# Transfer of Biological Samples

HORMONIC
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| **Basic rules FOR THE TRANSFER OF BIOLOGICAL SAMPLES in the PRBB environment** | **Review: 00** | **Approval Date: 04/07/16** |

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**1.- Objectives**

To establish basic rules for the transfer of biological samples from the centres located around the Barcelona Biomedical Research Park (PRBB) that ensure the safety of the personnel involved in the transfer and minimise potential risk to other people in that environment, in the case of an accident or incident, while this transfer takes place.

**2.- Scope**

This document applies to biological samples that are moved from the place they are generated to the place where they are analysed, whether this is within the centre itself, the PRBB environment, or any other destination.

**3.- Definitions**

**3.1.- Biological samples:** A biological sample is considered to be any infectious material or substance as well as samples for diagnosis or research.

**3.1.1.- Infectious substances or materials:** These are defined as containing viable microorganisms, including bacteria, viruses, mycoplasmae, parasites, fungi or recombinants, hybrids or mutants that are known, or reasonably suspected, to cause disease in both humans and animals. Although this definition does not include the prions that cause transmissible spongiform encephalopathies, as these are proteins, preventative common sense suggests that these should be included.

**3.1.2.- Samples for diagnosis or research:** These are materials of human or animal origin comprising, among other things, excretions, secretions, blood and its components, tissue and tissue fluids, whether contaminated by biological agents or not, that are transported for diagnostic or research purposes.

**3.2.- Biological agents:** Microorganisms, including those which are genetically modified, cell cultures and human endoparasites that may cause any kind of infection, allergy or toxicity.

**3.2.1.- Microorganisms:** Any microbiological entity, whether cellular or not, able to reproduce or transfer genetic material.

**3.2.2.- Cell cultures:** The result of the *in vitro* growth of cells obtained from multicellular organisms.

**3.2.3.– Genetically modified organisms:** Any microorganism whose genetic material has been altered in a way that is not produced through natural multiplication or recombination.

**3.3.- Classification of biological agents:**

- **Group 1 biological agents:** These are unlikely to cause disease in humans.

**- Group 2 biological agents:** These may cause disease in humans and may pose a danger to workers, although they are unlikely to spread to the wider community and for which there are generally effective treatments or prophylaxis.

**- Group 3 biological agents:** These may cause serious disease in humans and pose a grave danger to workers, with a risk of being spread to the wider community but for which there are generally effective treatments or prophylaxis.

**- Group 4 biological agents:** These cause serious disease in humans and represent a grave danger to workers, with a high risk of being spread to the wider community and for which there are no effective treatments or prophylaxis.

**Currently, within the PRBB environment biological agents in groups 1, 2 and 3 are used.**

**3.4.- Internal circuit:** Route to follow for transferring samples that includes all the centres located within the PRBB environment. An internal transport system must be assessed from the precise moment the sample is taken until it reaches the laboratory. It is preferable to select a transport route that avoids contact with the general public.

**3.5.- External circuit** Route to follow for transferring samples that includes any destination located outside the PRBB environment.

**3.6.- Transport of samples:** Movement of a sample from one point to another, once confined within its primary container, to its destination.

**3.7.- Primary Container:** A container suitable for depositing a sample in once obtained, that closes hermetically, and allows transport (see Annex 2 point 1)

**3.8.- Secondary container:** A container that is suitable for transporting one or more primary containers (see Annex 2 point 2).

**3.9.- Protective clothing:** According to the UNE-EN 340 regulation, protective clothing is clothing that covers or replaces personal clothing, and which is designed to provide protection against one or more hazards.

**4.- Responsibility**

The responsibility for compliance with this procedure lies with every person involved in the transfer of biological samples, be that in the supervision, preparation, transport, reception or opening of said samples.

**5. Transport**

Transportation of biological samples is an issue that requires special care because there is a potential risk of contamination by the worker who carries the sample, both to the general public and the recipient of said sample. There are a number of internationally accepted basic measures and common sense regulations that must be respected when a biological sample travels from the site where it is generated to the place where it is analysed, regardless of whether that is within the PRBB environment itself or anywhere else in the world.

There are three distinct situations that deserve special attention: transport within the PRBB environment, transport via mail or courier, and the receipt and opening of the biological sample container.

**5.1. Transport within the PRBB environment itself:** An internal transport system must be assessed from the precise moment the sample is obtained until it reaches the laboratory. Extraction tubes from the laboratory are placed into a safety rack or container within a secondary transport container in which they all fit and that closes tightly, and which contains absorbent material to soak up any leaks or spills and ensure additional protection. This secondary container should have a handle that allows the biological samples to be transported a short distance from the ground (see Annex 1 and Annex 2 points 1 and 2).

**5.1.1. Receipt and opening:** It is desirable that the person receiving the sample has prior knowledge of the number of samples that they will receive, to avoid the possibility of samples being or misplaced.

Samples must be opened in an environment with the appropriate level of biological containment.

The person in charge of receiving the samples must be trained so that if there are doubts about the integrity of the content of the container, it is introduced into a plastic bag that protects it until it is decontaminated or opened in a biosafety cabinet.

This risk is most significant for those samples that have been transported and which should be handled with particular care: the outside must always be cleaned with a chemical disinfectant suitable for the container, prior to it being opened.

**5.1.2. Protective material and general precautions for handling samples:** all laboratory personnel must use protective clothing. Lab coats, scrubs, aprons and so on must be of suitable fabric and designed for maximum protection. They must be properly fastened and changed when you change activity or area. They must not be used in areas accessible to the general public or outside the PRBB environment. They must also be changed when stained by biological material. Lab coats will be closed down the front and have elasticated cuffs.

The use of gloves is obligatory:

- When a worker has unhealed wounds, exudative or oozing skin lesions, cuts, cutaneous injuries, etc.
- When handling any type of biological sample.
- In contact with mucous membranes or non-intact skin.
- When handling any potentially dangerous material.

Gloves reduce the risk of hand contamination, but do not prevent puncture wounds or cuts caused by needles, other sharp instruments, broken glass or plastic. It is important to remember that the use of gloves complements and does not replace good working techniques and appropriate infection control practices, in particular, correct washing of the hands.

To this end, we must adopt the following general precautions:

- Throw away your gloves whenever you think you have been contaminated, and use a new pair.
- When wearing gloves, do not touch your eyes, nose, mucous membranes or skin.
- Always have spare gloves in case of an incident.
- Do not leave the place you are working, or walk through the laboratory with your gloves on.
- Wash your hands after removing your gloves.

**5.1.3. Emergency measures**

**5.1.3.1. What to do if a package is damaged:** when a package containing biological samples has deteriorated during transport, you think that the contents has come out, or it has some other defect, you must notify the transport company and provisionally make the package secure again, for which the following procedure is recommended.

- If you see broken glass or sharp objects, collect them up using a dustpan and brush or tweezers, taking care to avoid cutting your hands.
- Put on resistant gloves or insert your hands into a plastic bag in such a way that it serves as an improvised protection glove.
- With your hands protected in this way, pick up the package and deposit it in a rigid container, managing it as a biological residue and put it into a Group 3 container.
- Place the gloves or bags used into the same container.
- Close it and put it in a safe place.
- If liquid has leaked from the package, clean the contaminated area with a suitable chemical disinfectant.
- Wash your hands thoroughly.

Do not handle the package if you have a rash, ulcer or cuts in your skin. Do not eat or drink in the vicinity of these goods. There must be a place where the staff can change their clothes and wash their hands when they finish handling the package. Always use gloves. In the event of a spill, inform those in charge and follow the instructions below.

**5.1.3.2. Measures to be taken in the case of a spill**

**5.1.3.2.1. Spills of biological agents from infection risk group 1 or 2:** Clean small spills using a suitable chemical disinfectant. For large spills, if it is not necessary to evacuate the area, but a bioaerosol has formed, prevent staff coming into contact with it. If it is a closed area, ventilate it immediately to disperse the aerosol. The disinfectant to be used on the spill must be left to act for a certain length of time before the waste is swept up and collected using the necessary tools. The personnel who perform the cleaning must be protected with lab coats, gloves and all the necessary PPE. The waste must be packaged hermetically and suitably managed. In all cases, you must notify the person in charge of the area.

**5.1.3.2.2. Spills of biological agents from infection risk group 3:** It is necessary to quickly evacuate the area, isolate it and notify the person in charge of the area. The spill must be treated as in the previous case and, if necessary, fumigated with the appropriate chemical spray before you collect it up. The effectiveness of the fumigation must be verified for all possible cultures of microorganisms that could adhere to the clothes of staff performing the clean-up, as well as all surfaces in the fumigated area. Avoid exposure of the staff members to the fumigation vapour and do not go into the area until it is proven that the concentration in air does not exceed the Threshold Limit Value.

**5.1.3.3. Measures to be taken to decontaminate surfaces that have come into contact with biological agents.**

Put on the appropriate PPE (gloves, goggles, mask and recommended disposable protective clothing), mark out the area and cover the broken containers contaminated with biological samples with a cloth or absorbent paper. Next put a suitable disinfectant chemical on these (to be applied in a way that minimises the formation of bioaerosols) and which must be left to work for sufficient time. After this, remove the cloth or absorbent paper together with the broken material. Shards of glass must be handled using tweezers or a dustpan and brush. Then clean up the contaminated area using a suitable chemical disinfectant. The cloths and absorbent paper used for the cleaning, are to be treated as contaminated waste.

If worksheets or other documentation is contaminated, copy the information and throw away the originals into a contaminated waste container.

All materials that come into contact with the spilled biological agent and the equipment used to remove the broken material, must be subsequently sterilised using an autoclave or submerged in a suitable chemical disinfectant.

**5.1.3.4 Measures to be taken in the case of injection, puncture, cut or splash:**

In case of accidental contact with potentially contaminated material, follow the instructions below:

In the event of cuts or puncture wounds:

- Make the wound bleed a little to prevent the agent reaching the bloodstream.
- Immediately wash the wound with water and neutral soap and put povidone-iodine on it.

In the case of a splash:

- On the skin - rinse the affected area well with water and neutral soap.
- In the eyes - use water to rinse the eyes using an eyewash fountain for at least 20 minutes.

In all cases:

- Identify the biological agent involved in the accident and its source.
- Notify the person in charge of occupational health and safety.
- Go to a healthcare centre for monitoring.

**5.2. Transport by mail or courier:** The handling, transport and shipment of samples and infectious agents between laboratories or institutions by third parties services is regulated by a number of bodies to prevent or reduce the risk of exposure for the general public, airline and shipping company staff, and postal and courier company personnel. The shipment must be made according to the regulations in force in each case and using approved transportation methods for this type of transport

The packaging for infectious substances and diagnostic specimens must comprise three layers (see Annex 2).

- A tightly sealed primary container in which the sample is placed. This must be of good quality plastic or glass. It must seal hermetically to prevent leaks. The screw caps must be secured with adhesive or Parafilm-type tape, or other secure material. The primary container must be wrapped in absorbent material (paper towels, cotton wool or cellulose wadding) of sufficient quantity to absorb the liquid in case of a spill.
- The secondary container must be durable and waterproof. This can contain several samples in their primary containers. Stuffing material is to be used to avoid damage due to impacts.
- An outer casing must be used to protect the secondary container during transport and handling. It must be made of a solid enough material to ensure the protection of the samples. Information on the recipient and sender will be attached to this.

The samples must be accompanied by an identification form, as well as letters and other informative material identifying them or describing them, and that required by each shipping service. Other copies will be distributed as required and at least one will be for the recipient and another for the place of origin. This will allow the centre that receives the shipment to properly identify the sample, and make the appropriate arrangements for its safe handling and examination.

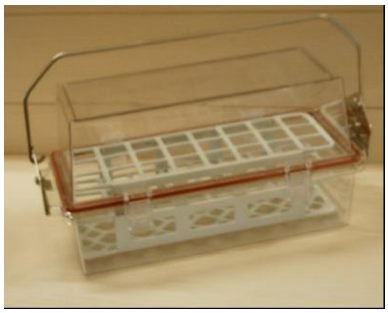
The container must be identified using the biological warning sign or a similar symbol that indicates danger of infection or biological sample (see Annex 3).

## 6.- References

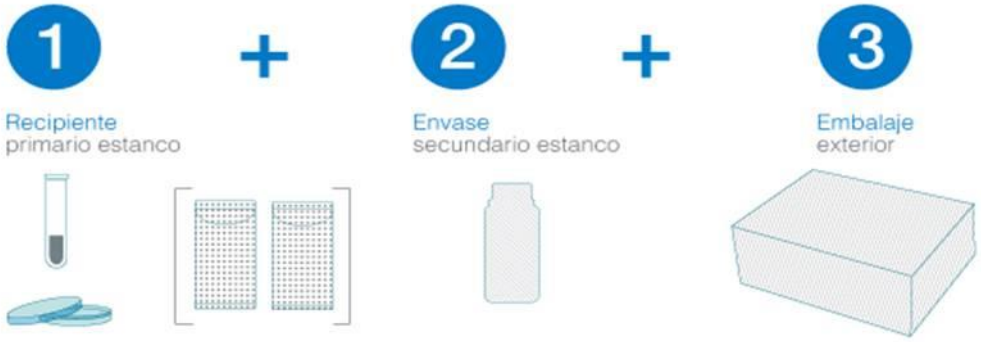
- ✓ *Royal Decree 664/1997 of May 12 on the protection of workers against the risks related to exposure to biological agents at work.*
- ✓ *Technical Guide for evaluating and preventing risks related to exposure to biological agents. INSHT.*
- ✓ *Biosafety in the laboratory manual. OMS.*
- ✓ *NTP 571: Exposure to biological agents: Personal Protective Equipment*
- ✓ *NTP 628: Biohazards in the transport of samples and infectious material.*
- ✓ *Universal Postal Convention. BOE (Official State Gazette) no. 303 of December 27, 1966.*

## 7.-Annexes

Annex 1. Secondary containers models for transportation within PRBB facilities.

| Samples not frozen | Frozen samples kept in dry ice | Frozen samples kept in liquid nitrogen |
|---|---|---|
|  |  |  |
| Picture 1 | Picture 2 | Picture 3 |

Annex 2. Examples of containers and packaging




Annex 3. Sign identifying biological samples