Safety instructions

Department of Biomedicine
Bartholin Building
Wilhelm Meyers Allé 4

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Introduction

Everyone who works in labs in the Department must be familiar with the contents of these safety instructions. They are meant as a help to the staff and students of the Department, as they provide guidelines as to how to relate to work safety.

Labs can be hazardous workplaces. Therefore, think through the working procedure, seek information about substances and safety, and keep the lab tidy. Safety instructions and working place directions must be available in the lab or the immediate vicinity. Here information can be obtained regarding what to do in case of spills and accidents.
At all times, the person responsible for the project has the overall responsibility for ensuring that the project is carried out in a safe and responsible manner. In the event of accidents, the project manager, in consultation with the working environment organisation, if necessary, is responsible for taking the necessary measures.

In case of emergencies, Building Manager, Viggo Nielsen can be reached at mobile 28 99 25 16.

New employees and students are to be thoroughly instructed in working procedures and safety regulations.
When in doubt, please ask - just for safety's sake.

Do not consume food and beverages in the labs – please use the lunch room on the 6th floor (lab coats are not allowed there).

Smoking is not allowed anywhere in the Bartholin Building.

More information can be obtained on the website of the Department:
http://biomed.medarbejdere.au.dk/en/working-environment/

Emergency numbers

In case of fire, accidents or other life-threatening situations at Aarhus University, first please call:

Emergency call centre: 112
(When dialling 112, it is not necessary to dial 0 to get a line out)

If it has been necessary to call 112, the second number to call is the university's emergency number, which is manned day and night all year.

Emergency number: 87 15 16 17

Emergency room:

You are not allowed to show up at the emergency room at the hospital without notifying the emergency room first.

Weekdays between 08:00 - 16.00: Call your own medical doctor.

On weekdays between 16:00 - 08:00, as well as on weekends and holidays:
Call the doctor on emergency duty 70 11 31 31

Reporting of work-related accidents

1. Report **all** work-related accidents/injuries to the local working environment representative. (See overview of working environment representatives in the Bartholin Building on http://biomed.medarbejdere.au.dk/en/working-environment/amg/)
2. You can find the form to fill in details regarding the injury on http://medarbejdere.au.dk/en/administration/hr/workingenvironment/reportinginjuries/
3. Please send the form to arbejdsmiljo@au.dk or Lars Asmussen (lars.asmussen@adm.au.dk) with a copy to your local head of the working environment committee.

Insurances:
University staff is insured. The university does not have insurances customized for students. Just as for lectures/classes, the students are to arrange their insurances themselves.

Bear in mind that you must always bring your insurance card on business travels. Find out more on AU Finance's website

http://medarbejdere.au.dk/en/administration/finance/travel-booking-and-expense-reimbursement/travel-insurance/

First aid / CPR

Is the person unconscious?
Speak and shake / subject to pain

NO → Help with the cooperation of the person

YES ↓

Does the person breathe?
- Create free airways / Clear the airways
- Watch - feel - listen for 10 seconds

YES → Place the person in the recovery position
Check the breathing
Call 112

NO ↓

Call 112

↓

Make 2 blows (The chest must rise)

↓

Check for signs of life for 10 seconds
- normal breathing
- coughing
- moving

→ Still no breathing but coughing and moving

↓

Make blows
Approx 12-15 per minut
If the coughing and moving stop please begin chest compressions

NO ↓

Begin chest compressions
15 pumps and 2 breaths
100 pumps per minute
4-5 cm compression depth

Place of compression: 3 fingers on the breastbone/sternum

→ Continue until there is sign of life or a professional takes over

Burns:

- Rinse the burned area with cold water.
- Remove loose-fitting clothes from the burned area.
- Continue to rinse until the pain is gone – at least for 30 minutes while others get a bowl with chilled water 22-23°C.
- Sink the burned area into the water and keep it there.
- Place a cold, soaked pack (i.e., towel, dish towel or a clean lab coat) on the burned area and take the injured person to the emergency room.

Chemical burns:

Internal chemical burns as a result of the swallowing of organic solvents.
Please note! Vomiting is in these cases **NOT** to be provoked.

- Immediately give plenty of fluids (milk or water).
- Call an ambulance or bring the injured to the emergency room – bring information about the cauterant (name, chemical formula, container).

External chemical burns:

- Rinse thoroughly with excessive amounts of water.
- Remove clothes – continue rinsing for 10 minutes.
- If the pain continues, keep rinsing for another 10 minutes.
- If the chemical burn is substantial, bring the injured person to the emergency room, e.g. by ambulance and bring information about the cauterant (name, chemical formula, container).

Chemical burns in the eye:

- Rinse immediately with excessive amounts of water in a low pressured water jet.
- Rinse from the root of the nose and outwards.
- Continue rinsing for 5 minutes.
- Always seek doctor afterwards - bring information about the cauterant (name, chemical formula, container).

Use of eye washer (is available in all labs):
You can find eye washers either fixed to the sink fixtures or as disposable bottles. Find out where they are situated before you actually need to use the eye washers.

When working alone:

- Be certain that the solution is clear and the bottle is sealed.
- The liquid in the eye wash bottles must always be sterile – see instructions on the bottle.
- The bottle is opened by turning the lid.
- Bend over the bottle.
- The eye is opened wide with thumb and index finger.
- Gently press the eye cup against the eye – the eye is kept open.
- Rinse thoroughly by squeezing the bottle repeatedly.
- In case of severe burns, the eye will shut on reflex which means that the injured person cannot rinse sufficiently, and the nearest person must step in and help.

Standing or sitting patient:

- The assisting person opens the eye with her/his thumb and index finger.
- The eyecup is held a hand's breadth from the eye.
- Rinse thoroughly by squeezing the bottle repeatedly.

Patient lying down:

- Remove the vertical plastic tube in the bottle.
- The eyecup is held a hand's breadth from the eye.
- Rinse thoroughly by squeezing the bottle repeatedly.

Eye washer as an integrated part of the water tap:

- In most labs, eye washers can also be found by the sink as an integrated part of the water tap. This eye washer is used by turning on the cold water, the switch on the back side of the eye washer is pushed in and the protective hood is then automatically pushed off. Place the eyes in such a manner that both eyes can be rinsed thoroughly. Remember to remove glasses or contact lenses before rinsing the eye.
- In some fume cupboards, an emergency eye wash fountain is available. The emergency eye wash fountain is used by taking it out of the holder. The safety cap is removed, and the red button on the side is pushed in. After that, it is placed on the eye to rinse.

Poisonings:

The poisoned person is awake:

- Attempt to induce vomiting by putting your fingers to the back of your throat, e.g. after drinking a glass of water.
- Place the poisoned person in the recovery position.
- Take the poisoned person to the emergency room, e.g. in an ambulance and bring the vomit.

The poisoned person is unconscious:

- Place the poisoned person in the recovery position.
- Take the poisoned person to the emergency room, e.g. in an ambulance and bring information about the poison (name, chemical formula, container if any).

First aid kits:

First aid kits are placed in the hallways of every floor of the building. Make yourself familiar with the positions of the first aid kits before they are needed.

When something is removed from the kit, every employee is obligated to refill the kit.
The most common things are available in the storeroom, room 030, in the basement (0th Floor).

Respirators:

Respirators are placed in a cupboard by room 131 on the 1st floor.

Spills alert:

An emergency kit for collection of minor spills is placed in the yellow cupboard in the hallways on all floors.
On the 1st floor by room 131, a spills emergency kit for more extensive spills is situated.

Reports:

All accidents – big or small – must be reported to a working environment representative or the daily working environment supervisor.
Accidents that cause sickness absence, the report must be submitted asap and within nine workdays.

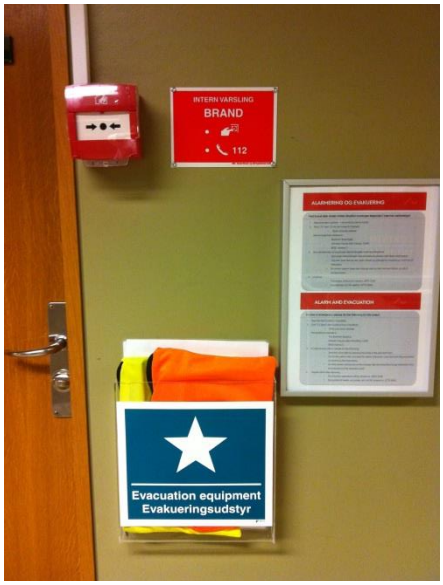
In cooperation, the form regarding work-related injury (Arbejdsskade) is filled in via this link:
http://medarbejdere.au.dk/en/administration/hr/workingenvironment/reportinginjuries/
(to be found under "Forms" to the right).

Even though the injury is not required to be reported to the Danish Working Environment Authority or The National Board of Industrial Injuries in Denmark, you must register the injury.

For more information, please follow the link above.

Fire instructions:

In the hallways (by the stairs) fire instructions are situated. You **must** study the fire instructions thoroughly.



Fire-fighting equipment is placed in the yellow cupboards in the hallways. Make yourself familiar with the location before it is too late.

Fire blankets hang right by the door in all labs.
Showers are situated by most fume cupboards and in one of the toilet facilities at each end of the hallways.

In case of fire:

1) **Call the fire department:**
   Phone 112
   Mobile 112

   State the address:
   Bartholin Bygningen
   Wilhelm Meyers Allé 4, Building 1240
   Universitetsparken
   8000 Aarhus C

2) Make certain that the two vests in the holder by the evacuation point are handed out. The evacuation leader is to have a yellow vest and the emergency coordinator is to have an orange vest.

3) The evacuation leader will spread the alarm to all employees throughout the building, and make sure that they are brought to the evacuation meeting place. **Use the stairs** – never the elevators!

4) If possible – close all doors and windows before leaving the building.

5) The emergency coordinator receives the evacuated persons in the evacuation meeting place and advises the fire department about:

   a. The location of the fire
   b. The extent of the fire
   c. Persons, if any, left behind in the fire threatened area

6) Take no chances and do NOT participate in any rescue work

7) Inform the alarm call number at Aarhus University:

   87 15 16 17

Escape ways:

Follow the arrows to the nearest staircase exit.

Do NOT use the elevators when there is a fire.

Breakdowns

Regarding ventilation, fume cupboards, water, drains and heat

Contact:

1) Poul Kaarsberg Christensen tel. 2899 2242
2) Dan Kimborg tel. 2162 6888

Regarding laboratory equipment/instruments

Contact:

Claus Bülow Gamst tel. 871 67607 / 2485 8764

General code of conduct in standard (unclassified) laboratories

General rules in laboratories:

- Each lab has a room number (situated at the top right of the door) that is to be applied in connection with wash-up and handling of waste.
- Each employee is allocated a basic workstation that consists of at least one table section.
- A lab has many users, and it is, therefore, important that you are flexible and considerate of others.
- You must wear a **white** lab coat when working in the lab (Ole Frandsen can provide new ones).
- You must wear disposable gloves when the work requires it.
- Mouth (oral) pipetting is prohibited.
- Food and beverages are **NEVER** allowed in the lab.
- Syringe needles, scalpels and other sharps must be placed in special waste containers for sharp objects.
- When you leave the work area, it must be tidied and cleaned.
- Handbooks, folders, notes (all paper) in the lab must be kept separately from chemicals, biological material, utensils, etc.
- When glassware is dropped on the floor/sink, **always** leave a note to warn the cleaning staff against glass fragments.

General rules when leaving the laboratory:

- Put a lid on the steel containers (when the container is full, fold the plastic bag loosely in the container before placing the lid. Place the container by the door).
- Wash hands – disinfect them.
- Turn of gas burners.
- Close windows.
- Turn off the light.
- Close the doors to the labs and offices. In that way, the smoke and heat development of a potential fire is slowed down, and the risk of damage to the equipment is reduced.

Flow benches:

Flow benches are used when work in a sterile environment is required. This way both you and your reagents are secured against contamination.
Flow benches are **not** to be used when working with chemicals.

Fume cupboards:

Fume cupboards are used when working with chemical agents and reactions that develop harmful or foul-smelling gasses or steam.

Use of gloves:
http://medarbejdere.au.dk/fileadmin/www.medarbejdere.au.dk/hr/Arbejdsmiljoe/Arbejdsmiljoe/Health_arbejdsmiljoe/handsketest.pdf (In Danish only)

1) **Nitrile gloves** can be used to protect yourself and the material when:
   - working with human and other potentially infectious material (blood, cell lines, etc.)
   - working with hazardous substances (see working place directions)
   - working with radioactive materials
   - you are attentive to the fact that centrifuges, microscopes, etc. can be contaminated
   - you always change gloves if you suspect that your gloves are contaminated.

2) **Latex gloves** are used when you only want to protect your material:
   - cell work in LAF benches
   - genetic engineering

3) You **are not** to wear gloves when
   - touching door handles
   - touching computer keyboards (unless it has a protective plastic cover)
   - speaking on the phone
   - in offices
   - in the hallways, elevators and on stairs, **one** hand must be without a glove for opening doors, etc.

4) Disposal of gloves
   - Dispose of the clean gloves in the ordinary wastebins in the lab
   - **ALWAYS** dispose of non-clean gloves in the square steel containers or the hazardous waste containers.

Clothing:

Coats:
- White coat (ordinary lab)
- Yellow coat (class 1 lab) Take off the coat before you leave the lab.
- Green coat (class 2 lab) Take off the coat before you leave the lab.
- Red coat (isotope laboratory) Take off the coat before you leave the lab.
- NEVER wear coats in the lunchroom/offices.
- Guests, workmen, cleaning staff and others must wear coats when visiting classified areas.

Washing of coats:
- Place the white coats in a fabric bag, which is then placed in the passage to the animal facilities.
- Yellow coats are placed in gelatin bags by the user. The bags can be found in the classified area or the storage room in the basement. Place the gelatin bags in a fabric bag and they are now to be handled in the same way as the white coats.
- Green coats are to be autoclaved before they are placed in the same fabric bags as the white coats.
- Red coats must be monitored before they are placed in fabric bags to be washed like the white coats.

Outdoor clothes:
- Outdoor clothes are not to be kept in the lab.
- Hang outdoor clothes on hooks in offices/passages to toilet facilities.
- As an option, you can get a locker in the basement. Please contact Annette Gils (tel. 28 99 22 46).

Handling of notes etc.:

Standard (unclassified) labs
Please note that handbooks, folders, notes must be kept separately from chemicals, biological material, utensils, etc.
Taking notes must only take place in areas with a defined desk pad, or on pullout boards when these are available. As an option, window sills can be used.

Classified labs
Papers are not to be lying around or posted in the lab. Cover formulas and the like with plastic. An area just for writing must be earmarked in the lab. Cardboard boxes and wastebins are not to be kept in the classified labs.

Instruction in the use of centrifuges:

Users who have no significant knowledge of how to use the centrifuges *must* have a thorough instruction in the use of centrifuges before they start using them. The supervisor or work leader is responsible for ensuring that each student or employee receives the necessary information about the use of rotors and centrifuges.

(Centrifuges must be equipped with a lock that ensures that the centrifuge cannot be started when the lid is open, and the lid cannot be opened unless the centrifuge has come to a stop. The lock must be able to work independently of a power failure.)

Cleaning: The necessary, obvious cleaning must be carried out after each run. *In this way, the single user is responsible for the cleaning of the centrifuge and rotor*.

In case of spills, clean the area and disinfect the area by washing with 70% Ethanol.

In the event of a breakdown: Clean the centrifuge! Leave a note on the centrifuge that it has a defect, and that repair is ordered. Remember to state the date.

Instruction in the use of ultracentrifuges:

The ultracentrifuge is especially sensitive and is, therefore, to be used with caution.

Users who have no significant knowledge of how to use ultracentrifuges *must* have a thorough instruction in the use of the ultracentrifuges before they start using them. The supervisor or work leader is responsible for ensuring that each employee receives the necessary information about the use of centrifuges.

Cleaning: The necessary, obvious cleaning must be carried out after each run. *In this way, the single user is responsible for the cleaning of the centrifuge and rotor*.

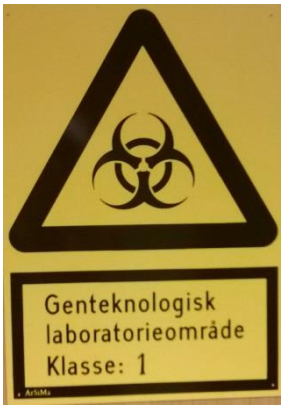
In case of spills, clean the area and disinfect the area by washing it with 70% Ethanol.

In the event of breakdowns: Clean the centrifuge! Leave a note on the centrifuge that it has a defect, and that repair has been ordered. Remember to state the date.

General code of conduct in classified laboratories

When working with classified materials, both the project (Anmeldelse af genteknologiske forskningsprojekter) and the laboratory (Anmeldelse til klassifikation af genteknologiske laboratorier og laboratorieområde samt anlæg til genteknologiske storskalaforsøg eller produktion) must be notified to the Danish Working Environment Authority.

GMO class 1 laboratory:



In the GMO class 1 lab, staff follows the regulations of the valid "Executive Order on Gene Technology and Working Environment" (http://arbejdstilsynet.dk/da/regler/bekendtgorelser/g/sam-genteknologi-og-arbejdsmiljo-910.aspx) supplemented with an AT instruction C.0.4 (http://arbejdstilsynet.dk/da/REGLER/At-vejledninger/K/C-0-4-Klassifikation-af-laboratorier.aspx) and "Executive Order on Biological Agents and Working Environment" (http://arbejdstilsynet.dk/da/REGLER/Bekendtgorelser/B/Biologiske-agenser-57.aspx#h2capther2)

Work with GMO includes all handling, production, application, enrichment, storing, destruction, disposal and transportation.

In the class 1 lab, the focus is on working with the biologically active material, meaning living organisms, cells or viruses containing DNA or RNA that are derived from genetic engineering (GMO).
(Isolated DNA, RNA or protein that are produced by genetic engineering are thus not included in this legislation.)

General rules in class 1 laboratories

- Work with biologically active material is only to take place in areas classified by the Danish Working Environment Authority – and must be marked "Gene technology area class 1".
- Each lab has a room number (situated at the top right of the door) that is to be applied in connection with wash-up and handling of waste.
- A lab has many users, and it is, therefore, important that you are flexible and considerate of others.
- You must wear a **yellow** coat when working in the lab.
- Special footwear is not insisted upon. (Clogs can be collected from Ole)
- In work operations where you get into contact with GMO, nitrile gloves must be worn.
- The working area must be kept tidy and must be cleaned daily by the users of the lab.

- Spills of a biologically active material must be cleaned up immediately, and the area must be washed with Virkon® or 70% ethanol for at least 10 seconds. As a supplement 30 minutes of UV-lightning in LAF-benches can be applied.
- Food and beverages are never to be kept in the lab.
- Outdoor clothes and other irrelevant material are not to be kept in classified rooms.
- Access to the lab must be limited.
- Doors and windows must be kept closed at all times due to the efficiency of the ventilation system.
- Wash hands when they are contaminated with a biologically active material, and before work breaks and at the end of the working hours.
- The project managing researcher must prepare a written risk assessment for each current project that is carried out in the GMO classified premises. The risk assessment must be available to the Danish Working Environment Authority, the working environment organisation as well as the users – and must be part of the mandatory instruction of employees and visitors prior to the start of work.
- If work is carried out involving non-genetically modified organisms in the lab, the safety regulations for work in GMO class 1 must be followed. In case of accidents, you must inform the person responsible for the project and the working environment group, and they will in consultation with each other take the necessary measures.

Transport of class 1 material:
Transport of biologically active material outside the designated labs or areas must be carried out using containers marked with the gene technological warning sign (yellow stickers or yellow tag). Closed Eppendorf tubes can be transported, for example, in the designated racks, agar plates in marked bags or plastic trays. Glass flasks can be transported, for example, in designated plastic trays on a trolley as long as you make sure that every spill is collected in the tray.

Class 1 waste handling:
Collect all waste containing genetically manipulated material in square steel containers (obtainable in the wash-up facilities). Place the containers for autoclaving in the hallways.

Place syringe and scalpel containers in round steel containers, and apply a steel sign marked “gene technological” before they are sent to the wash-up facilities.

Class 2 laboratory:

In class 2 labs, work is carried out containing biological materials that may cause infectious diseases in humans, for example, viruses.

General rules in class 2 labs

- Do not use class 2 before you have received instruction from the person responsible for class 2, and general working rules and procedures are available in each class 2 lab.

Transport of class 2 material:
Transport of biologically active material outside the designated labs or areas must take place in the “Toolbox” that is marked with a gene technological warning sign (yellow sticker). Cells cultivated and transduced in class 2 can, as a rule, not be moved to a class 1 lab. If a move of cells from class 2 to class 1 is required, a plan must be implemented, and the working environment organisation must be contacted.

In case of spills, always wash with Virkon® first and afterwards with 70% ethanol. When working with biologically active material, aerosol generating procedures must be limited as much as possible. Aerosol generating procedures, if any, must take place in fume cupboards or LAF-benches with a ventilation duct leading outside.

Containers holding genetically engineered organisms must be marked when stored in freezers, nitrogen tanks or cold storage rooms.

Class 2 waste handling:
Autoclave all waste from class 2 labs before it is taken out of the room. There are only round containers in class 2.

See handed out waste handling forms.

Procedure for upgrading from class 0 to class 1:

Upgrading of labs must be informed to the Danish Working Environment Authority. The contact to the Danish Working Environment Authority is to go through the safety organisation of the Department. Upgrading of laboratories can only take place if it has been authorized.

A person is appointed to be overall responsible for the classified facilities. The name of the person is informed to the Danish Working Environment Authority and entered in the log book.

In the classified lab, there is a phone list for the person responsible for the lab.

Out of regard for the cleaning, the classified room/area is arranged in such a way that only the necessary equipment is available.

Everyone in the classified area must wear buttoned-up coats.

According to the regulation of the Executive Order on Gene Technology, a log book of the classified area is kept. Date of the upgrading is recorded in the log book.

Warning signs (ArSiMa) marked Gene Technological Laboratory - Class 1 are placed visibly by the entrance to the classified facilities.

Autoclave containers are placed in the classified room.

Bottles containing 70% ethanol and Virkon® must be available in the classified room.
Coats are hung on hooks placed right by the entrance door inside the classified room.

Cleaning staff working in classified rooms must wear coats according to the Department's procedure for cleaning of class 1 labs. The person responsible for the room notifies the safety organisation (secretariat) as well as the works manager of the time of the upgrading. The users of the lab see to the daily cleaning and disinfection of work areas and appliances.

Students' work with the biologically active material must only take place when supervised by qualified supervisors.

Autoclave containers must be available in the room after the upgrading. The containers, marked with class 1-tags (ArSiMa), are used for collecting and decontamination of appliances that are used in

connection with the biologically active material (disposable pipettes, centrifuge tubes etc.) as well as culture media containing classified organisms.

Procedure for downgrading from class 1 to class 0:

Downgrading of labs must be informed to the Danish Working Environment Authority. The contact to the Danish Working Environment Authority is to go through the safety organisation of the Department. Downgrading of labs can only take place if it has been authorized.

The project manager of the area ensures that qualified persons carry out below-mentioned tasks:

All *coats* must be placed in polyvinyl acetate bags that are closed and sent to the laundry facilities. This takes place in accordance with the usual coat procedure of the Department.

All *autoclave containers* must be autoclaved.

LAF-benches – including filters – are decontaminated by the company with whom the Department has a maintenance contract regarding the type of LAF-bench in question.

Potentially *contaminated equipment* (gyro shakers, table centrifuges, mixers, micropipettes, etc.) are cleaned with a disinfectant before they are removed from the room.

All other utensils are removed from the room.

All *work surfaces* (laboratory tables, sinks and sink tops, fume cupboards, etc.) are disinfected with 70% ethanol and Virkon®. Afterwards, they are washed with a neutral soap.

The project manager notifies the works manager about the downgrading. After this the cleaning staff cleans the area thoroughly according to class 1 regulations.

The time of the downgrading is recorded in the log book of the room and is announced in writing to the safety organisation and the Danish Working Environment Authority.

ArSiMa warning signs are taken down.

The area is now used and cleaned according to class 0 regulations until a potential renewed upgrading.

Instruction for workmen:

Workmen
Workmen must ensure that they have knowledge of the special procedures for access to the laboratory/work area, in which they are to work.

If workmen do not have a contact who is responsible for the instruction to the area in which they are to work, please contact:

Claus Bülow (workshop)	871 67607 / 2485 8764
Poul K. Christensen (Building operation)	871 52243 / 2899 2249

Class 1:
- There is no access when there is work in progress in the lab, so access must be arranged in advance.

Class 2:
- There is no access when there is work in progress in the lab, so access must be arranged in advance.
- Always wear a green coat and shoe covers.
- Bring as few tools/aids as possible.
- Equipment that is to be repaired must be disinfected with 1% Virkon® and 70% ethanol.

In the event of accidents:
When you move about in a laboratory, you must treat everything as if it is hazardous.
In the event of accidents, please contact one of the employees of the laboratory/department immediately.
If you are in doubt about anything at all, it is better to ask once too often.

Cleaning directions for cleaning staff

Class 2 can only be accessed after a thorough instruction

Class 2: (yellow sign on the door “Gene technology lab area class 2”)

- The cleaning staff must wear green coats and shoe covers.
- The cleaning trolley and cleaning utensils are only to be used in that specific classified room.
- Wash the floor every day. Place the mops in the container for used mops (Class 2-staff autoclave mops weekly).
- In the event of accidents, contact one of the lab's users or your cleaning manager.

Class 1: (yellow sign on the door "Gene technology lab area class 1)

- Weekly floor wash with wet and dry mop. The mops are washed together with mops from non-classified labs by the cleaning staff.
- Daily emptying of wastebin (not the yellow boxes).
- Wash the sink every day.
- Change gloves after cleaning.
- In the event of accidents, contact one of the lab's users or your cleaning manager.

Both in class 1 and class 2, the lab users clean the window sills, work tables, fume cupboards, sterile benches and other workplaces.

General laboratory/office:
Daily: Empty the wastebin, clean the sink (if it has been emptied of laboratory material), and clean the floor lightly.
Weekly: Wash the entrance/stairway, wash the floor (wall to wall), wipe off the window sill, radiator, board, door handles, switch, and tables/desks that are cleared.

Sanitation:
Daily: wash the floor (wall to wall), clean the sink, toilet, mirror, shelf, door handle and switch. Supervise the supply of soap, towels and toilet paper.

Code of conduct in microbiological work

Staff who work with microorganisms must have read the guidelines before the work commences. These guidelines are prepared for work with microorganisms and have the objective to protect staff and the departmental environment against exposure to microorganisms in connection with studies that may constitute a hazard.

Before the microbiological work commences:

Work with microbiological agents in risk group 2 or more must be reported to the Danish Working Environment Authority at least 30 days prior to commencement of work (Executive Order no. 57 on biological agents and working environment, §15 and Appendix 4). The work with biological agents in risk group 2 must only be carried out in work areas with containment measures at least equivalent to class 2, i.e. work that involves low risk. Instructions for the employees must be in writing and, if necessary, they must be displayed on the notice boards. In addition, a special biological workplace assessment (APV) must be prepared before any work is carried out that may be affected by microorganisms. Guidelines are available on the Internet or obtained from the environmental organization.

Safety:

In the Department of Biomedicine, work is carried out involving microorganisms and samples from patients that may potentially be infectious. It is, therefore, necessary to observe certain precautions to avoid infection and spread of bacteria, viruses, fungi and other microorganisms.

We are working with biological agents of risk group 2 that are defined as "microorganisms or the like that can cause serious infectious diseases in humans and be a danger to the employees; there is a small risk of spread of infection to society; there is usually effective prevention or treatment" [ref.: 1, 2 and 3].

When working with GMOs or biological agents in risk group 2, special regulations must be applied, and special precautions must be taken.

When working with a human material, it is recommended that you get the hepatitis B vaccine. Frank De Pauli is in charge of hepatitis B vaccines in the Department (fdp@fi.au.dk).

The microorganisms can cause illness as stated above, but this risk is considered to be very poor when the following precautions are observed.

Precautions for microbiological laboratory work:

- A risk assessment must be made (including - which disinfectant/procedure is effective)
- Coming and goings in microbiological labs should be kept to a minimum, and the door should be kept closed as much as possible.

- You always work wearing the coat buttoned up. The coats may only be used in labs and exercise rooms. Leave the coats in the lab or exercise room when leaving.

- Use gloves when working with human samples such as blood or spinal fluids or if you have wounds or scratches on your hands.

- Avoid wearing rings, watches or bracelets, as it makes it difficult to clean and disinfect the skin.

- It is prohibited to eat, drink or smoke in microbiological labs, and you ought to refrain from putting things in your mouth (e.g. bite a pencil) or rubbing your eye.

- Keep books, instructions, notes, etc. separate from all biological material. Do not carry out office work on work tables that are intended for microbiological work.

- Do not sit on laboratory work tables.

- Wash and disinfect hands immediately upon contamination or before you leave the lab. Method: Wash your hands thoroughly with soap and water and dry them with a disposable towel. After that apply disinfectant (located by the sinks). Rub the disinfectant into your skin until the skin is dry.

- Avoid spills and contamination of the environment when working with live cultures. You can avoid, for example, aerosol formation when working with liquid cultures correctly and by flaming the lips of test tubes and flasks that contain bacterial cultures. In the event of accidents, immediately limit the contamination as much as possible and carry out a thorough cleaning and disinfection.

- Each employee must tidy up and clean the workplace upon completion of work with microorganisms.

In-house transport of microorganisms:

In-house transport of microorganisms must take place in a special container with a tight-fitting, clamped lid. The container is lined with an absorbent material. Containers must be labelled clearly stating that they contain microorganisms and risk material (class 2).

Handling of waste, etc.:

There are no wastebins in the microbiological labs, as all waste is considered to be contaminated.
Place all single-use material and infectious material (e.g., plastic test tubes, slides with your preparations, agar plates, rubber gloves, Pasteur pipettes, pipette tips, capillary tubes) in the yellow hazard container (cardboard boxes lined with yellow plastic bags).
Plastic pipes (cylinders) with plastic bags that are placed on the work tables are used for occurring minor waste in the category single-use material (inoculation needles, slides, etc.). Do not overfill the bags. When replacing the plastic bags in the plastic pipes on the work tables, you place the filled bags in the yellow boxes for hazardous waste.

Dispose of the yellow cardboard boxes with the infectious material by closing the box properly using tape and writing name and room number. Place the box on a pallet in the corridor to the animal facilities and the box will be disposed of by incineration.
Place contaminated recycled materials (flasks, etc.) in steel containers and send them to be autoclaved.

Before you leave the laboratory:

Tidy up on the work tables.
Wipe the tables thoroughly with a disinfectant using a coarse paper napkin that you dispose of in an autoclave container.

Code of conduct for work in an isotope laboratory

The laboratory must be classified and approved for work with radioactive material.
General and practical advice on how to handle isotopes that are presently used in the labs has been prepared.
The work is based on the following: SIS guidelines about radiation protection when working with open radioactive sources.
(http://www.sst.dk/publ/publ2005/sis/vejl_aabne_kilder/vejl_aabne_kilder.pdf):
Executive Order on the use of open radioactive sources in hospitals, laboratories, etc.
(https://www.retsinformation.dk/Forms/R0710.aspx?id=21441) and the Executive Order on Dose Limits for Ionising Radiation.
(Https://www.retsinformation.dk/forms/r0710.aspx?id=85966.
The idea is to expand the collection for each new isotope that may come to use.
SIS: http://sundhedsstyrelsen.dk/da/sundhed/straalebeskyttelse
During the preparation, it has been taken for granted that the general safety regulations regarding work with hazardous chemicals are applied during all work with isotopes, i.e. you use coat, gloves, goggles (when required), etc.
In addition, you must wear personal dosimeters when working with relevant isotopes (TL dosimeter - previously film badge).

The Danish Health and Medicines Authority's Executive Order no. 823 of 31/10/1997: *Order on Dose Limits for Ionising Radiation* forms the basis for the regulation. Compared to the previous order, the limit for the maximum allowable annual dose per person is lowered to 20 mSv, and special rules for pregnant women's work with radioactive substances has also been prepared.

For more information, please see appendix 1. Radioactivity

Accidents with radioactive material:

Spills or loss of radioactive material
It is the responsibility of the person who has caused the spill to ensure immediate and thorough cleaning. Clean up liquid radioactive spills with an absorbent paper (paper towel). Clean up spills of powder or other dry material using a wet absorbent paper. Then wash it with a carrier solution, i.e. a non-radioactive solution of the labelled substance that is spilled. **However, by ^{32}P spills a potassium phosphate solution is used, by ^{125}I spills a sodium iodide solution.**

All paper towels and other things that have been used for cleaning are treated as solid radioactive waste.

After cleaning the area, measure it for radioactive contamination: ^{35}S, ^{32}P, ^{33}P, ^{125}I and ^{14}C are measured directly with a monitor. Due to the poor sensitivity of the monitor for the measuring of ^{35}S, ^{33}P and ^{14}C radiation, these are also to be cleaned up with a damp filter paper and measured in a scintillation counter, as the paper is drying, and 5 ml scintillator liquid is added. The same method is used for ^{3}H.

Radioactive contamination of persons
A person who works with or regularly comes close to ^{125}I and ^{32}P must carry a personal dosimeter that is replaced every three months. However, the personal dosimeter must be changed every month when working with more than 5 MBq ^{32}P or more than 1,000 MBq ^{125}I, see Executive Order 823 about dose levels. A statement of the measured results from the National Institute of Radiation Protection arrives every three months as well as an annual statement. The dose level is 20 mSv/year. However, the dose level for foetuses is set to 1 mSv/year.

Always wear gloves when working with radioactive isotopes, and wash your hands thoroughly after the work. Should your skin be contaminated, rinse the area several times with a carrier solution, and then wash the area several times with soap and water. If the contamination of the skin still can be measured by a monitor, you ought to consult the emergency room.

In the event of damage to the skin, and at the same time radioactive contamination (etching or lesion) rinse with plenty of water and if possible open the wound by pulling the edges of the wound back in order to enhance the bleeding and rinsing. After this consult the emergency room immediately.

Clothing with a heavy radioactive contamination is treated as radioactive waste.

Intake of radioactivity
If you accidentally drink radioactive solutions, induce vomiting immediately (finger in the throat) and consult the emergency room immediately after this.

Contact in case of major accidents with radioactive isotopes:

National Institute of Radiation Protection (SIS)
www.sis.dk

44 54 34 54 (Opening hours 10-15)
44 94 37 73 (24-hour service)

Scintillation counting:

Bear in mind that toluene and xylene are *more hazardous* to your health than small amounts of radioactivity. Scintillation counting pipes must therefore immediately after the count is completed be placed in plastic bags in wastebins in a fume cupboard and after that in a waste deposit site in building 1249 in Biomedicine East.

Instructions in working with hazardous substances

Hazardous substances and products are defined as the substances that are hazardous to health and environment. They are hazard labelled with either hazard symbols, R- and S-phrases or hazard pictograms, H- and P-phrases.

At Health, workplace instructions (the Danish abbreviation is APB) are prepared by selected employees. Safety data sheets for the preparation of workplace instructions can be found in the chemical database, Kiros (kiros.dk). For SE login to Kiros, please contact your colleague, who prepares your local workplace instructions.

The safety data sheets provide instructions in how to work safely with a substance or product.
The workplace instructions describe how to work with the substance or product.

If you cannot find a safety data sheet in Kiros that covers your substance/product, please contact Lina Waldstrøm Asmussen, e-mail: lina.waldstrom@biomed.au.dk, tel. 871 67608.

There is a requirement for workplace instructions in hazardous substances and products in accordance with the following:

a) Substances and materials that meet the criteria for classification as hazardous in accordance with the rules of the Danish Ministry of the Environment.

b) Substances and materials that are included with a limit value in the Danish Working Environment Authority's list of Limit Values for Substances and Materials.

c) Materials that contain 1% or more (for gaseous materials 0.2 %) of a substance admitted with a limit value in the Danish Working Environment Authority's list of Limit Values for Substances and Materials.

d) Materials that contain 1% or more (for gaseous materials 0.2 %) of a substance that is classified as hazardous or environmentally hazardous in accordance with the rules of classification of the Danish Ministry of the Environment.

Registration of employees working with carcinogenic substances:

The following must be recorded:
- the carcinogenic substances in question
- how often work with a given carcinogenic substance is carried out
- start and end date when working with a given carcinogenic substance

See the website: http://biomed.medarbejdere.au.dk/arbejdsmiljoe/retningslinjer-og-vejledninger-for-health/tjekliste-til-arbejde-med-kraeftfremkaldende-stoffer/

Instructions in weighing of chemicals/hazardous substances

The injury caused by chemicals such as acids, bases or special cytotoxins depends on, in addition to the characteristic of the substance, the concentration of the substance in the tissue and the length of the period of time in which the substance will affect this. Therefore

• avoid splashes on the skin, i.e. work wearing gloves and a lab coat.
• avoid inhalation of fumes, i.e. work in a fume cupboard.
• clean up spills on tables and floors immediately
• rinse dirty glassware in plenty of water before sending the glassware to the wash-up facilities

The employee who orders or in any other way brings a chemical into the lab, must check and take responsibility for ensuring that the necessary protective measures are taken, including labelling of the substance and the instruction of all who are to work with the material.

All substances marked with warning symbols as well as powders for media that may be allergenic must always be weighed and dissolved in a fume cupboard.

Remember: Fume cupboards perform at their best with the hatches shut as much as possible.

Waste

Hazardous chemical waste is sent to Nord (previously known as Kommunekemi). Collect liquids in empty bottles/containers and mark them with the content. Collect centrifuge tubes, pipette tips and other items with chemical residues in "preserving jars". When the chemical waste containers are full, they are taped up, applied with lab number and name and placed on the table for waste in the middle of the hallway each Thursday between 1:00 PM and 1:30 PM - not before, not later. Outside of these hours, waste is stored in the cupboard for chemicals next to the fume cupboard.

Infectious waste and laboratory waste in general must be disposed of via the square steel containers. When the steel container is full, write the lab number on it and place it for autoclaving.

Infectious recyclable material is sent in the round steel containers to the wash-up facilities. Label the steel containers with a lab number and place them by the door at the end of the day.

Harmless material that needs to be washed up is to be rinsed with demineralised water and placed in the containers for wash-up. Place the container by the door at the end of the day.

Dispose of scalpels and needles in needle boxes. When a needle box is full, close it and apply autoclave tape. Dispose of it in the round autoclave containers.

See also the waste handling charts that must be placed visibly in the laboratory.

The Safety Adviser unit at AU can be contacted here:
http://medarbejdere.au.dk/en/administration/hr/workingenvironment/physical-work-environment/safety-adviser-function/

Instructions in the use and storage of flammable liquids and chemicals

Definitions:

Liquid:	Substance that is liquid at ordinary temperatures and pressures.
Flash point:	The lowest temperature at which a liquid emits an ignitable vapour.
Flammable liquid:	Liquid with a flash point of less than 100°C.
Class I:	Flammable liquid with a flash point of less than 21°C.
Class II:	Flammable liquid with a flash point of 21-55°C.
Class III:	Flammable liquid with a flash point above 55-100°C.

All three classes are divided into subclass 1 of liquids that are not water miscible in any respect, and subclass 2 of liquids that are water miscible in every respect.

Class	Storage unit	Maximum storage of	
		glassware	type-approved plastic or metal packing
I	1 l	2.5 l	no limitations up to 25 l
II	5 l	5.0 l	no limitations up to 125 l
III	50 l	10.0 l	no limitations up to 1.250 l

Plastic packaging of 125 ml or more must always be approved by the Danish Emergency Management Agency.

The quantities specified comprise the sum of storage, consumption and waste.

All in all, a total maximum of 25 storage units are allowed per laboratory.

Container with flammable liquids of class I-1, I-2, II-1 and III-1 **are not** to be placed in the building's escape routes (hallways, staircases and the like).

Flammable or explosive chemicals:

Avoid working in the vicinity of an open fire or in areas where there is a risk of formation of sparks.

NOTE:
Explosive chemicals, e.g. diethyl ether and petroleum ether, are not to be stored in an ordinary refrigerator.

Reference can also be made to Kiros chemical database http://www.kiros.dk/Web/, and the laboratories' collection of workplace instructions.

See Appendix 2 for a list of flammable and explosive liquids.

ATEX APV

According to the Danish Working Environment Authority Executive Order no. 478 of June 10, 2003, all areas in which chemicals are stored/handled are to be reviewed in order to assess the risk of explosion - a so-called ATEX workplace assessment.

https://www.retsinformation.dk/Forms/R0710.aspx?id=29735

http://arbejdstilsynet.dk/da/regler/at-vejledninger/a/c-0-9-arbejde-i-eksplosiv-atmosfaere.aspx

Instructions in working with dry ice and liquid nitrogen

Dry ice:

There is a risk of frostbite injuries to the touch. Avoid contact with skin and eyes by wearing suitable gloves and safety glasses. Dry ice releases carbon dioxide by evaporation. Inhalation of high concentrations of carbon dioxide can cause suffocation.

In case of transport by car, the container is to be placed and fixed securely in the boot separated from the driver's cab. The driver must know the risk of the load and the precautions to take in the event of an accident or an emergency situation. In principal, dry ice should not be transported in an elevator in connection with passenger transport. In case of transport in an elevator, the dry ice must be stored in a closed container, e.g. in a polystyrene box with the lid closed.

Special rules apply to the sending of packets containing dry ice. For guidelines see this link:

http://medarbejdere.au.dk/en/administration/hr/workingenvironment/physical-work-environment/safety-adviser-function/guides/dangerous-goods-consignment/dry-ice-shipments/

Liquid nitrogen:

Liquid nitrogen can by contact with skin/eyes cause frost bites. Use gloves that protect against cold and pressure influences. The gloves must fit so loosely that they can be shaken off easily. Vaporized gas can displace the atmospheric air, and there may thus be a risk of suffocation. Avoid contact with the liquid and cold product. Ensure adequate ventilation. Avoid inhalation of cold vapours. Do work in a fume cupboard if possible.

Transport of liquid nitrogen must take place in suitable, closed containers that secure the container against tipping over, overheating and the like. Liquid nitrogen must not be transported in elevators in connection with passenger transports. There is an oxygen alarm in room 027, in which the liquid nitrogen containers are stored.

Transport of animals outside the animal facilities

Anyone who is to work with animal experiments must complete a course in animal scientific experiments. Please note that a special set of rules applies to access to, and use of the animal facilities in building 1244.

No work involving live animals must take place in building 1242. In the Bartholin complex, all work involving live animals take place in the animal facilities.

Information is available on the website of the animal facilities: http://biomed.medarbejdere.au.dk/en/core-facilities/animal-facilities/

If animals are taken from the animal facilities and transported to a lab located in building 1242, the following rules apply:

- If the animal is put down in the animal facilities, it can be transported to the lab in a plastic bag. In the lab, the bag with the animal can only be opened in a fume cupboard or a sterile bench in order to prevent the spread of allergens.

- The requested organs are removed, and the remains of the animal are placed in a plastic bag and disposed of in the frost-container for dead animals in the animal facilities.

- If live animals are to be transported between buildings (to a lab that has been approved as a class animal), it must be in a transport box. Transport boxes can be obtained from the animal facilities and are transport boxes that have been used for the delivery of laboratory animals to the animal facilities. The transport box must be disposed of after use.

- Animals that have been taken out of the animal facilities must never be returned alive to the facilities.

There are special rules regarding transport of live animals that can be found on the website: http://biomed.medarbejdere.au.dk/en/core-facilities/animal-facilities/

Physical and psychological working environment

Physical working environment:

The physical environment of the workplace is important to the employees' well-being and satisfaction. It is, therefore, important to draw attention to problems in time. There may be problems with poor indoor air quality, warm offices, poor lighting, unfavourable work positions, heavy lifting, etc. This is done by contacting a working environment representative who will be able to help solve the problem or create the necessary contact to the management.

Department of Biomedicine's policy for a good psychological working environment:

Good physical and psychological working conditions are important preconditions for us to achieve our goals - and are important for the individual employee's well-being and efficiency. Department of Biomedicine must be an attractive workplace where employees and students can work in a safe and healthy environment, and the working environment is assessed positively by staff, students and government agencies and institutions.

A good psychological working environment is a significant contributing factor to our inclination to perform well in the day-to-day business, and this is also contributing to the development of our workplace toward a good performance.

The individual employee must have the opportunity to use his/her abilities, have an influence on the planning of his/her work and have good opportunities for personal development, and trough this strengthen his/her desire for and pleasure in the work - this is a decisive factor when it comes to counteracting stress.

All types of harassment including sexual harassment are unacceptable. Our daily interaction with each other must be characterised by respect and tolerance both verbally, physically, psychologically and culturally.

It is the responsibility of the management to ensure that there is a good psychological working environment, but it is also the obligation of all employees to contribute constructively to improving the good working environment. *We must all have a sense of responsibility for each other.*

A positive view on differences among employees has a significant impact on the psychological working environment. If everyone respects everyone's efforts in the workplace and actively engages in a dialogue about the duties to be performed, it will result in a synergy benefit. An accommodating attitude and helpfulness are, in that connection, important for a good psychological working environment.

You are always welcome to approach your working environment representative if you have issues to discuss.

Every three years a psychological workplace assessment for AU as a whole is carried out. Reference groups and action plans are created subsequently.

Aarhus University's policy for a good psychological working environment:

A good psychological working environment is a prerequisite for job satisfaction and well-being in the workplace. A good psychological working environment means that there is a balance between the demands made on the employee and the resources and skills of the employee. In case of imbalance the risk of stress, conflict, poor well-being, increased sick leave, etc. increases.

Problems associated with the psychological working environment may be connected to, for example, a poor indoor climate or other physical loads. It is, therefore, important to consider the possible factors that may affect the psychological working environment.

On a day-to-day basis, questions concerning well-being are often handled in collaboration between the management and the union representative, and the liaison committee and the working environment organisation may also be involved.

Well-being, stress and bullying are topics within the psychological working environment, and on the pages, you can find detailed information about the various topics:

http://medarbejdere.au.dk/en/administration/hr/workingenvironment/psychological-work-environment/

Physical and psychological workplace assessment:

Every three years a survey of the physical and psychological working environment at AU as a whole is carried out. The survey is carried out using a questionnaire, i.e. a workplace assessment. Here, the employees will be able to draw the attention of the management to problems that need to be taken care of, and propose solutions that are for the benefit of the working environment. After completion of the survey, groups are created and action plans are carried out to solve the problems.

The workplace assessment must be placed in a location that is accessible to everyone.

Psychological counselling

AU has entered into an agreement with Dansk Krisekorps, a health advisory company, to provide psychological counselling for all employees of the University.

A joint scheme for psychological counselling is an important element in the University's efforts to reduce stress, cooperation issues, abuse and crises that may have a negative effect on an employee's work and performance. The scheme will give employees access to third-party psychological counselling in any situation that could affect the employee's capacity to work.

Aarhus University has chosen a plan that comprises both referred and anonymous counselling.

Referred counselling:

Via the referral scheme, the employee can receive five consultations with a psychologist or another adviser.

To apply for referral, the employee must apply via his/her immediate superior. At this stage, the employee can choose to involve a union representative. When the immediate superior has been informed of the issue and has authorized funding of five hours of consultation, he/she will then contact Dansk Krisekorps directly (unless otherwise agreed):

- by mail: info@danskkrisekorps.dk (the employee will then be contacted within 24 hours) or
- tel. no.: 7022 7612 (9-15) or 7022 7610 (acute).

When contacting Dansk Krisekorps, please state the following:

- Name of employee
- Civil registration number (CPR)
- Telephone number (private)
- Main academic area and Department/area/centre

Dansk Krisekorps will then contact the employee for an exploratory interview. Next, a fully confidential process with a psychologist will begin. When the five consultations are over, the employee and the manager are responsible for agreeing on a plan of action in relation to the employee's present and future work situation.

For the manager, it is important to involve the relevant HR partner at an early stage and preferably throughout the referral. AU HR recommends that the manager and employee have a meeting halfway through the counselling and again after the final consultation (about 8th or 10th week).

In the event of a referral, the referral date and number of hours are registered.

Anonymous counselling:

To obtain anonymous counselling, the employee calls Dansk Krisekorps counselling hotline on tel.: **7022 7612 (9-15 on weekdays) or 7022 7610 (acute)** directly. The counselling hotline is open 24 hours a day, and the employee is entitled to three consultations with a registered psychologist or other adviser.

If, after three consultations, the psychologist or advisor estimates that additional consultations are necessary, the employee can be transferred to the referral scheme. The employee will then be required to give up his/her anonymity and the employee's immediate manager will be contacted. At this stage, the employee can choose to involve a union representative or AU HR.

From this point forward, the procedure is identical to the referral scheme procedure.

Please note! All employees must bring a copy of their latest salary statement to the first interview with the psychologist.

It is, of course, possible to seek psychological counselling in English.

If you have any questions about the scheme, you are welcome to contact the Working environment in AU HR or your HR partner, who will handle your inquiry confidentially.

Handbook on psychological workplace environment:

The Danish Working Environment Authority has published a handbook on psychological workplace environment that can be downloaded from the following link:
http://arbejdstilsynet.dk/da/temaer/tema-psykisk-arbejdsmiljo/Handbog-om-psykisk-arbejdsmiljo.aspx

Special guidelines for pregnant women

When you are pregnant, you and your immediate supervisor are to reassess your project and its procedures to assess whether there are problems in relation to a pregnancy.

When pregnant, you have an increased responsibility in checking the workplace instructions of the substances that you are working with. It is of particular importance to check whether the reagent is to be avoided when pregnant.
If you need to use a reagent that you cannot handle yourself ask your colleague to help handle the product.

Further information is available on the website of the Danish Working Environment Authority (At-vejledning A. 1.8):
http://arbejdstilsynet.dk/da/REGLER/At-vejledninger/G/A-1-8-Gravides-og-ammendes-arbejdsmiljoe.aspx

Rules for working with radioactivity during pregnancy and nursing:

Pregnant women's work must be planned to the extent that there is no risk that the exposure of the unborn child exceeds 1 mSv. "The National Institute of Radiation Protection" considers this dose limit to be observed if no work is done with larger volumes than:

^{32}P: 5 MBq (135 µCi)
^{3}H, ^{14}C, ^{35}S or ^{33}P: 50 MBq (1.35 mCi)

Pregnant women must not perform iodination with ^{125}I, and they must change personal dosimeter once a month.
If a pregnant woman works in a lab where other staff or students work with open radioactive sources, the dose and risk of these are to be included in the overall assessment of the load.
The Work Medical Clinic may be included in the risk assessment.
If a woman is breastfeeding for a period of time when she is working with radioactive substances, the breastfeeding must be taken into account as radioactivity in the event of an accident can be transferred to the child through the breast milk. If the woman is working with activity quantities that are less than the limits of an S1 authorisation, the risk, however, is tiny.

Working environment organization

Leader of the Occupational Health and Safety group: PEDER S. MADSEN, **tel. 871 67792/2328 2255**

Occupational Health and Safety group	**Working environment representative**	**Phone**	**Leader**	**Phone**
Build. 1233	Biomedicine **South**			
	Majken Sand Christian V. Westergaard	871 67174 871 67061	Rikke Nielsen	871 67647/2778 2817
Build. 1160/1182	Biomedicine **West**			
	Lone Overgaard Anne Lillevang	871 67758 871 67745	Steen Nedergaard	871 67724
Build. 1170				
	Anja Aagaard Debbie Lemming	871 67052 871 67078	Olav Andersen	871 67786/2037 0740
Build. 1242	Biomedicine **East**			
Animal facilities	Janni Kær		Ulla Dansberg	871 67601/2899 2529
	Tina Fuglsang Bettina Bundgard Heidi Schou Knudsen	871 67018 871 67036 871 67678	Uffe Skov Sørensen Charlotte Petersen	871 67832 871 67834

References (The following references are in Danish only)

Guidelines for gene technological work in class 1 laboratories:

Reglerne er udarbejdet på grundlag af Arbejdsministeriet bekendtgørelse nr. 642 af 28. juni 2001 "Bekendtgørelse om genteknologi og arbejdsmiljø". Der henvises i øvrigt til At-vejledningerne C.0.4, april 2004 "Klassifikation af laboratorier til genteknologisk arbejde" og C.0.5, april 2001 "Risikovurdering af genteknologiske forskningsprojekter m.v."
https://www.retsinformation.dk/Forms/R0710.aspx?id=121099
http://arbejdstilsynet.dk/da/REGLER/At-vejledninger/K/C-0-4-Klassifikation-af-laboratorier.aspx
http://arbejdstilsynet.dk/da/regler/at-vejledninger-mv/stoffer-og-materialer/c-0-5-risikovurd-af-genteknologisk-.aspx

Code of conduct for microbiological work:

- Universiteter og forskning - Arbejdsmiljøvejviser 36.
  http://arbejdstilsynet.dk/da/arbejdspladsvurdering/arbejdsmiljovejvisere/2009-36-universiteter-og-forskning.aspx
- Udsættelse for bakterier, svampe og andre mikroorganismer - At-vejledning C.0.18, September 2006
  http://arbejdstilsynet.dk/da/regler/at-vejledninger-mv/stoffer-og-materialer/c-0-18-mikroorganismer.aspx
- Bekendtgørelse om biologiske agenser og arbejdsmiljø, Arbejdstilsynets bekendtgørelse nr. 57 af 27. januar 2011.
  http://www.ilo.org/wcmsp5/groups/public/---ed_protect/---protrav/---ilo_aids/documents/legaldocument/wcms_202324.pdf

Code of conduct for work in an isotope lab:

- Sundhedsstyrelsens Vejledning om strålebeskyttelse ved arbejde med åbne radioaktive kilder,2005
  http://www.sst.dk/publ/Publ2005/SIS/Vejl_aabne_kilder/Vejl_aabne_kilder.pdf
- Sundhedsstyrelsens bekendtgørelse nr. 954 af 23/10/2000: Bekendtgørelse om anvendelse af åbne radioaktive kilder på sygehuse, laboratorier m.v.
  https://www.retsinformation.dk/Forms/R0710.aspx?id=21441
- Sundhedsstyrelsens bekendtgørelse nr. 823 af 31/10/1997: *Bekendtgørelse om dosisgrænser for ioniserende stråling.*
  https://www.retsinformation.dk/Forms/R0710.aspx?id=85966

Test of gloves:

Der er foretaget tests på en lang række handsker, med henblik på at kortlægge engangshandskers brugbarhed som beskyttelse mod forskellige stoffer.
En opdateret liste kan ses på adressen:
http://health.medarbejdere.au.dk/fileadmin/www.medarbejdere.au.dk/hr/Arbejdsmiljoe/Arbejdsmiljoe/Health_arbejdsmiljoe/handsketest.pdf
Ønsker du selv at få foretaget en handsketest findes en blanket hertil på samme adresse

Instructions in work with hazardous substances:

Reference (Arbejdstilsynet):
http://arbejdstilsynet.dk/da/brancher/undervisning-og-forskning/wwwforskningatdk/de-vigtigste-regler/kemi-.aspx

Flammable liquids and chemicals:

Tekniske forskrifter for brandfarlige væsker, Statens Brandinspektion 15. juni 1985 (nu under Beredskabsstyrelsen).
http://brs.dk/forebyggelse/brand/Documents/Meddelelse%20nr.%204%20af%2016.2.2010.pdf

Appendix 1. Radioactivity

Activity units**:**

1 Bq is one radioactive decay per second
1MBq is 1 million radioactive decays per second

1 mCi = 37 MBq
1 MBq = 27 µCi

The following isotopes are used at the Department of Biomedicine, the Bartholin Building:

Isotope	Radiation type	Maximum energy (MeV)	Half-life	Radionuclide group
^{3}H	beta radiation	0.018	12.3 years	4
^{14}C	beta radiation	0.159	5760 years	3
^{35}S	beta radiation	0.167	87.2 days	4
^{32}P	beta radiation	1.71	14.3 days	3
^{33}P	beta radiation	0.249	25.4 days	3
^{125}I	gamma radiation	0.035	60.1 days	2

^{125}I and $^{32}P/^{33}P$ material must be stored until the radioactivity is below the limit fixed by the Danish Health and Medicines Authority cf. Executive Order no. 954.

Radiation protection:

For beta particles, a maximum reach is calculated which is dependent on the energy of the particle. The particle is slowed down, and the heavier the slowing agent is, the faster the particles are slowed down. A few chosen agents are specified here:

Isotope	Water	Perspex/Glass	Air	Shielding required at
^{35}S and ^{33}P	0.3 mm	0.2 mm	25 cm	> 1.3 mCi/50 MBq
^{14}C	0.3 mm	0.2 mm	25 cm	> 1.3 mCi/50 MBq
^{32}P	10 mm	5 mm*	700 cm	> 0.13 mCi/5 MBq
^{125}I	Shielding by 3 mm lead or lead glass**			> 27 mCi/1000 MBq

*In praxis, shielding is recommended at > 25µCi.
**In praxis, shielding made of lead or lead glass is always recommended.

The weak beta particles from ^{3}H will be slowed down by the passage of a few micro litres of water. For the gamma radiation, the conditions are more complicated, but the radiation from ^{125}I will be halved after the passage of, for example, 0.2 mm lead, 5 mm aluminium or 3 mm H_2O.

Storage of radioactive agents:

The stock of ^{125}I and $^{32}P/^{33}P$ must be stored in a refrigerator or freezer in building 1242, room 360. A radioactivity warning sign must be posted on the entrance door and the repository for radioactive isotopes.

Maximum limits for work with radioactivity:

The isotope lab in building 1242, room 360, is classified as a type C lab. The lab is distinctive in the way that is has a drain directly into the sewer.

For isotope work in S1 labs (labs with a fume cupboard, which are classified to work with radioactivity), the following maximum limits apply (MBq/mCi):

S1-laboratory (Type C laboratory)	^{125}I	^{32}P, ^{14}C, ^{33}P	^{3}H, ^{35}S
Stock (MBq/mCi)	500/13.5	5000/135	50000/1350
MBq/mCi in use per time in:			
simple wet operations	50/1.35	500/13.5	5000/135
wet operations	5/0.135	50/1.35	500713.5
operations with dry material	0.5/0.0135	5/0.135	50/1.35

If you want to exceed the limits in special tests, it is possible to apply for permission in the individual cases.

Here are examples of what is meant by

"simple wet operations":	Collection from stock solution, dilutions.
"wet operations":	Ordinary experiments.
"operations with dry material":	Work that involves a risk of dust: chromatograms, evaporation, dried gels.

The term "in use per time" means the maximum activity that may be used in the lab at a time. If several experiments are taking place simultaneously in a lab, the volume per experiment must be reduced for the sake of the increased risk of contamination of persons by work and accidents.

The maximum amount of radioactivity that may be stored in a lab is identical to the maximum amount that may be used in a "wet operation".

Guidelines for working with the isotopes ^{3}H, ^{14}C, ^{33}P and ^{35}S:

1) When collecting from rubber cap ampoules: always stick a needle with a cotton pledget in the ampoule before use in order to compensate for pressure differences (many compounds have been dispatched in dry ice and will therefore assume considerable excess pressure when heating to room temperature).

2) Work with above-mentioned isotopes can only take place in approved type C labs. Naturally, a general vigilance must be demonstrated. Therefore, always use plastic trays, gloves, etc. when working.

3) Persons who work with more than 400 MBq at a time must submit a urine sample. Please contact your local working environment leader.

Waste and cleaning after working with ^{3}H, ^{14}C, ^{33}P and ^{35}S:

1) *Liquid waste* is diluted to less than 2.7 µCi/L (0.1 MBq/L) and poured into the sink. Always rinse thoroughly with clean water and leave, for example, the water running in the sink for 5 minutes after discharge. You can also pour the isotope directly into the drain. Per month, the maximum discharge of ^{35}S and ^{3}H in the sink is 13.5 mCi (500 MBq) and 1.35 MCI (50 MBq) of ^{14}C and ^{33}P.

2) All solid waste must be disposed of in a yellow, hazardous waste container that you mark with the name, room number and the name of the isotope. When the container is full, contact the person responsible for radioactive waste (Ole Frandsen). The container can be sent to incineration when the total radioactivity is less than 1.3 mCi (50 MBq). Less than 0.01 MBq/kg (0.27 µCi/kg) is considered to be inactive and discarded as general hazardous waste.

3) Glassware and the like that have been used for preparation soak overnight in soapy water (e.g. Decon 90) and are rinsed thoroughly before they are sent to the wash-up facilities.

4) Check your workplace at least once a month. Take a piece of wet filter paper (such as Whatman 3 MM, diameter 2.4 cm) and wipe table, sink, and similar places. Dry the paper and run it through a scintillation counter.

5) Check the lab regularly with a monitor.

6) Keep a record of control measurements.
If the lab is only used for work with open radioactive sources periodically, warning signs must be removed outside such periods.

Guidelines for working with the isotope ^{32}P:

1) Always keep the ^{32}P ampoule in a lead container.

2) All work with isotope amounts larger than 1 mCi (37 MBq) must take place in the isotope lab 360. Keep the handling of the isotope behind plexiglass shielding or similar shielding. Work with smaller amounts of isotopes must take place in the classified labs only. These labs are clearly marked.

3) Always do work in plastic trays and always wear gloves during the work. (Use thin plastic gloves on top of the rubber gloves.

4) Always have a monitor by the workplace.

5) Regularly check yourself and the workplace with the monitor – also check when you leave the workplace.

6) Keep a record of control measurements.
If the lab is only used for work with open radioactive sources periodically, warning signs must be removed outside such periods.

7) Use plexiglass or lead containers for transportation between labs.

Waste and cleaning after working with ^{32}P:

1) *Liquid waste* is diluted to less than 2.7 µCi/L (0.1 MBq/L) and poured into the sink in the isotope lab. Rinse thoroughly with water. Liquid waste that contains more than 0.5 mCi (20 MBq) ^{32}P must be collected in specific containers. Per month and permit, the maximum discharge into the sink is 1.3 mCi (50 MBq).

2) *Liquid waste* that apart from ^{32}P contains organic solvents (phenol or formamide) either ought to be collected in a fume cupboard (i.e. a glass bottle with other phenol waste) until the isotope is decayed, or placed in a closed tube in a hazardous waste container in the isotope room.

3) *All solid waste* that is ^{32}P contaminated must be collected. Use the waste containers that are placed in the isotope laboratory. A measurement of less than 2.7 µCi/kg (0.01 MBq/kg) is considered to be inactive and is disposed of as ordinary hazardous waste. Slightly contaminated equipment (gloves and the like) are thus discarded in the regular hazardous waste containers.

4) *Glassware and the like* that have been used for preparation are washed with Decon 90 (only use the sink in the isotope laboratory). If there is no traceable contamination after the washing, send the items to the wash-up facilities. If the items are still contaminated immerse them in the decontamination bath overnight. If this is still not sufficient, store the glassware for ten half-lives.

5) Cleaning of the workplace. Check the workplace using the monitor and clean the contaminated areas. Have in mind that an isotope lab does not necessarily have to be contaminated! Keep a record.
If the lab is only used for work with open radioactive sources periodically, warning signs must be removed outside such periods.

6) ^{32}P waste from the isotope lab in room 360 is stored for approx. ten half-lives. You can send the box to incineration when the content of the box is less than 1.3 mCi (50 MBq) and radiation is less than 5 microSv on the outside of the box.

Guidelines for working with the isotope ^{125}I:

Contact the person responsible for working with radioactive isotopes in the respective sector before starting to work with this type of isotope. The person responsible will provide detailed instructions in this type of work.

1) All work with the isotope ^{125}I in the free form must take place in the fume cupboards of the isotope room, room 360. An extra protection shield of lead glass must be attached to the fume cupboard. As free IOD, in particular, is hazardous, you must especially take caution not to get the substance on your body or internally. Work with iodinated molecules (proteins, etc.) must take place in type C labs.

2) Keep the ^{125}I ampule in a lead container.

3) Always keep a monitor at the workplace.

4) Persons doing iodination work must submit a urine sample. Contact your local working environment manager.

5) Regularly check yourself and the workplace with the monitor – also check when you leave the workplace.
   Keep a record of the control measurements.
   If the lab is only used for work with open radioactive sources periodically, warning signs must be removed outside such periods.

Waste and cleaning after working with ^{125}I:

1) *Liquid ^{125}I waste* is collected in bottles in a lead container marked "Liquid ^{125}I waste" in the fume cupboard in the isotope lab. The flask must contain 1 M NaOH. Liquid waste containing less than 2.7 µCi/L (0,1 Mbq/L) can be poured directly into the sink. All in all, per month, 0.13 mci (5MBq) can be poured into the sink.

2) *Solid waste* containing ^{125}I is placed in a lead lined container in the depot at the north side of Building 1171. Solid waste containing less than 0.01 MBq/kg is considered ordinary hazardous waste.

3) *Glassware and the like* is rinsed with 0.5 M NaOH that afterwards is poured into the bottles marked "liquid ^{125}I waste" or in the sink depending on the degree of contamination. After that, rinse a couple of times with cold 1% NaI and wash with Decon 90. If the monitor cannot trace any sign of contamination after the wash, send the items to the wash-up facilities, otherwise continue the washing until no radioactivity is traceable. <u>It is an advantage to use disposable plasticware</u>.

4) *Cleaning of the workplace*. Check fume cupboards and gloves with the monitor and clean contaminated areas, if any, with 0.5 M NaOH and 1% NaI.

5) Waste is stored for at least 1 year. Each sack must contain 135µCi at the most when it is sent to incineration. The dose rate must not exceed 5 microSv/h on the outside of the box.

Appendix 2. Flammable and explosive chemicals

Frequently used solvents – The Emergency Management Agency			
Liquid	**Flash point**	**Fire rating**	**Number of litres per storage unit**
Diethyl ether	-45°C	I-1	1
n-Hexane	-22°C	I-1	1
Acetone	-20°C	I-2	1
Tetrahydrofuran	-14°C	I-2	1
n-Heptane	-4°C	I-1	1
Ethyl acetate	-4°C	I-1	1
Acetonitrile	2°C	I-2	1
Toluene	4°C	I-1	1
Methanol	11°C	I-2	1
2-propanol	12°C	I-2	1
Dioxane	12°C	I-2	1
Ethanol	13°C	I-2	1
Butyl acetate	22°C	II-1	5
m-Xylene	25°C	II-1	5
Acetic acid	39°C	II-2	5
N,N-Dimethylformamide	58°C	III-2	50
Dimethyl sulfoxide	95°C	III-2	50

Source: http://www.e-pages.dk/hk/1645/32

Executive Order on the technical regulations for flammable liquids (in Danish):
https://www.retsinformation.dk/forms/R0710.aspx?id=128847