its nature:

- Corpuscular radiation. (α, β…)
- Electromagnetic radiation. (x y α Ray)

Corpuscular radiation:

TYPES OF RADIATIONS	NATURE
Alfa (α)	Núcleos de átomos de He (2 protones + 2 neutrones)
Beta (β)	electrons
Protons	Protons
neutrons	Neutrons

Other factors that determine the degree of danger are:

- Energy (the greater the energy, the greater the danger)
- Activity (the greater the ….)

Characteristics of radiation:

- Its ionization capacity is proportional to the energy level of the radiation. "The greater the energy, the greater the degree of ionization"
- The penetration capacity is inversely proportional to the size of the particles. "The greater the particle size, the lower the degree of penetration".

Examples of sources of ionizing radiation:

- Radioisotopes, can be encapsulated.
- X-ray equipment.
- Sincrotons

RISKS AND EFFECTS ON HEALTH

HEALTH RISKS

Irradiation: the body receives the radiation from a radiant source without there being any contact between them. External irradiation occurs when the source is outside the organism (Ionizing Radiation generating equipment and source encapsulated) …, while internal irradiation occurs when the source is inside the organism.

Contamination: Exposure to radiation occurs when the body is in contact with radioactive material (non-encapsulated sources):

- External contamination: when the radioactive material is deposited on the skin, hair, clothing…
- Internal contamination: when the material enters the body through the following routes: ingestion, inhalation, epidermis.

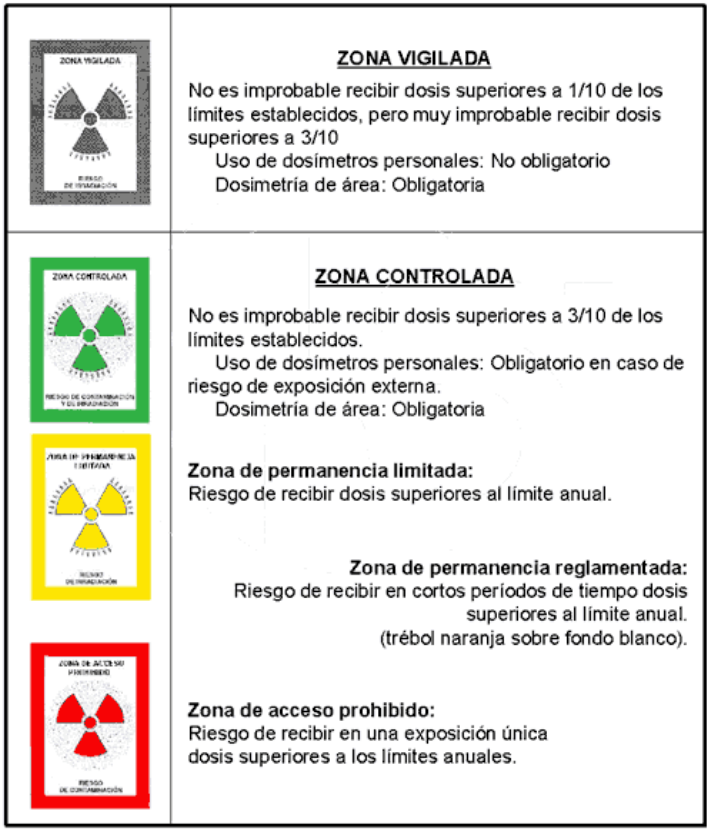
Fundamentals of damage and repair

- The nucleus is the cellular structure most sensitive to radiations. It stores the genetic information of living beings.
- When a biological system is irradiated, two types of effects are produced:
  - Direct effects: Excitation or ionization occurs at the molecular level.
  - Indirect effects: intermediary molecules are produced in aqueous media Great chemical reactivity (free radicals).
- The lesions on the hereditary material are diverse: breaks of single or double chains, alteration of nitrogenous bases, etc.
- There are mechanisms of natural repair of protection against radiation.

CLASSIFICATION OF EFFECTS

- **Non-stochastic** (Deterministic): Mortality of a large number of irradiated cells with loss of tissue functionality. The severity of the effect depends on the dose.
- **Stochastic** (Probabilistic): The irradiated cells survive with alteration of the genome. The probability of occurrence increases with the dose. They also show:
  - Genetic effects. If it affects hereditary transmission
  - Somatic effects. It ifdoes not affect hereditary transmission (induced carcinogenesis).

CLASSIFICATION OF WORK AREAS



PREVENTIVE MEASURES DURING TRANSPORTATION AND HANDLING OF WASTE

- When handling waste containers, the highest level of protection will be applied in case of not knowing exactly the properties and characteristics of the product to be moved.
- The transport of waste containers will be carried out whenever possible by mechanical means of loading, the area arranged for the transport of the containers will be completely ventilated and isolated from any source of ignition.
- Prohibited smoking and/or eating during the handling and transport of waste.
- For liquid waste, care should be taken not to use containers larger than 30 liters, to facilitate handling and avoid unnecessary risks.

- The dumping of waste to the corresponding containers has to be carried out in a slow and controlled way.

- The containers must not be filled more than 90% of their capacity in order to avoid splashes, spills and overpressures.
- Whenever possible, the containers will be deposited on the ground to prevent possible falls. In any case, they will not be stored more than 170 cm tall.

INDIVIDUAL PROTECTION EQUIPMENT

Direct contact with chemical products or waste will be avoided. During transportation and handling, the following IPEs must be used:

- Under normal conditions: gloves against mechanical, chemical and biological risks, eye protectors with integral mount, against splash projection and safety footwear.

- In case of accidental spillage: previous equipment plus respiratory protection equipment with mixed filter against organic and inorganic gases and vapors, SO2, NH3 and particles.

MORE INFORMATION

- Law 10/1998 of Waste.
- RD 952/97 and RD 833/98 of danger and toxic waste
- Regional legislation.

- NTP: 276, 359, 372, 480, 793, 805, 806, 838, 853.

Elaborado por Servicio de Prevención y Salud Laboral de Madrid - spsl.madrid@csic.es

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LABORATORY WASTE

Área de Prevención de Riesgos Laborales del CSIC
C/ Serrano 113 posterior, 28006 Madrid - Area.prl@csic.es

DEFINITION AND CLASSIFICATION

All the centers that generate hazardous waste will be located in the register of small producers and waste management will be carried out through a management company authorized by the corresponding Regional Government. Hazardous waste is defined as those listed as such in the list of Annex II of RD 952/97, as well as the containers and containers that have contained them. They are classified in:

1. **Halogenated solvents:** organic liquids, very toxic, irritant and, in some cases, carcinogenic, with contents higher than 2% of some halogen.
2. **Non-halogenated solvents:** flammable and toxic organic liquids containing less than 2% halogen.
3. **Aqueous solutions:** aqueous solutions of organic and inorganic products.
    a. Inorganic aqueous solutions.
        i. Basic aqueous solutions.
        ii. Aqueous solutions of heavy metals
        iii. Aqueous solutions of hexavalent chromium
    b. Inorganic aqueous solutions or high chemical oxygen demand.
        i. Aqueous dye solutions.
        ii. Organic fixatives solutions.
        iii. Water / solvent mixtures.
4. **Acids:** inorganic acids and their concentrated aqueous solutions with more than 10% by volume.
5. **Oils:** mineral oils derived from maintenance operations, heating baths ...
6. **Solids:** Chemical products in solid state, organic and inorganic in nature.
    a. Organic solids.
    b. Inorganic solids.
    c. Contaminated disposable material.
7. **Special products:** solid or liquid chemical products that due to their high toxicity or dangerousness cannot be included in any of the other groups, as well as obsolete or expired pure reagents.
8. **Contaminated glass:** with remains of chemical products in which you have to include the bottles of empty glass closed and with remains of chemical products.
9. **Biohazards:** products similar to waste of sanitary origin and includes:
    a. Microbiological cultures.
    b. Residues of infectious animals, anatomical waste, blood and blood products in liquid form.
    c. Needles, scalpel blades and sharp and / or cutting material.
    d. Contaminated or broken glassware.
10. **Cytostatics** liquid and solid products, carcinogenic, mutagenic or teratogenic, as well as single-use material contaminated with these or other very toxic products.

DO NOT PULL TO THE DRAIN LABORATORY WASTE

LABELLING

Any container of hazardous waste must be properly labeled with:

- Indication of content.
- Name of the waste that contains "indicating composition in case of mixture of components, whenever possible".
- Department, laboratory or building.
- Volume of the container.
- Date (Start and End).

PACKING

For group 1 to 7 wastes approved packaging for the transport of dangerous goods will be used:

- **High density polyethylene carafes:** resistant to most chemical products, from 5 to 30 liters capacity. The original containers from chemical products can also be used provided they are properly labeled and marked.
- **Polyethylene drums of 60 or 90 liters of wide-mouth capacity**, intended for contaminated disposable material.
- **Polyethylene sealed boxes with a bottom of absorbent product,** prepared for the storage and transport of obsolete reagents and other special.
- **Polyethylene containers of 30 to 60 liters capacity approved for cytostatic products**. The liquid cytostatic waste is deposited in a container that closes perfectly and is placed inside the cytostatic container.
- **Rigid cardboard boxes of single use of 30 or 60 liters,** with polyethylene inner bag and double closing system, approved and labeled for biohazardous waste.
- **Packages of 1 or 2 liters**, for needles, sharp or cutting objects, pipette tips, etc., which, once filled, are placed in the containers for cytostatic or biohazardous.

Bidones para líquidos

Contenedores para sólidos

Contenedores para agujas / punta

SECURITY IN WORK WITH MICROORGANISMS

- Restrict access for personnel working with biological agents.
- All laboratory equipment must be in perfect order and cleanliness.
- Prohibited to eat, drink and or smoke in the laboratory.
- Use appropriate clothing. Do not mix work and street clothes.
- Each individual will be responsible for their personal hygiene, washing before and after their stay in the laboratory.
- Protect open wounds in jobs with exposure to biological agents.
- Use the relevant biological safety cabinets, class I, II or III.
- Disinfect or sterilize correctly all the material used.
- Do not re-encapsulate used needles.
- Have a security warehouse for biological agents.
- All products will be labeled and stored in a safe place once laboratory work is finished.
- Signaling areas at risk of exposure to biological agents.
- Develop safe work procedures for each task that involves exposure to biological agents.

- Develop guidelines for action in case of emergency and first aid.
- Manage biowaste waste through an authorized waste manager.
- Health Surveillance of exposed workers.

EFFECTS ON HEALTH

The possible effects on health derived from work with exposure to biological agents are:

- Inflammation.
- Infection.
- Sensitization and subsequent development of allergies.
- Possible carcinogenic effects.
- Poisoning.
- Effects on reproduction.

HEALTH SURVEILLANCE

If you are pregnant or breast-feeding or suffer from any immunodeficiency, go to your Occupational Medicine Unit, by appointment, for medical evaluation.

In Madrid - Health Surveillance Unit of the CSIC: 915681931/32/33 v.salud@orgc.csic.es

In the rest of Spain - FREMAP: 902 16 61 61

FOR MORE INFORMATION…

- RD 664/1997, on occupational exposure to biological agents.
- INSHT Biological Agents Technical Guide.
- NPTs: 233, 376,447, 520, 539, 545, 571, 585, 616, 628, 771, 772, 807, 812 y 822

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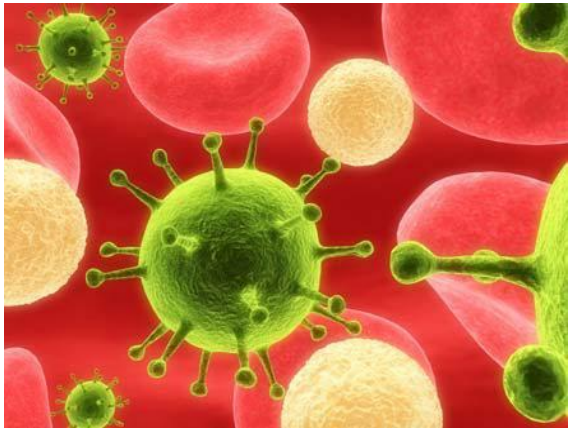
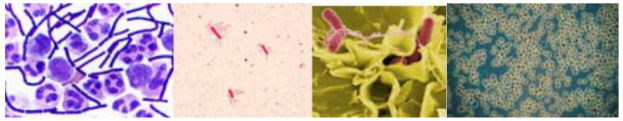
BIOLOGICAL SECURITY



Occupational Risk Prevention Area of the CSIC
C/ Serrano 113 posterior, 28006 Madrid - Area.prl@csic.es

INTRODUCTION

Definition: Microorganisms are understood as biological agents, including genetically modified organisms (GMOs), cell cultures and human endoparasites, which can cause any type of infection, allergy or toxicity. The products and byproducts derived from these organisms (spores, toxins, ...) will be considered as biological contaminants..



Pollution sources:

- People or infected animals.
- Fluids and contaminated biological samples.
- Vegetables, organic powder, soil, water…
- Contaminants of food and derivatives.
- Waste and waste contamination.
- Pollution of air conditioners…

Entry way:

- Inhalation of aerosols.
- Absorption through the skin or mucous membranes:
  - Splashes or production of aerosols. o Contact with contaminated material.
- Absorption through wounds caused by:
  - Abrasion.
  - Cuts.
  - Scratches.
  - Animal bites.
- Insect bites.
- Autoinoculation or punctures.

CLASIFICATION

Biological agents are classified according to their danger in 4 risk groups:

Biological agent	Infectious risk	Risk of propagation	Prophylaxis
1	Unlikely	No	Unnecesary
2	It can cause diseases and constitute a danger for workers	Unlikely	Usually possible
3	It can cause serious illnesses and constitute a serious problema for workers	Probable	Usually possible
4	They cause serious illness and constitute a serious danger for workers	High	Unknown at present

Example 1: Saccharomyces cerevisiae & Saccharomyces pombe.
Example 2: Legionella, Salmonella, Herpes and influenza virus,
Example 3: Trypanosoma brucei rhodesiense, Bovine Espogiform Encephalopathy and HIV.
Example 4: Ebola and Marburg viruses

Each biological agent will require certain structural / organizational safety conditions defined in containment levels of laboratories according to their risk group (P2, P3, P4 laboratories)

PROTECTION MEASURES

Primary Protection Barriers:
It has the purpose of the confinement of the biological agent. Collective protection equipment as biological safety cabinets (NTP 233). They will be used in those operations that:

- They can produce aerosol sprays.
- Crushing.
- Handling of material susceptible to being contaminated.

Secondary Protection Barriers:
They have the objective of preventing failures in primary barriers, some examples:

- The walls, floors, ceilings and surfaces should be:
  - Smooth.
  - Easy to clean.
  - Waterproof.
  - Resistant to acids, alkalis, solvents and disinfectants.
- Automatic closing doors and locks.
- Negative pressure.
- Purification of expelled air.

Tertiary Protection Barriers:
They aim to act directly on the worker, some examples are:

- IPE´s.
- Medical surveillance.
- Vacunation.
- Personal hygiene.
- Good laboratory practices (BPL – NTP 376).

MEANS OF PROTECTION

At least the following guidelines should be followed:

- Always have safety glasses available. It is advisable to use them permanently.
- Use the right gloves for every task that requires the use of such garments.
- Use specific masks for the chemical agent used.
- Keep the emergency showers and eyewash in good condition.
- Know the application of the first aid products of the first-aid kit and the procedures of action in case of accidents.
- Have a spill collection kit to act in case of accidental spillage.
  Basic equipment: acids, bases, organic solvents and mercury.

In case of splash and/or burn immediately wash with plenty of water for at least 20 minutes and go immediately to receive health care

CONTROL OF CHEMICAL AGENTS

There are collective protection equipment (gas cabinets, security cabinets ...) and personal protective equipment (PPE's), which is a complementary technique and not a substitute for collective protection.

Election Criteria of IPEs

They must have CE Marking and follow the selection criteria in accordance with Appendix 8 of the Technical Guide RD 374/2001.

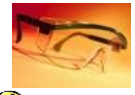
Always supply a brochure to the supplying company.

- **Gloves:** Choose that they are class II according to the standard EN 374.3. They must contain the signage shown on the right, compatible with the chemical agents used.

- **Respiratory protection:** Choose that they are class III according to the norm:

	Mask	Filter
Particles	EN149	EN143
Gases	EN405	EN141

- **Glasses or protective screens:** According to the norm EN 166.



- **Appropriate clothing:**

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SECURITY IN CHEMICAL LABORATORIES

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ORGANIZATION OF THE WORK

- The laboratory must be in perfect order and cleanliness.
- Replace the most dangerous chemicals by others of lesser danger.
- Develop and implement safe work procedures.

- You must work in showcases whenever chemical products are handled and periodically check their correct operation.
- Chemical products must be properly labeled.

- Laboratories where chemicals are handled will have specific cabinets for storage.

- Chemicals will be grouped taking into account compatibility characteristics.
- Do not use conventional refrigerators for flammable products, use specific refrigerators.

- The elimination of waste must be adequately regulated. Do not dispose through the drain.
- In operations with risk, people who may be affected must be informed.
- A person should never work alone in the laboratory and especially outside normal hours or in risky operations.

PERSONAL HABITS

- Wash hands after using chemical products and always when leaving the laboratory.
- Always keep lab coat fastened and snug at the cuffs.
- Wear safety glasses when handling chemicals or in situations with the risk of splashing.

- Wear closed shoes and the collected hair.

- Do not eat or drink in laboratories.
- Do not apply cosmetic products in the laboratory
- Do not store food or drinks in the laboratory fridges.
- Do not wear robes to places of common use such as libraries or cafeterias.
- Do not touch chemicals with your hands.
- Do not pipette with your mouth.
- Do not use contact lenses in the laboratory.
- Do not wear rings, chains or bracelets.

WORK HABITS

- Do not handle a chemical product without following the measures established in the safety data sheet and labels.
- The H and P phrases of the products must be known.

- Use and store chemical products in the essential amount.

- During work with fume hoods keep guillotines at the lowest posible position. Keep the interior as empty as possible and not use it as a warehouse for chemical products.

- The preparations and mixtures will be properly Packaged and labeled, indicating corresponding hazards.
- Transport the products in trays or containers to avoid spills.
- At the end of a task or operation, collect materials, reagents, equipment, etc., avoiding unnecessary accumulations.
- When finished, disconnect devices, gases…
- Lighters should not be left on unnecessarily.

PRECAUTIONARY MEASURES

Collective protection measures

- Areas with laser devices will be signaled, as well as the laser equipment itself.
- Install a flashing light in the area of access to the premises where the 3B or 4 laser device is located, which is activated when the equipment is in operation.
- Place specific screens or independent rooms for cutting, welding or drilling operations with laser devices.
- Remove all explosive, flammable or solvent products from the work area with laser equipment.
- The trajectory of the beam must end at the end of its path on a material with diffuse reflection and adequate technical properties.
- Class 3B and 4 lasers must have a protective housing, confinement and interlocking system.
- Do not allow the presence of beams in passage areas.
- Do not leave the laser unattended.
- Limit the duration and level of exposure.
- Adequate preventive maintenance programs for laser equipment.
- Use suitable personal protective equipment:
  - Rule EN 207: Individual eye protection.
  - Rule EN 208: for protective glasses for laser adjustment.

HEALTH SURVEILLANCE

If you suffer from any illness or eye problem, you are in treatment, you have some disease / illness or you are pregnant, go to your Occupational Medicine Unit, by appointment, for medical evaluation.

In Madrid - Health Surveillance Unit of CSIC: 915681931/32/33 v.salud@orgc.csic.es

In the rest of Spain - FREMAP: 902 16 61 61

FOR MORE INFORMATION…

- RD 486/2010 of April 23, on protecting the health and safety of workers against the risks related to the exposure to artificial optical radiation.
- NTP 654.

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SAFETY WHEN WORKING WITH LASERS

Occupational Risk Prevention Area of CSIC
C/ Serrano 113 posterior, 28006 Madrid - Area.prl@csic.es

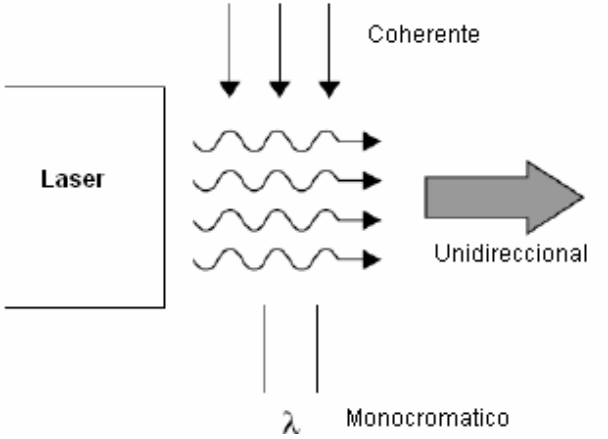
LASER CHARACTERISTICS

Definition

LASER: Light Amplification by Simulated Emission of Radiation . It is a device capable of producing or amplifying electromagnetic radiation in the wavelength range of optical radiation, mainly through the controlled stimulated emission process.

Laser properties

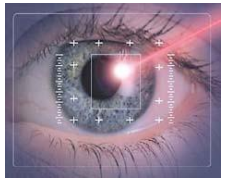
- **Coherent:** waves oscillate in phase.
- **Monochromatic:** single wavelength.
- **Unidirectional:** very small angular divergence.



Aplications

You can find many applications in any sector of today's society. These include fields as diverse as consumer electronics, computer science, research, diagnosis and medical treatment, as well as machining, welding or cutting systems in industrial and military sectors....

EFFECTS ON HEALTH



Health risks

Eyes

- Most sensitive organ.. Especially the visible and near infrared region (400-1400 nm).
- Exposure to direct or indirect radiation can cause burns to the cornea or retina.
- In conditions of lack or absence of light, the possible penetration of the beam in the eye will be elevated due to the dilatation of the pupil in the dark.

Skin: burns from exposure of the skin to direct laser radiation. Carcinogenesis can occur at certain wavelengths.

Other risks

Explosion risk: by ignition of an explosive substance.

Fire risk, by ignition of a flammable substance.

Electrical risk, by the presence of high potential differences in some laser devices.

Mechanical risk: as a consequence of the accessible mobile elements, transmission mechanisms, etc.

Chemical risks, by the use of substances such as process, operating and material processing gases, due to the emission of toxic pollutants (including nanoparticle emission).

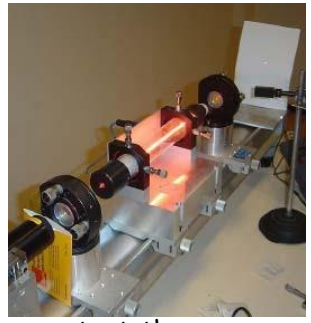
Particle projection, during cutting, drilling or welding of materials.

Environmental pollution, produced by:

- Vaporized material from the incidence of the laser.
- Gases from laser systems with gas circulation.
- Vapors from the evaporation of cryogenic fluid.

LASER CLASSIFICATION

The classification of a laser in categories of risk, allows to identify the danger of it and is based on the Accessible Emission Limit (LEA) for the user:



- **Class 1:** Safe under reasonable conditions of use.
- **Class 1M:** Like Class 1, but not safe when viewed through optical instruments such as magnifiers or binoculars.
- **Class 2:** Aversive reflexes protect the eye even when used with optical instruments.
- **Class 2M:** Like class 2, but not safe when using optical instruments.
- **Class 3R:** Lasers whose direct vision is potentially dangerous but the risk is lower and need less manufacturing requirements and control measures than Class 3B.
- **Class 3B:** Direct vision of the beam is always dangerous, while the diffuse reflection is normally safe.
- **Class 4:** The direct exposure of eyes and skin is always dangerous and diffuse reflection usually also. They can cause fires.

GENERAL SECURITY MEASURES

1. Acquisition of safe machines (with CE labeling) and the corresponding certificate of conformity.
2. Follow the instructions set out in the manual of the manufacturer of the work equipment.
3. Periodically check the proper functioning of the equipment.
4. Establish a program of preventive maintenance of work equipment to ensure proper operation.
5. Use the equipment only for the purpose intended by the manufacturer.
6. Before starting a team check the security elements of the equipment and the state of the same.
7. If a computer does not work properly, do not try to fix it.
8. Never cancel or remove the protection devices that the machine owns.
9. Carry out the revision or maintenance operations with the equipment stopped and disconnected from the power supply.
10. Never use a work team if you do not have the necessary training.
11. Use personal protective equipment in a manner complementary to the collective protections included in the machine, in particular protective gloves against mechanical risks in accordance with EN-388.

HEALTH RISKS

If during the use of equipment and / or machines at work there is damage to the health of the worker, the nearest health center will be immediately approached. The assessment and monitoring of the injury corresponds to the Mutual of Work-related Accidents and Occupational Diseases or the corresponding Work-Related Accident Insurance.

FOR MORE INFORMATION…

- RD 1215/1997, Minimum health and safety requirements for the use by workers of work equipment.
- RD 1435/1992 (Transposition of the Machinery Directive 89/392/CEE), modified by RD 56/1995.
- NTP´s: 87, 235 y 552.

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WORKING WITH MACHINES AND EQUIPMENT

Occupational Risk Prevention Area of the CSIC
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DEFINITIONS

Machine: Set of parts or organs joined together (actuators, control and power circuits, or others), of which at least one must be mobile.
They are associated in solidarity for a particular application, in particular for the transformation, treatment, displacement and conditioning of a material

Working device: any machine, device, instrument or installation used in the work.

Use of a working device: Any activity related to a work team, such as commissioning or detection, employment, transportation, repair, transformation, maintenance and conservation, including cleaning.

Danger zone: Any area located inside or around a work team in which the presence of an exposed worker entails a risk to their safety or health.

Exposed worker: Any worker who is totally or partially in a dangerous area.

Research prototype: working devices designed for the commercialization phase, wich contains pieces with CE labeling and declaration of conformity, but not the whole..

RISKS DERIVED FROM THE USE OF EQUIPMENT

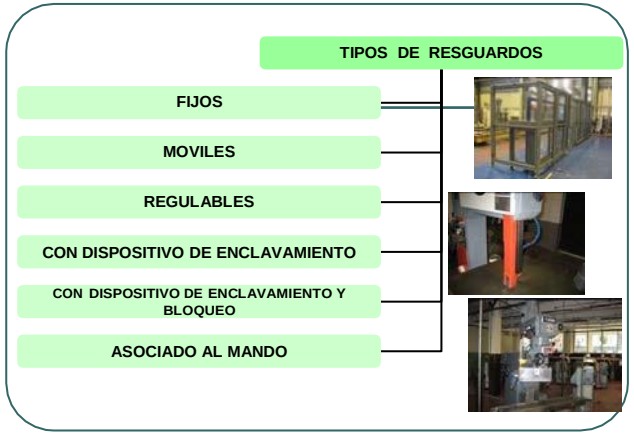
- **Mechanical Risk:** They produce injuries of different types produced by:
  - mobile elements.
  - transmission elements.
  - Projection of machine elements due to breakage.
  - Projection of the material worked.

- **Electrical risk:** can cause injury, burns or shock death from contact with electrical current (direct contacts) or accidentally in unsuitable voltage

- **Thermal risk:** can cause burns by contact with hot objects or materials.
- **Risks caused by exposure to noise:** noise can be the origin of: permanent loss of auditory acuity, fatigue, stress, interference with oral communication and with acoustic signals and difficulty in concentration and attention.

- **Risks produced by exposure to vibrations:** very intense vibrations can lead to muscle disorders in the hand,
- **Risks derived from not applying Ergonomics to the design of the machine:** the inadequacy of the machine to human characteristics and aptitudes, can be uncomfortable, or cause excessive or repetitive efforts.

PROTECTION MEASURES



UNIT OF HEALTH SURVEILLANCE AND WORK MEDICINE

Who are we?: A specialized multidisciplinary health team, whose objective is to carry out periodic monitoring of the health status of workers, based on the risks inherent in their job.

Head of the Health Surveillance Unit:

Dr. Marta L. Bermejo Bermejo

e-mail: v.salud@csic.es

Address: C/ Serrano 113 posterior, 28006 Madrid

Telefonos: 91 568 19 32 / 91 568 19 33

Fax: 91 568 19 19

Attention schedule

EMERGENCY AND WORK ACCIDENTS:
8:00 to 15:00

NURSING CONSULTATION
12:30 to 14:00
Medical prescription is essential for the application of injectables

MEDICAL CONSULTATION
12:30 to 14:00

After telephonic appointment: **915681932-33**

Phone numbers of interest

EXTRAHOSPITAL EMERGENCIES: 112

FREMAP EMERGENCIES: 900610061
To call from outside Spain: +34 91 581 18 09

TOXICOLOGICAL INFORMACION: 915620420

CSIC LABOR RISK PREVENTION: 91 568 19 23
Occupational Risk Prevention Service(Madrid): 91 568 19 25

INTERNATIONAL VACCINATION:

Monographic Center for International Health
c/ Montesa, 22 –Edificio A- Planta Baja: **902 333 010**

Carlos IIIHospital
c/ Sinesio Delgado, 10: **91 453 26 72**

OverseasHealth
c/ Francisco Silvela, 57 – 1ª Planta: **902 02 73 73**

ACTION GUIDELINES FOR CHEMICAL SPLASHES, BURNS AND BIOLOGICAL ACCIDENT

UNIT OF HEALTH SURVEILANCE AND WORK MEDICINE

FIRST AID IN CASE OF OCULAR CHEMICAL SPLASHES

1. Wash eyes immediately with **plenty of water** for at least **20 minutes**

2. Cover the eyes with sterile (or clean) gauze

3. Ask for urgent health assistance

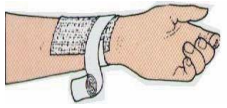
REMEMBER: CORRECT WASHING CAN AVOID IRREVERSIBLE SEQUELS, INCLUDING BLINDNESS.DO NOT ATTEMPT TO NEUTRALIZE THE CHEMICAL NOR APPLY EYE-DROPS

IN CASE OF BURNS

1. Eliminate the cause

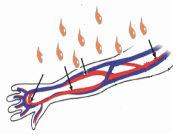
2. Remove clothes **(AFTER CUTTING)** with care.
Do not remove anything adhered to the skin

3. Wash immediately with **plenty of water** at least for **20 minutes**



4. Cover the lesion with clean gauze

5. Ask for urgent health assistance

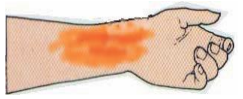


MAKE THE SAME STEPS IN SPLASHES BY CHEMICALS EVEN IF THERE IS NO EVIDENCE OF INJURY, TO AVOID ABSORPTION

FIRST AID IN CASE OF INOCULATION OF BIOLOGICAL AGENT

1. Wash the area with soap and water for at least **20 minutes**

2. Bleed the wound under running water for the first few minutes



3. Apply hydrogen peroxide and then a disinfectant (*Betadine*,*Cristalmina*)

4. Cover the affected area with sterile (or clean) gauze

5. Ask for urgent health assistance

REMEMBER: PROVIDE THE DOCTOR WITH ALL THE AVAILABLE INFORMATION ABOUT THE INOCULATED BIOLOGICAL AGENT

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EMERGENCIAS 112

URGENCIAS MUTUA FREMAP	**900 61 00 61**
INFORMACIÓN TOXICOLÓGICA	**91 562 04 20**
SERVICIO DE PREVENCIÓN DE MADRID	**91 568 0004 / 05**
UNIDAD VIGILANCIA DE LA SALUD MADRID	**91 568 1931 / 32 / 33**
ÁREA DE PREVENCIÓN DE RIESGOS LABORALES	**91 568 1923 / 25 / 27**

* Esta información debe permanecer visible y accesible en todas las dependencias de los Centros del CSIC.