Laboratory Hoods–What's the Difference?

Many biomedical research laboratories use ventilation equipment to protect the worker and/or the experiment. Examples of these devices include: cell culture hood, tissue culture hood, fume hood, laminar flow hood, PCR hood, clean bench, and biosafety cabinet (BSC). It is important to understand how these systems operate as well as their limitations. These containment devices differ in the type and level of protection provided to the worker, the environment, and the experiment. Work involving hazardous agents should always be conducted in an appropriate containment device in order to protect the worker. Therefore, it is crucial to understand the safety features of each device and consider their application to your research.

Biosafety Cabinet

A biosafety cabinet (BSC) is a necessary primary containment device when working with potentially infectious materials. All BSCs use high efficiency particulate air (HEPA) filters to treat intake and exhaust air. These filtered cabinets are designed to protect the experiment and the worker. 70% of the air in most BSCs is recirculated back into the lab through its exhaust HEPA filter. This purifies the air of potentially infectious aerosols and animal dander or bedding but does not reduce exposure to chemicals or gases including waste anesthetic gases such as isoflurane. Only ducted BSCs should be used for work involving both infectious materials and chemicals or waste anesthetic gasses.

Laminar Flow Hood (Clean Benches)

A laminar flow hood (LFH) is NOT a biosafety cabinet. These devices do not provide any protection to the worker. They are designed to provide a sterile environment to protect the product. Air potentially contaminated with infectious agents may be blown out of the enclosure towards the worker. LFHs should only be used for work with non-infectious materials such as media preparation. They should never be used with potentially infectious materials, toxins, volatile chemicals, or materials that may cause hypersensitivity to the worker such as animal dander.

Animal Transfer Station

Animal transfer and cage changing stations are portable downdraft-filtered laminar flow benches (clean benches) that have been specifically modified for small rodent handling and cage changing. These stations provide improved laboratory animal allergen control from dust and dander while performing animal husbandry activities. These units are NOT a biosafety cabinet and should not be used for work with potentially infectious materials, toxins, or volatile chemicals.

Chemical Fume Hood

A fume hood is a ventilated, enclosed workspace intended to capture and exhaust dangerous chemical vapors and particulate matter. No HEPA filtration of either the intake or exhaust air takes place and air is exhausted outside the laboratory. This makes a fume hood most suitable for chemical use and other work where sterility is not a concern. Fume hoods should be utilized for hazardous drug or chemical preparation and use with waste anesthetic gases such as isoflurane. Fume hoods should not be used for infectious biological work. Use of ductless fume hoods is not permitted at UNMC.

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Biosafety Cabinet (BSC)	Laminar Flow Hood (Clean Bench)	Chemical Fume Hood	Animal Transfer Station
			
Designed to protect against exposure to particulates and aerosols from biological agents. Provides product, personnel, and environmental protection.	Designed to provide a sterile work environment. Does not provide any protection to personnel or environment.	Ventilated, enclosed work space intended to capture and exhaust dangerous chemical vapors and particulate matter outside the laboratory.	Designed for animal allergen control while performing husbandry operations including cage changing or animal transfer.
Should only be used for work with infectious agents or for the capture of nuisance dust and allergens from bulk operations such as animal cage changing or dumping.	Should only be used for work with non-infectious materials such as media preparation.	Primarily for chemical use including preparation of hazardous drugs and volatile anesthetic gases used for animal anesthesia and/or euthanasia	Should only be used for husbandry operations with healthy animals that have not been infected with biological agents or administered hazardous drugs.
In general, never use with: • volatile or flammable chemicals • Waste anesthetic gases including isoflurane • Only ducted BSCs may be used for the above	Never use with: • potentially infectious materials • volatile or flammable chemicals • waste anesthetic gases including isoflurane	Do not use where sterility of the product is a concern.	Never use with: • potentially infectious materials • volatile or flammable chemicals • waste anesthetic gases including isoflurane

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