

BSL Classification Table

The Japan Agency for Marine-Earth Science and Technology classifies the BSL of microorganisms as follows based on criteria established in JAMSTEC's Regulations for Safe Handling in Microorganism Experiments (Attached Table 1)

- Notes:
- 1) The table shows specific pathogens, etc., in a range from type one pathogen (type 1) to type 4 pathogen (type 4).
 - 2) Those microorganisms having no or low pathogenicity for human beings are marked with asterisks.
 - 3) Experiments using arthropod vectors shall be considered separately and individually.
 - 4) Microorganisms not appearing in this table shall be considered separately.

BSL Classification of Microorganisms

1. Viruses

Names of viruses were taken from "Virus Taxonomy Report of the International Committee on Taxonomy of Viruses, 2005." Names are noted in order of family, genus, and species.

- BSL1

Attenuated live vaccine or adeno-associated virus (excluding Vaccinia)

- BSL2

Adenoviridae

Mastadenovirus

*Canine adenovirus (Infectious canine hepatitis virus) **

Human adenovirus A

Human adenovirus B

Human adenovirus C

Human adenovirus D

Human adenovirus E

Human adenovirus F

*Murine adenovirus A **

Arenaviridae

Arenavirus

Lymphocytic choriomeningitis virus ⁴⁾

Arteriviridae

Arterivirus
*Lactate dehydrogenase-elevating virus (LDV) **

Astroviridae
Mamastrovirus
Human astrovirus

Bornaviridae
Bornavirus
Borna disease virus

Bunyaviridae
Orthobunyavirus
Bunyamwera virus
California encephalitis virus
Simbu virus

Caliciviridae
Norovirus
Norwalk virus
Sapovirus
Sapporo virus
Vesivirus
*Feline calicivirus **

Coronaviridae
Coronavirus
Human coronavirus 229E
Human coronavirus OC43
Human coronavirus NL63
*Bovine coronavirus **
*Canine coronavirus **
*Feline infectious peritonitis virus **
*Infectious bronchitis virus (Avian infectious bronchitis virus) **
*Murine hepatitis virus ¹⁾ **
*Porcine epidemic diarrhea virus **
*Rat coronavirus **
*Sialodacryoadenitis virus **
*Transmissible gastroenteritis virus **

Flaviviridae
Flavivirus
Apoi virus
Aroa virus
Dengue virus (type 4)
Ilheus virus

Japanese encephalitis virus (type 4) (excluding at, m, ML-17, and S strains)

Langat virus

Rio Bravo virus

Yokose virus

Hepacivirus

Hepatitis C virus

Unassigned

Hepatitis G virus

Hepadnaviridae

Orthohepadnavirus

Hepatitis B virus

Hepeviridae

Hepevirus

Hepatitis E virus

Herpesviridae

Cytomegalovirus

Human herpesvirus 5

Ictalurivirus

*Caviid herpesvirus 1 (Guinea pig herpesvirus) **

Lymphocryptovirus

*Cercopithecine herpesvirus 12 (Herpes virus papio) **

Human herpesvirus 4

Rhadinovirus

Human herpesvirus 8

Saimiriine herpesvirus 2

Roseolovirus

Human herpesvirus 6

Human herpesvirus 7

Simplexvirus

*Cercopithecine herpesvirus 16 (Herpes virus papio 2) **

Human herpesvirus 1

Human herpesvirus 2

Varicellovirus

*Felid herpesvirus 1 (Feline viral rhinotracheitis virus) **

Human herpesvirus 3

*Suid herpesvirus 1 (Pseudorabies virus) **

Orthomyxoviridae

Influenzavirus A

Influenza A virus (type 4) (limited to H2N2 and H5N1 or less virulent

strains of H7N7 [see note])

Influenza A virus ²⁾

Influenzavirus B

Influenza B virus

Influenzavirus C

Influenza C virus

Papillomaviridae

Papillomavirus

Human papillomavirus

Paramyxoviridae

Avulavirus

Newcastle disease virus ¹⁾

Metapneumovirus

Human metapneumovirus (hMPV)

Morbillivirus

Canine distemper virus *

Measles virus

Pneumovirus

Human respiratory syncytial virus

Murine pneumonia virus (Pneumonia virus of mice) *

Respirovirus

Human parainfluenza virus 1

Human parainfluenza virus 3

Sendai virus ¹⁾

Rubulavirus

Mumps virus

Human parainfluenza virus 2

Human parainfluenza virus 4

Parvoviridae

Erythrovirus

B19 virus

Parvovirus

Canine parvovirus *

Feline panleukopenia virus *

Kilham rat virus (Rat virus) *

Lapine parvovirus *

Picornaviridae

Caridiovirus

Encephalomyocarditis virus

Theilovirus *

Enterovirus

Human enterovirus A

Human enterovirus B

Human enterovirus C

Human enterovirus D

Poliovirus (type 4) (excluding vaccine strains)

Hepatovirus

Hepatitis A virus

Kobuvirus

Aichi virus

Parechovirus

Human parechovirus

Rhinovirus

Human rhinovirus A

Human rhinovirus B

Polyomaviridae

Polyomavirus

BK polyomavirus

JC polyomavirus

Simian virus 40

Murine polyomavirus *

Poxviridae

Molluscipoxvirus

Molluscum contagiosum virus

Orthopoxvirus

Cowpox virus

Ectromelia virus (*Mousepox virus*) ¹⁾ *

Monkeypox virus ³⁾ (type 3)

Rabbitpox virus *

Vaccinia virus

Yatapoxvirus

Tanapox virus

Yaba monkey tumor virus

Reoviridae

Orbivirus

Bluetongue virus *

Rotavirus

Rotavirus A *

Rotavirus B

Rotavirus C

Rotavirus D

Rotavirus E

Retroviridae

Deltaretrovirus

*Primate T-lymphotropic virus 1 (Human T-lymphotropic virus 1) **

*Primate T-lymphotropic virus 2 (Human T-lymphotropic virus 2) **

Gammaretrovirus

*Feline leukemia virus **

*Gibbon ape leukemia virus **

*Murine leukemia virus **

Lentivirus

*Feline immunodeficiency virus **

Simian immunodeficiency virus

Rhabdoviridae

Lyssavirus

Rabiesvirus (type 3) (CVS, ERA, Flury Fuenzalida S-51, Fuenzalida S-91, Kelev, LEP, Nishigahara, Paris Pasteur, PM, PV, SAD, Vnukovo-32 strains)

Rabies virus (HEP, RC·HL strains)

Vesiculovirus

Vesicular stomatitis Alagoas virus

Vesicula stomatitis Indiana virus

Togaviridae

Alphavirus

Bebaru virus

O'nyong-nyong virus

Sindbis virus

Rubivirus

Rubella virus

Unassigned-Family

Deltavirus

Hepatitis delta virus

Anellovirus

Torque Teno virus (TTV)

- 1) When used in experiments involving small animals: ABSL3 (however, not applicable to experiments involving monkeys)
- 2) Excluding highly virulent strains of H5 and H7

*Note: Meets one of the following criteria:

1. The death rate with intravenous injection ifor chickens aged between four weeks and eight weeks is lower than 75%
 2. The intravenous pathogenicity index (IVPI) in six-week-old chickens is 1.2 or lower.
 3. No contiguous sequence of previously confirmed highly virulent influenza A virus or similar basic amino acid exists in the HA protein cleavage site.
- 3) In the case of an animal experiment, when mice are infected with BSE prion: ABSL2. When mice or monkeys into which bovine or human prion genes have been introduced are infected with BSE prion ABSL3. Animal experiments using other animal prion shall be considered individually.
- 4) In case of animal experiments ABSL3

- BSL3

Bunyaviridae

Hantavirus

- Hantaan virus* (type 3)
- Seoul virus* (type 3)
- Dobrava-Belgrade virus* (type 3)
- Puumala virus* (type 3)
- Andes virus* (type 3)
- Sin Nombre virus* (type 3)
- New York virus* (type 3)
- Bayou virus* (type 3)
- Black Creek Canal virus* (type 3)
- Laguna Negra virus* (type 3)

Phlebovirus

- Rift Valley fever virus* (type 3)

Coronaviridae

Coronavirus

- Severe acture respiratory syndrome (SARS) coronavirus* (type 2)

Flaviviridae

Flavivirus

- Kyasanur Forest disease virus* (type 3)
- Omsk hemorrhagic fever virus* (type 3)
- Louping ill virus*
- Murray Valley encephalitis virus*
- Powassan virus*

St. Louis encephalitis virus

Tick-borne encephalitis virus (type 3)

West Nile virus (type 4)

Yellow fever virus (excluding 17D vaccine strain) ^{5),6)} (type 4)

Herpesviridae

Simplexvirus

Cercopithecine herpesvirus ^{5),6)} (type 3) (B virus)

Orthomyxoviridae

Influenza A

Influenza A virus (type 4) (limited to highly virulent strains of H5N1 and H7N7)

Influenza A virus ⁵⁾

Paramyxoviridae

Henipavirus

Nipahvirus ⁶⁾(type 3)

Hendra virus ⁶⁾(type 3)

Reoviridae

Coltivirus

Colorado tick fever virus

Retroviridae

Lentivirus

Human immunodeficiency virus 1

Human immunodeficiency virus 2

Rhabdoviridae

Lyssavirus

Rabies virus (street strain) (type 3) (excluding CVS, ERA, Flury Fuenzalida S-51, Fuenzalida S-91, Kelev, LEP, Nishigahara, Paris Pasteur, PM, PV, SAD, and Vnukovo-32 strains and HEP, RC-HL strains)

Lagos bat virus, Mokola virus, etc.

Togaviridae

Alphavirus

Chikungunya virus

Eastern equine encephalitis virus (type 3)

Getah virus

Mayaro virus

Semliki Forest virus

Venezuelan equine encephalitis virus (type 3)

Western equine encephalitis virus (type 3)

- 5) Highly virulent H5 and H7 strains
- 6) Limited to small-quantity cultures for diagnostic testing; in other cases: BSL4

- BSL4

- Arenaviridae*

- Arenavirus*

- Guanarito virus* (type 1)

- Sabia virus* (type 1)

- Junin virus* (type 1)

- Lassa virus* (type 1)

- Machupo virus* (type 1)

- Bunyaviridae*

- Nairovirus*

- Crimean-Congo hemorrhagic fever virus* (type 1)

- Filoviridae*

- Ebola virus*

- Ivory Coast ebolavirus* (type 1)

- Reston ebolavirus* (type 1)

- Sudan ebolavirus* (type 1)

- Zaire ebolavirus* (type 1)

- Marburg virus*

- Lake Victoria marburgvirus* (type 1)

- Poxviridae*

- Orthopoxvirus*

- Variola virus* (major, minor) (type 1)

2. Bacteria

- BSL1

Bacteria not belonging to BSL2 that has low pathogenicity for people in good health or is a BCG vaccine strain

- BSL2

(Because not all bacteria that can be segregated from human beings are listed here, individual studies shall be made as required.)

- Actinomadura*

- A. madurae*

- A. pelletieri*

- Actinomyces*

A. bovis
A. israelii
A. pyogenes
A. viscosus

Aeromonas
A. hydrophila (toxinogenic strain)
A. sobria (toxinogenic strain)

Arcanobacterium
A. haemolyticum
A. pyogenes

Bacillus
B. cereus (toxinogenic strain)

Bacteroides
B. fragilis

Bartonella
B. bacilliformis
B. clarridgeiae
B. elizabethae
B. henselae
B. quintana
B. vinsonii

Bordetella
B. bronchiseptica *
B. parapertussis
B. pertussis

Borrelia (all bacterial strains)

Burkholderia
B. cepacia

Calymmatobacterium
C. granulomatis

Campylobacter
C. coli
C. jejuni
C. fetus

Chryseobacterium
C. meningosepticum

Citrobacter
C. freundii *
C. rodentium *

Cilia-associated respiratory (CAR)

Bacillus *

Clostridium

- C. botulinum* (type 2)
- C. difficile*
- C. haemolyticum*
- C. histolyticum*
- C. novyi*
- C. perfringens* (toxinogenic strain)
- C. piliforme* (Tyzzer's disease) *
- C. septicum*
- C. sordelli*
- C. sporogenes*
- C. tetani*

Corynebacterium

- C. diphtheriae*
- C. jeikeium*
- C. kutscheri* *
- C. pseudodiphtheriticum*
- C. pseudotuberculosis*
- C. ulcerans*

Enterobacter

- E. aerogenes*
- E. cloacae*

Enterococcus

- E. faecalis*
- E. faecium*

Erysipelothrix

- E. rhusiopathiae*

Escherichia

- E. coli* (excluding *E. coli*, K12 strains, B strains and their derivatives)
- E. coli* (type 4) (limited to enterohemorrhagic *E. coli*)

Francisella

- F. tularensis subsp. holarctica* (limited to LVS strains)
- F. novicida*
- F. philomiragia*

Fusobacterium

- F. necrophorum*

Haemophilus

- H. actinomycetemcomitans*
- H. aegyptius*

H. ducreyi

H. influenzae

Helicobacter

H. bilis *

H. hepaticus *

H. pylori

Klebsiella

K. oxytoca

K. pneumoniae

Legionella

All bacterial strains (including *Legionella*-like organisms)

Leptospira

All serum types of *L. interrogans* sensu lato

Listeria

L. monocytogenes

Moraxella

M. catarrhalis

Mycobacterium

M. avium

M. chelonae

M. fortuitum

M. haemophilum

M. intracellulare

M. kansasii

M. laprae

M. lepraemurium

M. malmoense

M. marinum

M. paratuberculosis

M. scrofulaceum

M. simiae

M. szulgai

M. ulcerans

M. xenopi

Mycoplasma

M. arthritis *

M. fermentans

M. hominis

M. neurolyticum *

M. pneumoniae

M. pulmonis *

Neisseria

- N. gonorrhoeae*
- N. meningitidis*

Nocardia

- N. asteroides*
- N. brasiliensis*

Ureaplasma

- U. urealyticum*

Vibrio

- V. cholerae*
- V. cholerae* (type 4)
(limited to serum protein type O1, O139)
- V. fluvialis*
- V. mimicus*
- V. parahaemolyticus*
- V. vulnificus*

Yersinia

- Y. enterocolitica*
- Y. pseudotuberculosis*

N. farcinica

- N. otitidiscaviarum*

Pasteurella

- P. multocida* (limited to serum protein type that causes disease in animals only)
- P. pneumotropica* *
- P. ureae*

Plesiomonas

- P. shigelloides*

Proteus

- P. mirabilis*
- P. penneri*
- P. vulgaris*

Pseudomonas

- P. aeruginosa*

Rhodococcus

- R. equi*

Salmonella ¹⁾

- All serum types excluding BSL3

Serratia

- S. marcescens*

Shigella

S. spp. All bacterial strains

S. sonnei (type 4)

S. dysenteriae (type 4)

S. flexneri (type 4)

S. boydii (type 4)

Staphylococcus

S. aureus

Streptobacillus

S. moniliformis

Streptococcus

S. agalactiae

S. dysgalactiae

S. equi

S. pneumoniae

S. pyogenes

S. sanguinis

S. zooepidemicus ³⁾ *

Treponema

T. carateum

T. cuniculi *

T. pallidum

T. pertenue

Botulin (type 2)

Shiga toxin (type 4)

(Chlamydia, rickettsia)

Chlamydophila

C. pecorum

C. pneumoniae

C. psittaci ²⁾ (type 4)

Chlamydia

C. trachomatis

Simkania

S. negevensis

Ehrlichia

E. canis

E. chaffeensis

E. sennetsu

1) Use in animal experiments shall be considered separately.

- 2) When large quantities (roughly 20 liters) are proliferated: BSL3
- 3) When used in an experiment involving small animals: ABSL3 (however, this does not apply to experiments involving monkeys)

●BSL3

Bacillus

- B. anthracis* (type 2)
- B. anthracis* (34F2, Davis strains)

Brucella

- B. spp.* All bacterial strains
- B. abortus* (type 3)
- B. canis* (type 3)
- B. suis* (type 3)
- B. melitensis* (type 3)

Burkholderia

- B. mallei* (type 3)
- B. pseudomallei* (type 3)

Francisella

- F. tularensis* (type 2)
(sub-species tularensis and holarctica; however, excluding LVS strains)
- F. tularensis* (Sub-species tularensis B38 strain)

Mycobacterium

- M. africanum*
- M. bovis* (excluding BCG)
- M. tuberculosis* (type 4)
(excluding multiple-drug-resistant bacteria)
- M. tuberculosis* (type 3)
(limited to multiple-drug-resistant bacteria)

Pateurella

- P. multocida* (B:6, E:6, A:5, A:8, A:9)

Salmonella

- S. enterica*
 - serovar *Paratyphi* A (type 4)
 - serovar *Typhi* (type 4)

Yersinia

- Y. pestis* (type 2)

(Chlamydia, rickettsia)

Coxiella

- C. burnetii* ¹⁾ (type 3)

Orientia

O. tsutsugamushi

Rickettsia

(*Spotted fever group*)

R. japonica (type 3)

R. rickettsii (type 3)

Spotted fever group R. spp.

(*Epidemic typhus group*)

R. prowazekii (type 3)

Epidemic typhus group R.spp

- 1) Although, in terms of classification, this is *Legionella coxiella coxiella*, here it is listed in *Rickettsia* as per customary practice.

3. Fungi

• BSL1

Fungi not belonging to BSL2 or BSL3

• BSL2

Aspergillus fumigatus

Candida albicans

Cladosporium carrionii

Cladosporium trichoides

(*C. bantianum*)

Cryptococcus neoformans

Exophiala dermatitidis

Fonsecaea pedrosoi

Microsporum canis

Sporothrix schenckii

Trichophyton

T. mentagrophytes

T. verrucosum

•BSL3

Blastomyces dermatitidis

Coccidioides immitis (type 3)

*Histoplasma capsulatum*¹⁾

Histoplasma farciminosum

Paracoccidioides brasiliensis

Penicillium marneffe

- 1) Includes both of the variants *H. capsulatum* var *capsulatum* and *H. capsulatum* var *duboisii*.

Note: The toxinogenic strains of *Aspergillus* spp., *Chaetomium* spp., *Fusarium* spp., *Myrothecium* spp., and *Penicillium* spp. are handled as BSL2.