**Labrules for the**

**Cell lab**

**Room K3-309**



 1. General rules for IBT

1. Protective equipment

* Gloves must be used when necessary. Take them off when the lab work has ended or when you leave the lab.
* Eye protection must be used in areas where it is mandatory or when there is a risk of injury to eyes (e.g. corrosive chemicals or high/low pressure). The NT-faculty has a written an eye protection regulation (the faculty’s web).
* Ventilation hoods/ spot hoods must be used when working with volatile, hazardous or malodorous chemicals.

2. Equipment and chemicals

* Overview of IBT’s chemicals with material safety data sheet (MSDS) can be found in NTNU’s electronic chemical register, Ecoonline (My bookmarks → organizational → Fakultet for Naturvitenskap og Teknologi → stoffkartotek). Paper copies in Norwegian and English are located in relevant labs. Users of chemicals must check the MSDS information.
* The technical staff routinely prepares stock solutions of chemicals that are documented with weight forms. Everybody that prepare these solutions must use weight forms (e.g. if we run out and the technical staff does not have capacity to supply in short notice). Empty forms can be found in binders in lab. Forms that are filled out should be archived in these binders.
* Room U07 in Kjemiblokk 3 is used for common storage of chemicals. Used the log book when borrowing/ removing chemicals.
* It is everybody’s responsibility to order common chemicals and equipment before we run out. If relevant, inform the room administrator or supervisor. It may take a while to receive supply.
* Orders are sent to IBTs ordering staff (”fagbestillere”) by electronic requisition forms. See innsida: My bookmarks → organizational → Institutt for Bioteknologi → Routines → Bestillingsrutiner.
* Registrations of chemicals that are emptied or disposed and not replaced must be removed from Ecoonline. Empty original packing (boxes etc.) must in such cases be labelled with Ecoonline location and placed in collection boxes/ trays in room K3-403 (Kjemiblokk 3) or D1-174 (Realfagbygget)
* Chemicals in the categories ”toxic”, ”very toxic” or ”explosive” must be secured from public access in cabinets, fridges etc. with locks or in or safes.
* Stock-chemicals in unoriginal packing must be labeled according to local routines (se innsida: My bookmarks → organizational → Institutt for Bioteknologi → HSE (Health, safety and environment → Merking). Other goods (ager plates, samples etc.) must be labeled with date and name. Unlabelled goods will be discarded.
* In order to identify owners of chemicals and goods, each lab has an initial list for the users (e.g. “EDE” = Emanuel Desperado).
* Always use log books when established.

3. Behaviour in lab

* Eating and drinking in lab is prohibited
* Keep the lab tidy and clean
* Don not contaminate stock chemicals: Never return chemicals to the stock container and always use clean spatulas
* Confer the room administrator (romansvarlig) before you borrow/ remove equipment
* It is prohibited to work alone outside normal working hours in case there is a rask for acute health injury that prevents call for help (e.g. entry to the -40 C room, working with cyanides). See risk assessment.
* Contact room administrator if you plan activity that is not in accordance with information from the room card.
* Report aberration by the electronic aberration form (NT-faculty’s web pages)

4. Risk assessments

* All activity at IBT should be subjected to risk assessment. The project leader is responsible for the preparation of risk assessment documentation for activities with risk. Risk assessments and operating instructions are archived and accessible on innsida (My bookmarks → organizational → Institutt for Bioteknologi → HSE Health, safety and environment → Risikovurderinger IBT)
* Everybody that starts working in lab should send the following to the HSE-coordinator:
1. Risk mapping and risk assessments
2. Signed documentation for guiding and training in lab (last chapter in this document).

5. HSE-contact persons

* Leaders in all levels (including. Project leaders and supervisors) are responsible for the lab security.
* HSE-coordinator, safety deputy, room administrators.
* Other roles can be found on innsida (My bookmarks → organizational → Institutt for Bioteknologi → HSE Health, safety and environment → Organisering)

6. HSE-information

* Fire instructions (building)
* Room cards (room)
* Material safety data sheets (chemicals)
* HSE-info can be found at innsida:
	+ My bookmarks → organizational → Institutt for Bioteknologi
	+ My bookmarks → organizational → Fakultet for Naturvitenskap og Teknologi

**2. Specific rules for the “Cell lab”**

**2.1. General info - status of the laboratory**

• The cell lab is restricted to room K3-309.

• Relevant regulations for cell lab are Norwegian national regulations the "”Forskrift om vern mot eksponering for biologiske faktorer (bakterier, virus, sopp m.m.) på arbeidsplassen” (FVB) and ”Forskrift om innesluttet bruk av genmodifiserte mikroorganismer” (FGM).

• The Cell Lab has status:

A) **Laboratory of organisms to infection grade 21 according to FVB**
B) **Laboratory of the contained use of genetically modified microorganisms (GMM) up to business class 22 according to FGM**
This means that it is permissible to work with biological tissues and groups of microorganisms that represent a moderate risk of infection. Activity in these rooms shall be in accordance with local and national regulations (FVB, FGM, HMSR-05 (NTNU guideline), etc.).

• Unless otherwise specified the containment level 2 is used as defined in FVB and FGM. Containment levels can be reduced to levels 1 if in accordance with the activities. Reduced cintainment levesl should be posted on the door and communicated to other users.

Footnotes:
1) Defined in § 6 of the FVB. The creation of the laboratory and initial notification of work in risk 2 is sent to the Labour Inspection cf. Chapter 7. Consequently, additional reports of class 2 work are not required (FVB § 20). Description of the containment level and associated containment measures are given in § 11 FVB
2) Description of the activity classes can be found in FGM § 6. Associated containment and control measures are described in the FGM, respectively. § 8 and Annex C.

**2.2. Documentation for projects in the risk and and infection class 2**

Documentation must be written for projects in risk and infection class 2. Here "project" refers to a given type of work with a biological factor (eg. Studies of genes involved in biosynthesis of the "X" in an organism or a group of organisms, which are uniform with respect to risk characteristics, "Y").

According to. FVB the required documentation must include:

1) **Classification** of the biological factor (FVB see § 6).
2) **Risk assessment.** Risk assessment must be repeated annually and upon any change of circumstances which may affect workers' risks related to exposure to biological factors (see § 7 FVB, NTNU's risk assessment form is used).
3) **Planning** to avoid / minimize the spread of harmful biological agents and reduce the number of exposed workers (see FVB § 9).
4) **Protective measures**, including vaccination and specific procedures for disinfection of work areas and contaminated materials (see § 10 FVB and § 13). The project must assess the need for project-specific routines. The assessment should answer the general rules of the Cell laben are sufficient or whether the project-specific procedures should be established. Documentation describing any new protective measures must be available.
5**) Procedures for storage, handling, transport and waste management in the project** (see § FVB 14). The assessment should answer the general rules of the Cell Labben are sufficient or whether the project-specific procedures to be established. Documentation describing any new procedures should be available.
6) **Measures unexpected exposure** (see FVB § 15).
7) **Medical examination.** Assessment should answer the need for medical examination to provide a basis for preventive measures (see § FVB 19).

For GMM projects, the documentation shall include, acc. FGM:
1) GMM projects to be pre-evaluated and classified according to. FGM § 5 and § 6 FGM-documented requirements involve pre-assessment and (normally) a message to the Health Directorate. Consult the contact person for work with GMOs by IBT.

**The above documentation is sent to the HSE Coordinator for registration and storage**

**3.1 Vaccination**

As mentioned in the preceding paragraph, item "4)", workers should get relevant, effective and safe vaccines (FVB § 10d). Project / and supervisors are responsible to actuate vaccination, so that adequate protection is obtained before work starts. "Relevant vaccines" also includes vaccines against biological agents in other projects conducted on the cell lab. HSE department must be contacted for identification of relevant vaccines and vaccination. For work with human tissue and blood hepatitis B vaccine are normally given (2 doses 1 month intervals provides protection in the following year). The project or the Department must pay for the vaccine.

**3.2 Common Rules for Cell Lab**

**3.2.1 Access to the cell lab**
• Access to the cell lab (C3 and C3-327-309) should be minimized (FVB § 9)
• The following requirements apply to users of cell lab:
- must have experience in good laboratory practice
- must Read, understood and signed labregler
- must be trained in project-specific hazards, safe work practices and actions by accident (the project manager is responsible).
- must be register with the HSE Coordinator

**3.2.2 General procedures**
• There should always be good order in the laboratory.
• It is mandatory to wear a lab coat in the Cell lab. The coat should be taken off when leaving the lab and hung on hooks selected for this purpose. Lab coats must be autoclaved before it is sent to the laundry. .
• When handling micro-organisms in the Class 2 shall be used gloves to protect against micro-organisms / infection risk and any relevant chemicals / or infection. Gloves brands EN 374 protects against both, but it must be checked that the type of glove is relevant to the appropriate chemicals (see glove guide in the lab and workshop manual). Gloves brands EN 455 protects against the risk of infection, but has not been tested with respect to protection from chemicals. Vinyl gloves should not be used.
• Hands must be washed before leaving the area.
• Contaminated reusable equipment must be disinfected
• Work with open cultures / suspensions should only be performed in the sterile bench at room 309
• Incubation of cultures (microtiter plates, culture plates or cylinders) with class 2 organisms should be performed only in room 309
• Cultures should be incubated in a closed system (eg. Sealed in plastic bags).
• Cultivation containers (dishes / flasks / plates) must be labelled “class-2-organisms”.

**3.2.3 Measures prior to work with organisms in infection class 2**
• People with access to room 309 must be informed
• Door to room 309 must be tagged with sign for biological hazards.
• Signs to the cleaning staff / caretaker stating that work with biological agents is in progress and entry is prohibited.
• Work area cleared of extraneous materials.
• Waste management is planned and waste containers prepared.

**3.2.4 Inactivation of biological factors**
• Lab and workshop handbook provide any disinfection procedures and the effect of these (Section 10.6) and common procedures for handling risk waste (infectious waste) are given in kap7.1. Since the effect of these inactivation methods vary between biological factors each project must identify the appropriate disinfection procedures.

**3.2.5 Routine disinfection of work areas**

• At startup and completion of work, all work surfaces must be disinfected according to appropriate methods.
• Floor surfaces should be washed with disposable mop of personnel who have authorized access.

**3.2.6 Measures in case of accidents or spills**

• The project should have specific measures of unexpected exposure (2.2., item 6).
• Spills of microorganisms at work or equipment must immediately be wiped up with paper that is treated as hazardous waste. Exposed area must be disinfected after project-specific procedures (section 2.2, item 4)). Care must be taken in order to avoid spreading of infectious organisms.
• NTNU Guideline HMSR-05 must be followed when working with human material ("Working with the human material"). The guideline describes the action in case of "blood spill on the benches, equipment, etc.," "blood spill on humans / sting injuries" and "Follow-up on risk of blood contamination." Spills of human cells must be wiped up with paper (hazardous waste) and the exposed area must be disinfected.

**In case of accident that could have led to the proliferation of biological material in the risk of infection and enterprise class 2 out of the area is restricted and intended to work with class 2, the supervisor and the department is notified immediately**

**3.2.7 Handling of risk waste - standard routines**

• “**Risk waste**” is Biological material that may represent infection risk or other hazards (including tissue samples, cells, blood, urine, genetically modified organisms) and cytostatic / antibiotics are considered as “Risk wate”. Items that are contaminated with risk waste are included (e.g. stinging / cutting objects such as syringes and scalpel, disposable tubes, inoculation needles, etc.)

• Organic solvents, explosive chemicals and toxic inorganic compounds such as heavy metals (mercury, cadmium, lead, etc.) should **never be mixed with “Risk waste”.**
• **Risk waste is inactivated** by autoclaving, treatment with chemicals or collected in yellow risk waste containers. Risk waste containing chemicals that cannot be autoclaved due to risk of release of hazardous vapor must be inactivated chemically (liquid waste) or disposed of risk waste containers.

• General **procedures for handling risk waste** listed in Table 1. Each project must decide whether this procedure is appropriate. E.g. if autoclaved biological material can be a hazard after autoclaving (toxins, resistance genes against the "last bastion" antibiotic, etc.), it should still be disposed of as risk waste after autoclaving.

• **Yellow risk waste containers** must be labeled with a specific declaration form. Tick for ​​biological waste for incineration, enter the date, Dept. of Biotechnology and sign. Full containers are transported to room DU4-164 in theRealfagbygget. This room is locked. The key is available from the Division Engineer Merethe Christensen (tel. 73598683) or engineering Anita Storsve (tel. 73550788). New risk waste containers retrieved from room DU4-164. Contact the Siri Stavrum for disposal.

Table 1: Management of hazardous waste. Each project must decide whether these procedures are adequate.

|  |
| --- |
| **Collection of risk waste in lab** |
| * *Liquid waste for autoclaving is collected in autoclave bottles*
* *Liquid waste for chemical inactivation is collected in bottles or flasks. Chemical inactivation agents are added.*
* *Solid waste for autoclaving (including disposable tubes with small amounts of autoclavable liquid waste) is collected in autoclave buckets with autoclave bags.*
* *Solid waste that cannot be / should not be autoclaved is collected in yellow risk waste containers*
 |
| **Type of hazardous waste (not stinging / cutting)** | **Suitable for autoclaving** | **Action** | **Comment** |
| Biological material that may represent a hazard Examples: - Bacterial Cells - Mammalian cells - GMO - Antibiotics - Material contaminated with risk waste (e.g. pipette tips disposable equipment, tubes, agar plates, gloves, cultivation tubes, eppendorf tubes, disposable inoculation needles etc.). | Autoclavable | Autoclaved (121 C, 60 min) (minor volumes may be disposed in yellow risk waste containers. After autoclaving, if necessary: - *Solid* *waste* (including agar) is disposed as non-hazardous waste. - *Liquid waste* (not containing agar) is emptied in a sink in a ventilation hood  | Autoclaving is performed at room K3-425 |
| Not autoclavable (health risk) - | - *Liquid waste*: inactivate chemically in a ventilation hood | The project must specify suitable inactivation procedure (caustic soda, chlorine, amine, time of exposure, etc.)  |
| *- Solid waste*: Dispose in risk waste containers  |  |

3. Signing of documentation

Lab rules and guiding in the cell lab, room K3-309

I, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ , have read and understood the lab rules and

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ has been responsible for the mandatory guiding in lab

Date/ signature:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 Trained/ guided person

Date/ Signature:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 Responsible for guiding

Cross out:

**□** I confirm that (1) documentation for mapping of activities and risk assessments for planned activities have been sent to the HSE-coordinator and that (2) risk assessment for new activities have been sent to achive-administrator.

Date/ signature:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 Trained/ guided person

Date/ signature:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_­­­­­­­­­­­­­­­­­­­­­­\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 Supervisor

Send this document (signed) to the HSE-coordinator

**□** Controlled by the head of the institute: Date/ Signature:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_­­­­­­­\_\_\_\_\_