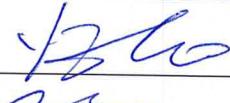


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Changes from previous version:

Section	Summary of Changes	Change Control Number
ALL	1. New document	

1. PURPOSE

Employee safety is of prime importance to the Management at Synoligo Biotechnologies. The Chemical Hygiene Plan (CHP) is intended to summarize the policies and procedures regarding the use of the chemicals in the laboratories.

2. SCOPE

All employees, contract workers / consultants, suppliers and visitors admitted to the site are required to adhere to the CHP. There may be no exceptions and the policy is enforced seven days a week, 24 hours a day.

3. INTERNAL REFERENCES

Document ID	Title

4. EXTERNAL REFERENCES

Document ID	Title
ISO9001	Quality management

5. RESPONSIBILITIES

Job Function and/or Department	Responsibility
All Personnel	<p>It is the responsibility of all employees to adhering to the CHP and all other safety-related documents that direct the correct and safe performance of tasks;</p> <p>employees are expected to exercise good judgment, common sense and conduct themselves professionally in the workplace; and</p> <p>employees are encouraged to be proactive with regard to their safety and the safety of others.</p>

6. DEFINITION

Term	Definition
Aqueous solutions	Solutions that are greater than 80% water
CHP	Chemical Hygiene Plan
EHS	Environmental Health and Safety
Empty	A container is empty when there is no longer a continuous stream of material coming from the opening when the container is held in any orientation.
(l)fpm	(Linear) Feet per minute
PPE	Personal Protective Equipment
Sash	The glass window that travels in the plane of the hood face that opens and closes the hood and protects the user during use.
SDS	Safety Data Sheets (previously known as MSDS (Material Safety Data Sheets))
Spill (release, leak)	When a substance breaches its primary container due to human, equipment or process errors.
Transfer container	Vessel that contains material from a primary container (e.g. purchased materials and incoming goods).

7. General Safety Rules

7.1. It is extremely important that all laboratory safety rules are known and followed by lab personnel. Not only is it important that the rules are understood and followed, it is also important that the Laboratory Supervisor enforce all lab safety rules. A culture of safety shall be adopted by all employees before a lab safety program can be successful. The following general laboratory safety rules should be followed at all times.

7.2. Think safety – work safely:

7.2.1. Prior to beginning work in the lab, be prepared for hazardous materials emergencies and know what actions to take in the event of an emergency. Plan for the worst-case scenario. Be sure that necessary supplies and equipment are available for handling small spills of hazardous chemicals. Know the location of safety equipment such as the nearest safety shower and eyewash station, fire extinguisher, spill kit, and fire alarm pull station. The following are documents that cover this information.

7.2.1.1. Hazard Communication Program

7.2.1.2. Emergency Response Plan

7.2.1.3. Spill Response Plan

7.2.1.4. Regulated Waste Management Plan

7.2.2. Food and drink is prohibited at all times in the laboratories and areas storing hazardous materials.

7.2.2.1. Eating and Drinking is not allowed in the manufacturing areas. This also applies to water bottles.

7.2.2.2. Sealed containers of food and drink may be stored in the office area.

7.2.3. Personal protective equipment shall be required all times when working in a laboratory or when handling chemicals.

7.2.4. Long pants are required at all times when working in all laboratories. Capris do not count as long pants. In the event of a splash, your ankles would not be protected.

7.2.5. Lab coats and gloves are not permitted outside of the manufacturing and chemical areas.

7.2.6. Personal Protective Equipment (PPE) may not be worn in office areas, conference rooms, restrooms or the lunch room.

7.2.7. Headphones are prohibited in the lab areas.

7.2.8. Visitors and contractors shall be required to wear Personal Protective Equipment commensurate with the requirements of the area being visited. For example, if a visitor will tour a laboratory, the Personal Protective Equipment described shall be worn.

7.2.8.1. Visitor including contractor policy is described in SOP.

8. Guidelines for use of Chemicals

8.1. Minimize all chemical exposure

8.1.1. Precautions for handling all laboratory chemicals should be adopted.

8.1.2. Exposure can occur by way of inhalation, skin absorption, or ingestion.

8.1.3. Do not smell or taste chemicals. If you feel the need to test a smell of a chemical, use a wafting method to bring the smell toward you. Do not put your nose directly over a bottle, puddle, or chemical container. The preferred method is to use the Eagle 2 gas monitor- ask a Spill Response Team or EHS member for help. Do not EVER eat something from a lab.

8.1.4. Vent equipment that may discharge toxic chemicals (pumps, DNA synthesizers, rotary evaporators) into local exhaust devices (hoods).

8.1.5. Inspect gloves before use.

8.1.6. Pour chemicals slowly (liquids and solids).

8.1.7. Inspect chemical containers, tanks and drums before using and transport to ensure integrity.

8.1.8. Use good personal hygiene practices. Keep your hands and face clean; wash thoroughly with soap and water after handling any chemical.

8.2. Estimation of risk

8.2.1. Even for substances with no known significant hazard, exposure should be minimized.

- 8.2.2. Unless known otherwise, assume any mixture will be as toxic as its most toxic component.
- 8.2.3. All substances of unknown toxicity are considered hazardous.
- 8.3. Control Exposure
- 8.3.1. Minimize exposures by preventing their escape into the working environment by using fume hoods and other ventilation devices.
- 8.3.2. Keep lids and caps on containers and reaction apparatuses.
- 8.4. Working with Chemicals
- 8.4.1. Do not take chances.
- 8.4.2. Avoid emergencies by planning ahead before starting hazardous operations.
- 8.4.2.1. Be familiar with every step and associated hazards, refer to Safety Data Sheets where applicable.
- 8.4.2.2. Be familiar with emergency systems and equipment in the area you work.
- 8.4.3. Use the appropriate PPE.
- 8.5. Transport of Chemicals
- 8.5.1. A plastic bottler carrier, bucket or lipped cart shall be utilized whenever hazardous materials are carried throughout the facility to serve as secondary containment. Additionally, a hazardous chemical may be transported through the facility in the original shipping container (e.g. a box of 4x 4L solvent bottles). Supervisors and Managers are required to intervene when this requirement is not being met.
- 8.5.2. This applies to hazardous liquids and solids.
9. Housekeeping
- 9.1. Housekeeping is an important element to a laboratory safety program. A clean, well-maintained lab improves safety by preventing accidents and can enhance the overall efficiency of the work being performed. The following laboratory housekeeping guidelines should be followed:
- 9.1.1. Doorways and hallways are required to be free of obstructions to allow unhindered egress.
- 9.1.2. The laboratory should be uncluttered without excessive storage of materials that could cause or support a fire (e.g., paper, cardboard, flammable liquids, etc.).
- 9.1.3. Fire protection sprinklers shall not be obstructed; a minimum of 18 inches of clearance is required below the sprinkler head.
- 9.1.4. Do not store items that block fire extinguishers or eyewash and safety shower stations.
- 9.1.5. Do not store items in front of electrical boxes/panels in the lab.
- 9.1.6. Do not place chemicals near sinks and waterways.
- 9.1.7. A routine cleaning schedule should be established. All work surfaces should be kept as clean as possible. All potentially chemically contaminated work area surfaces (e.g., chemical fume hood deck, countertops) should be cleaned routinely (e.g. daily, weekly).
- 9.1.8. All chemical spills shall be cleaned up immediately.
- 9.1.9. Do not allow materials to accumulate in laboratory hoods and remove used tissues, foil, gloves, or other consumables promptly after use. The safety of the workspace and the hood ventilation may be compromised when chemicals, equipment and consumables are kept in the hoods.
- 9.1.10. Ensure that all waste (e.g., trash, chemically contaminated waste, common lab consumables, etc.) is placed in the appropriate containers. Do not overfill waste containers.
- 9.1.11. All equipment shall be cleaned and returned to storage after each use.
- 9.1.12. Equipment shall be stored in a safe and orderly manner that prevents it from falling.
- 9.1.13. Chemical containers shall be clean, properly labeled, and returned to storage upon completion or usage. Avoid storing liquids above eye level.
- 9.1.14. Empty manufacturing bottles may be rinsed with methanol and placed in recycling as long as the container is empty.

9.1.15. Do not store heavy or frequently used items on top shelves. Locate items used daily close to the work area.

10. Container Labeling

10.1. Incoming containers shall be labeled with at a minimum, state the chemical name (as it appears on the SDS and chemical inventory), the manufacturer, importer, or supplier name and contact information, and the chemicals' hazard information.

10.1.1. Existing labels on incoming/received containers must not be removed or defaced unless the container is immediately marked with the required information.

10.1.2. If label is missing or does not meet requirements, contact EHS.

10.2. Transfer containers and in-house materials shall be labeled if the chemical will not be used within one work shift or if the container will not be constantly attended to and under the user's immediate supervision.

10.2.1. It is best practice to always label transfer containers. This eliminates confusion where there are more than one (unlabeled) containers in use, and ensures that container content is known in the event of an emergency where outside personnel may be involved.

10.2.2. Transfer container labeling shall include:

10.2.2.1. The name of the substance

10.2.2.2. GHS hazard warnings

- Irritant
- Toxic
- Flammable
- Health Hazard
- Corrosive
- Explosive
- Environmental Hazard
- Oxidizing
- Compressed Gas



10.2.2.3. Solutions that are greater than 80% water are considered aqueous solutions.

10.2.2.4. Stickers of GHS symbols are available in the stockroom areas.

10.3. Containers of 100 mL or smaller in size do not need labels affixed to them if they are piped into an instrument. Instead, the area in which they are stored should have signage indicating the name and hazard class of the materials stored. All other containers need to be labeled individually.

11. Personal Protective Equipment

11.1. PPE shall be inspected prior to and as appropriate during each use for defects such as holes, tears, scratches, signs of material deterioration, cracks, poor closure or any other sign of degradation which may affect the PPE performance. PPE with defects shall be immediately removed from service and replaced or repaired.

11.2. PPE shall not be required when moving originally sealed containers and/or in DOT approved packaging.

11.3. PPE Types

11.3.1. Eye Protection

11.3.1.1. Eye protection shall be durable, comfortable and easy to clean. Persons whose vision requires the use of corrective lenses and who by nature of their job duties require eye protection shall wear safety

goggles. Prescription glasses are not considered safety goggles. Safety goggles must be worn over prescription glasses. Alternatively, prescription safety goggles can be worn. See EHS for information on how to get prescription safety goggles.

11.3.2. Hand Protection

11.3.2.1. Hand protection shall be worn when handling hazardous materials to protect from skin absorption, severe cuts or lacerations, severe abrasions, punctures, chemical burns, thermal burns and harmful temperature extremes.

11.3.2.2. The type of hand protection used shall be based on the performance characteristics of the hand protection relative to the task(s) to be performed, conditions present, duration of use, and the hazards or potential hazards identified.

11.3.2.3. Consult with EHS if assistance is needed with glove selection.

11.3.2.4. Glove Types:

- Nitrile – gloves made from nitrile polymer. Good for use with low/non-hazardous chemicals. Ideal for labs with aqueous solutions.
- Neoprene – gloves made from synthetic rubbers of chloroprene. Neoprene gloves are highly resistant to most chemicals. Ideal for working with organic solvents.

11.3.2.5. Mil – unit of thickness for gloves with 1 mil = 0.001 inches.

11.3.2.6. Hand protection provided:

- 4 mil gloves- provided in both Neoprene and Nitrile.
- 8+ mil gloves- provided in Neoprene and Nitrile.
- Orange rubber, long-cuff, puncture resistant gloves. These gloves shall be used during the cleanup of broken glass. Glass pieces must be swept up with a broom and dustpan or collected with forceps.
- Silver Shield 4H gloves: Resistant to over 280 different chemicals, does not contain latex or chemical accelerators; can be used as a secondary inner glove.

11.3.3. Foot Protection

11.3.3.1. Employees working in manufacturing areas are required to wear closed toe shoes which cover the whole foot (no skin should be exposed).

11.3.3.2. In addition, employees working in Hazard Level 1 areas are required to wear non-permeable shoes. Alternatively, employees can wear chemically resistant anti-slip shoe covers provided in the consumable stock area.

- See EHS for questions or assistance in finding and using the right footwear.

11.3.4. Body Protection

11.3.4.1. Body protection shall be worn when there is a potential for contamination or exposure to other parts of the body (e.g., legs, arms, back, chest) from heat, impacts, cuts, and chemicals.

11.3.4.2. Body protection includes the following:

- Lab coats: protective coat worn by workers in a laboratory.
- Disposable Frocks: a loose, lightweight over-garment worn to protect the body.
- Shoe covers: durable covering for shoes extending no higher than the ankle.
- Aprons: a protective garment over the front of one's clothes and tied at the back to protects against chemicals and oils.
- Chemically resistant sleeve covers: sleeve covers that go over lab coats.
- Bouffant caps: provides full hair coverage.
- Coveralls: full-length protective outer garments often zipped up to the front.

- N95 mask: mask that filters at least 95% of airborne particles but is not resistant to oil.

11.3.5. Respirators

11.3.5.1. Respirators only can be worn if training and fit testing is completed. Contact EHS for medical clearance, training, and respirator distribution.

11.3.5.2. In reference to 29 CFR 1910.134(c)(2)(i), voluntary use of respirators: Respirators on site are used on a voluntary basis. Laboratories on site are equipped with ventilation and engineering to avoid reaching any Personal Exposure Limits (PEL), meaning respirators are not required for working. When a respirator is used voluntarily, there is no medical clearance required.

11.4. PPE Requirements for Individual Areas

11.4.1. PPE requirements for Petaluma

11.4.1.1. Entry into all lab areas requires lab coat and safety goggles.

11.4.1.2. No tainted gloves on door handles; only use clean gloves on doors for entry and exit.

11.4.1.3. Working with hazardous materials in all lab areas requires lab coat, safety goggles and gloves, at a minimum. Additional PPE may be required depending on hazardous nature of chemical being used or the operation

- Employees working in the purification labs can wear nitrile or neoprene gloves. Nitrile is preferred.
- Employees working in synthesis labs are required to wear neoprene gloves.

12. First Aid Response

12.1. First-aid kits are located throughout facility. Look for the one closest to your work area(s). They will be mapped on the emergency equipment maps, posted in the facility.

12.2. Each of these first-aid kits shall be monitored by the EH&S Department to ensure items are stocked.

13. Needle Use and Disposal

13.1. Needles, once uncapped, should NEVER be recapped as this is the most common cause of needle sticks.

13.2. Needles should be disposed of in an appropriately labeled waste container (Sharps). These waste containers should be puncture resistant and located near needle usage areas.

13.2.1. The lids of the sharp containers are a one way opening. Place whole needle and plunger into sharps container.

13.2.2. Syringes are then disposed of in the biohazard waste stream. Contact EH&S department for replacement sharps container.

13.3. At no time should any needle, razor blade or similarly sharp item be placed in any Glass Disposal boxes. The plastic bag/cardboard combination in those containers is easily penetrated by needles and can pose a serious hazard to workers.

13.4. If a needle stick should occur, appropriate first aid should be administered based on the suspected substance that needle was in contact with. If this information is unknown, it shall be treated as serious and appropriate action taken to ensure the employees' health.

14. Compressed Gas Cylinder Safety

14.1. Compressed gas storage and safety requirements for use of compressed gases in laboratories detailed below:

14.1.1. Gas cylinder connections and fittings shall be inspected frequently for deterioration.

14.1.2. Never use a leaking, corroded, or damaged cylinder and never refill compressed gas cylinders.

14.1.3. When stopping a leak between cylinder and regulator, always close the valve before tightening the union nut.

14.1.4. The regulator shall be replaced with a safety cap when the cylinder is not in use.

14.1.5. The safety cap shall be in place when a gas cylinder is moved. For large gas cylinders (>27 inches), an

approved gas cylinder cart shall be used.

14.1.6. The cylinder shall be strapped to the cart and the protective cap shall be in place before moving the cylinder. A cylinder should never be moved or transported without the protective cap. The proper way to move a large gas cylinder as shown.

15. Cryogenic Liquid Safety

15.1. A cryogenic liquid is defined as a liquid with a normal boiling point below -150 °C (-240 °F). The most common cryogenic liquid used in a laboratory setting is liquid nitrogen. By definition, all cryogenic liquids are extremely cold. Cryogenic liquids and their vapors can rapidly freeze human tissue and can pose an asphyxiation hazard if handled in confined spaces. The following precautions should be taken when handling cryogenic liquids:

15.1.1. Use and store cryogenic liquids in well-ventilated areas only.

15.1.2. Wear appropriate PPE while handling cryogenic liquids. Proper PPE for handling cryogenic liquids includes lab coat, chemical splash goggles, a face shield, cryogenic-safe gloves, long sleeves, long pants, and closed-toe shoes.

15.1.3. Cryogenic liquids will vent (boil off) from their storage containers as part of normal operation. Containers are typically of a vacuum-jacketed design to minimize heat loss. Excessive venting and/or an isolated ice build-up on the vessel walls may indicate a fault in the vessel's integrity or a problem in the process line. A leaky container should be removed from service and taken to a safe, well-ventilated area immediately.

15.1.4. All systems components piping, valves, etc., shall be designed to withstand extreme temperatures.

15.1.5. Pressure relief valves shall be in place in systems and piping to prevent pressure build up. Any system section that could be valved-off while containing cryogenic liquid shall have a pressure relief valve. The pressure relief valve relief ports shall be positioned to face toward a safe location.

15.1.6. Transfer operations involving open cryogenic containers, such as Dewars shall be done slowly, while wearing all required PPE. Care shall be taken not to contact non-insulated pipes and system components.

15.1.7. Open transfers shall be allowed only in well-ventilated areas.

15.1.8. Do not use a funnel while transferring cryogenic liquids.

15.1.9. Use tongs or other similar devices to immerse and remove objects from cryogenic liquids; never immerse any part of your body into a cryogenic liquid.