**Biosafety Requirements for SARS-CoV-2 (COVID-19) Laboratory Research at the University of Utah**

# (Adapted from Duke University and ABSA Guidelines)

# Please note that all research with SARS-CoV-2 (COVID-19) requires review and approval by the University of Utah Institutional Biosafety Committee (IBC), PRIOR to commencing any experiments.

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| **Research Activities** | **Biosafety Level** |
| * Storage and laboratory work with seed stocks, working stocks or specimens**1** with the intent to grow or use live virus.
	+ Virus isolation, characterization and/or expansion
	+ Viral cultures or isolates must be transported as Category A, UN2814, “infectious substance, affecting humans.” Contact Environmental Health and Safety (801-581-6590) for shipping
* Use of live SARS-CoV-2 virus in functional assays:
	+ Plaque/Focus Forming Unit assays
	+ Serologic virus capture/binding assays
	+ Therapeutic minimum inhibitory concentration (MIC) assays
 | **BSL-3** |
| * Processing, aliquoting or preparing specimens**1** for research use and storage
* Preparation of chemical- or heat-fixed specimens**1** for microscopic analysis
* Nucleic acid extraction of specimens**1** for molecular analysis
* Preparation of inactivated specimens for other laboratory assessments
* Performing diagnostic tests (e.g. serology) that do not involve activities with the potential to propagate virus
* Inoculating bacterial or mycological culture media
 | **BSL-2+ (enhanced)2** |
| * Molecular analysis of already extracted nucleic acid preparations
* Analysis of specimens**1** that have been inactivated by a method approved by the U. BioSafety Program or documented inactivated by a commercial vendor
* Final packaging of specimens**1** already in a sealed, decontaminated primary container for transport to collaborating laboratories for additional analyses
	+ Specimens from suspected or confirmed cases should be transported as UN3373, “Biological Substance, Category B
* Pathologic/microscopic examination of fixed specimens**1** (e.g. formalin-fixed tissues or glutaraldehyde-fixed grids)
* FACS analysis of samples/specimens that have been inactivated by a method approved by the U. BioSafety Program
* Routine staining and microscopic analysis of fixed smears
 | **BSL-2** |

**The following laboratory activities cannot be performed at the University of Utah at this time due to lack of appropriate workspace:**

* + Live cell sorting with intact virus
* Use of live SARS-CoV-2 virus in animal

# Specimens are defined as, but not limited to, blood, serum, plasma, tissues, feces, urine, sputum, mucosal swabs or washes/secretions collected from patients with COVID-19 or animals infected with SARS-CoV-2: see matrix below for procedures for handling and processing human samples.

1. Required Enhancements to standard BSL2:
	* Personnel will wear a closed front gown, eye protection and face mask (or face shield) and double pair of gloves. Respiratory protection (N-95s or PAPRs) may be required, based on the risk assessment.
	* The use of glassware and sharps should be eliminated wherever possible.

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**SARS-CoV-2 Sample Type Risk Assessment**

| **Sample types** | **Potential hazards** | **Engineering controls** | **Administrative controls** | **PPE** | **Additional controls/processes** |
| --- | --- | --- | --- | --- | --- |
| **Processing blood, plasma/serum (convalescent, confirmed negative)** | DropletFomitesAerosol | Negative air flow into laboratory (recommended)Biosafety Cabinet (BSC) (preferred)Centrifuge cup & lid or sealed rotor | Universal precautionsBiohazardous waste disposalDisinfection SOPBloodborne Pathogens (BBP) trainingExposure Control Plan or Biosafety Manual | Laboratory coatSingle or double glovesEye protection (if outside of BSC)Mucosal protection (face mask) (if outside of BSC) | Hand hygieneIf BSC not available, work behind a splash shield |
| **Processing Blood (suspected or confirmed SARSCoV2)** | DropletFomitesAerosol | Negative air flow into laboratory (recommended)BSCCentrifuge cup & lid or sealed rotor | Universal precautionsBiohazardous waste disposalDisinfection SOPBSL2/BBP trainingBiosafety Manual | Solid front gown (not cloth)Double gloves Eye protectionMucosal protection (face mask) | Hand hygieneNo glass or sharps  |
| **Processing swab (suspected or confirmed SARSCoV2)** | DropletFomitesAerosol | Negative air flow into laboratory (recommended)BSCCentrifuge cup & lid or sealed rotor | Universal precautionsBiohazardous waste disposalDisinfection SOPBSL2 trainingBiosafety Manual | Solid front gown (not cloth)Double gloves Eye protectionMucosal protection (face mask) | Hand hygieneNo glass or sharps |
| **Urine (suspected or****confirmed SARSCoV2)** | DropletFomitesAerosol | Negative air flow into laboratory (recommended)Biosafety Cabinet (BSC) (preferred)Centrifuge cup & lid (recommended) | Universal precautionsBiohazardous waste disposalDisinfection SOPBSL2 trainingBiosafety Manual | Laboratory coatSingle or double glovesEye protection (if outside of BSC)Mucosal protection (face mask) (if outside of BSC) | Hand hygieneIf BSC not available, work behind a splash shield |
| **Stool (suspected or****confirmed SARSCoV2)** | DropletFomitesAerosol | Negative air flow into laboratory (recommended)BSCCentrifuge cup & lid or sealed rotor | Universal precautionsBiohazardous waste disposalDisinfection SOPBSL2 trainingBiosafety Manual | Solid front gown (not cloth)Double gloves Eye protectionMucosal protection (face mask) | Hand hygieneNo glass or sharps |
| **Respiratory samples** | Higher concentration of virusDropletFomitesAerosol | Negative air flow into laboratoryBSCCentrifuge cup & lid or sealed rotor | Universal precautionsBiohazardous waste disposalDisinfection SOPBSL2 trainingBiosafety Manual | Solid front gown (not cloth)Double gloves Eye protectionRespiratory protection recommended or, if not available, mucosal protection (face mask): may be required based on the risk assessment | Hand hygieneNo glass or sharps |
| **Environmental samples (wastewater/****sewage)****Collection, surface sampling and routine processing** | DropletFomitesAerosol | Processing:BSCNegative air flow into laboratory (recommended)Centrifuge cup & lid or sealed rotor  | Universal precautionsBiohazardous waste disposalDisinfection SOPBSL2 trainingBiosafety Manual | Solid front gown (not cloth)Double gloves Eye protectionRespiratory protection recommended or, if not available, mucosal protection (face mask) | Hand hygieneNo glass or sharps |
| **Concentrated Environmental samples (Filtration/****Precipitation)** | Higher concentration of virusDropletFomitesAerosol | BSCNegative air flow into laboratory Centrifuge cup & lid or sealed rotor  | Universal precautionsBiohazardous waste disposalDisinfection SOPBSL2 trainingBiosafety Manual | Solid front gown (not cloth)Double gloves Eye protectionRespiratory protection  | Hand hygieneNo glass or sharpsSeparate area for donning and doffing PPE |

1. https:[//w](http://www.cdc.gov/coronavirus/2019-nCoV/lab/lab-biosafety-guidelines.html#testing)ww[.cdc.gov/coronavirus/2019nCoV/lab/labbiosafetyguidelines.html#testing](http://www.cdc.gov/coronavirus/2019-nCoV/lab/lab-biosafety-guidelines.html#testing)
2. https:[//w](http://www.cdc.gov/coronavirus/2019-ncov/php/water.html)ww[.cdc.gov/coronavirus/2019ncov/php/water.html](http://www.cdc.gov/coronavirus/2019-ncov/php/water.html)
3. https:[//w](http://www.cdc.gov/coronavirus/2019-nCoV/lab/guidelines-clinical-specimens.html)ww[.cdc.gov/coronavirus/2019nCoV/lab/guidelinesclinicalspecimens.html](http://www.cdc.gov/coronavirus/2019-nCoV/lab/guidelines-clinical-specimens.html)