
WARNING: Cryovial Safety

WARNING: *Take extra care when storing materials in liquid nitrogen.*

Cryovials are commonly used at UCSF for the cryogenic storage of biological materials. Liquid nitrogen can leak into the vials. If this occurs, the liquid nitrogen will rapidly expand up to 700X its liquid volume as the vial warms. This may result in the vial exploding and/or result in spraying of the liquid from the lid.



Exposure to the liquid nitrogen can cause not only serious physical injury but may also expose you to infection from the vial contents. Recently, a researcher suffered an injury when a cryovial exploded due to liquid nitrogen leaking into the vial (photo above).

Vials can explode if they are not rated for storage in liquid nitrogen OR as a result of ‘creep’ of liquid nitrogen into properly rated vials if the seal fails

Safety Guidelines:

1. Samples for freezing and storage should be placed in appropriate containers such as polypropylene cryovials and not in glass or polystyrene which may crack.
2. All biological samples in cryovials should be stored in the nitrogen vapor phase if possible.
3. When storing samples in the liquid phase, use internally threaded cryovials with a silicone gasket.
4. Do not over tighten the caps prior to freezing as this will distort the gasket.
5. Vials should be certified for use in liquid nitrogen. Do not store cryovials in the liquid phase of liquid nitrogen unless they are correctly sealed in CryoFlex Tubing (available from various scientific vendors).
6. Wear appropriate protective clothing including cryogenic gloves, lab coat or apron, and a face shield during transfer processes.

All laboratory personnel must be aware of the hazards of liquid nitrogen. There are three important points to remember when freezing biological samples in liquid nitrogen.

1. Liquid nitrogen can cause cold burns with potentially severe tissue damage.
2. Vials can explode due to rapid expansion of the liquid to gas phase, particularly when a sample is removed from the liquid phase and thawed.
3. An exploded cryovial with Risk Group 2 or 3 content would constitute a biohazard spill which can contaminate equipment and expose users to infection.