

BIOSAFETY  
APPENDIX R  
ANIMAL BIOSAFETY LEVEL (ABSL) DETERMINATION MATRIX

REV. FEBRUARY 2019

A guideline based on the current edition of the *Biosafety in Microbiological and Biomedical Laboratories (BMBL)\** which is to be used for determining BSL and ABSLs for research  
(\* <http://www.cdc.gov/biosafety/publications/bmbl5/index.htm>)

NOTE: The following PPE must be worn in all facilities when entering animal rooms or labs where animals are manipulated: <i>facility dedicated scrubs/shoes, gloves, surgical mask, eye protection (or face shield)</i> . Additionally, all cage dump stations must be ventilated.							
MATERIAL	BIOSAFETY LEVEL (applicable to injections/necropsy)	ANIMAL BIOSAFETY LEVEL (applicable for animal housing / cage changes)	HOUSING REQUIREMENTS	CAGE CHANGES	PRE/POST INFECTION MANIPULATIONS	IMAGING	
<b>MATERIALS NOT KNOWN TO BE TRANSMITTED VIA AEROSOL ROUTES (* "Retroviral" is inclusive of lentiviral vectors)</b>							
1	Murine cell lines transduced with an ecotropic retroviral* vector with benign insert (ex. GFP)	BSL2	ABSL1	No special requirements	<b>No special requirements</b> - cages can be changed on benchtop. Bedding does not need autoclaved prior to disposal / cages do not need autoclaved prior to washing	All injections and necropsies in BSC for DURATION of project (following BSL2 practices)	No special requirements
2	Murine cell lines transduced with an amphotropic retroviral* vector with benign insert (ex. GFP)	BSL2	ABSL2 for 1 week / then ABSL1	Microisolator technique for 1 week post dosing; after 1 week, no special requirements	<b>For first week:</b> 1. ALL cage changes in BSC; 2. bag and autoclave bedding; 3. bag and autoclave caging before wash; After one week, resume normal cage change.	All injections and necropsies in BSC for DURATION of project (following BSL2 practices)	All manipulations inside BSC where feasible. Maintain BSL2/ABSL2 practices where feasible, especially during the first week.
3	Murine cell lines transduced with an ecotropic retroviral* vector with 'hot' insert (ex. oncogene)	BSL2	ABSL1	No special requirements	<b>No special requirements</b> - cages can be changed on benchtop. Bedding does not need autoclaved prior to disposal / cages do not need autoclaved prior to washing	All injections and necropsies in BSC for DURATION of project (following BSL2 practices)	No special requirements
4	Murine cell lines transduced with an amphotropic retroviral* vector with 'hot' insert (ex. oncogene)	BSL2	ABSL2 for 1 week / then ABSL1	Microisolator technique for 1 week post dosing; after 1 week, no special requirements	<b>For first week:</b> 1. ALL cage changes in BSC; 2. bag and autoclave bedding; 3. bag and autoclave caging before wash; After one week, resume normal cage change.	All injections and necropsies in BSC for DURATION of project (following BSL2 practices)	All manipulations inside BSC where feasible. Maintain BSL2/ABSL2 practices where feasible, especially during the first week.

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NOTE: The following PPE must be worn in all facilities when entering animal rooms or labs where animals are manipulated: *facility dedicated scrubs/shoes, gloves, surgical mask, eye protection (or face shield). Additionally, all cage dump stations must be ventilated.*

MATERIAL	BIOSAFETY LEVEL (applicable to injections/necropsy)	ANIMAL BIOSAFETY LEVEL (applicable for animal housing / cage changes)	HOUSING REQUIREMENTS	CAGE CHANGES	PRE/POST INFECTION MANIPULATIONS	IMAGING
5 Murine cell lines transduced with an pantropic retroviral* vector with 'hot' insert (ex. oncogene)	BSL2	ABSL2 for 1 week / then ABSL1	Microisolator technique for 1 week post dosing; after 1 week, no special requirements	<b>For first week:</b> 1. ALL cage changes in BSC; 2. bag and autoclave bedding; 3. bag and autoclave caging before wash; After one week, no special requirements	All injections and necropsies in BSC for DURATION of project (following BSL2 practices)	All manipulations inside BSC where feasible. Maintain BSL2/ABSL2 practices where feasible, especially during the first week.
6 Unmodified murine cells into mice	BSL1	ABSL1	No special requirements	<b>No special requirements</b> - cages can be changed on benchtop. Bedding does not need autoclaved prior to disposal / cages do not need autoclaved prior to washing	No special requirements	No special requirements
<b>MATERIALS KNOWN TO BE TRANSMITTED VIA AEROSOL ROUTES</b>						
7 Adenovirus/Adeno-Cre; Adenoviral vectors; cells transduced with adenoviral vectors	BSL2	ABSL2 for 1 week / then ABSL1	Microisolator technique for 1 week post dosing; after 1 week, no special requirements	<b>For first week:</b> 1. ALL cage changes in BSC; 2. bag and autoclave bedding; 3. bag and autoclave caging before wash; After one week, resume normal cage change.	All injections and necropsies in BSC for DURATION of project (following BSL2 practices)	All manipulations inside BSC where feasible. Maintain BSL2/ABSL2 practices where feasible, especially during the first week.
8 Known Human Pathogens (ex. <i>Toxoplasma gondii</i> ; <i>Listeria monocytogenes</i> ; <i>Helicobacter pylori</i> ; <i>LCMV</i> ; <i>Citrobacter rodentium</i> ; Certain toxins (i.e. Diphtheria); others as reviewed by IBC	BSL2	ABSL2	Microisolator technique for DURATION of experiment	<b>For first week:</b> 1. ALL cage changes in BSC; 2. bag and autoclave bedding; 3. bag and autoclave caging before wash; After one week, resume normal cage change.	All injections and necropsies in BSC for DURATION of project (following BSL2 practices)	All manipulations inside BSC where feasible. Maintain BSL2/ABSL2 practices where feasible.

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NOTE: The following PPE must be worn in all facilities when entering animal rooms or labs where animals are manipulated: <i>facility dedicated scrubs/shoes, gloves, surgical mask, eye protection (or face shield)</i> . Additionally, all cage dump stations must be ventilated.							
MATERIAL	BIOSAFETY LEVEL (applicable to injections/necropsy)	ANIMAL BIOSAFETY LEVEL (applicable for animal housing / cage changes)	HOUSING REQUIREMENTS	CAGE CHANGES	PRE/POST INFECTION MANIPULATIONS	IMAGING	
<b>HUMAN CELL LINES (* "Retroviral" is inclusive of lentiviral vectors)</b>							
9	Unmodified (established) Human cell lines inserted into an Immuno-compromised mouse	BSL2	ABSL1	No special requirements	No special requirements - cages can be changed on benchtop. Bedding does not need autoclaved prior to disposal / cages do not need autoclaved prior to washing	All injections and necropsies in BSC for DURATION of project (following BSL2 practices)	No special requirements
10	Human cell lines transduced with retroviral* vector then inserted into an immuno-compromised mouse	BSL2	ABSL2 for 1 week / then ABSL1	Microisolator technique for 1 week post-dosing; after 1 week, no special requirements	<b>For first week:</b> 1. ALL cage changes in BSC; 2. bag and autoclave bedding; 3. bag and autoclave caging before wash; After one week, resume normal cage change.	All injections and necropsies in BSC for DURATION of project (following BSL2 practices)	All manipulations inside BSC where feasible. Maintain BSL2/ABSL2 practices where feasible, especially during the first week.
11	PRIMARY human tissue transplant into mice	BSL2	ABSL2	Microisolator technique for DURATION of experiment	1. ALL cage changes in BSC; 2. bag and autoclave bedding; 3. bag and autoclave caging before wash	All injections and necropsies in BSC for DURATION of project (following BSL2 practices)	All manipulations inside BSC where feasible. Maintain BSL2/ABSL2 practices where feasible.