

## Diagnostic antibodies and antigens for infectious disease detection

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It is important to diagnose the infectious disease even before it becomes serious. The traditional pathogen-detection methods, such as culture, have established their credibility over time, they are often slow and relatively insensitive. In addition, there are several emerging infectious diseases (ID) such as dengue fever, zika virus, corona virus and so on are need to be diagnosed immediately to prevent the outbreak. Immunodiagnosics show great promise than the traditional methods used in clinical diagnosis. GENEMEDI developed the antigens and antibodies for rapid kit such as ELISA, Lateral flow immunoassay (LFIA), colloidal gold immunochromatographic assay, Chemiluminescent immunoassay (CLIA), turbidimetric inhibition immuno assay (TINIA), immunonephelometry and POCT to detect the different types of infectious disease.

**Classification:** [Flu A](#) [Flu B](#) [HIV-1](#) [HIV-2](#) [HIV1/2](#) [HIV-O](#) [HCV](#) [Treponema Pallidum](#) [T. gondii](#) [rubella virus](#) [Cytomegalovirus](#) [HSV](#) [HSV-1](#) [HSV-2](#) [B. anthracis](#) [Ebola virus](#)  
[Vaccinia virus \(cowpox virus\)](#) [West Nile virus](#) [Adenovirus](#) [Plasmodium](#) [Astrovirus](#) [Norovirus](#) [C. jejuni](#) [L. monocytogenes](#) [Rotavirus](#) [Salmonella typhi](#) [C. albicans](#) [HPV](#) [HBV](#) [HBV-PreS1](#)  
[Food source pathogenic bacteria resistant](#) [Rift Valley Fever](#) [EBV](#) [V. cholerae](#) [M. tuberculosis](#) [Cryptosporidium parvum \(Cp23\)](#) [RSV](#) [Rhinoviruses](#) [dengue nonstructural 1 \(DEN-NS1\)](#) [Enterovirus](#)  
[streptolysin O](#) [Mycoplasma pneumoniae](#) [Helicobacter pylori](#) [Prion](#) [STDs](#) [ARTI](#) [SARS-CoV2](#)

### Influenza A (flu A)

Cat No.	Pathogen	Target	Disease	Cat No.of Antigen	Bioactivity validation of Antigen	Cat No.of Antibodies	Bioactivity validation of Antibodies	Order
<a href="#">GMP-IVD-P001-Tg001</a>	Influenza A (flu A)	nucleoprotein (NP)	Flu	<a href="#">GMP-IVD-P001-Tg001-Ag01: Recombinant Influenza A (flu A) nucleoprotein (NP) Protein</a>	Influenza A (nucleoprotein (NP)) antibodies binding, Immunogen in Sandwich Elisa, lateral-flow tests, and other immunoassays as control material in nucleoprotein (NP) level test of Infectious disease (Flu) and related syndrome evaluation.	<a href="#">GMP-IVD-P001-Tg001-Ab01;</a> <a href="#">GMP-IVD-P001-Tg001-Ab02:</a> <a href="#">Anti-Influenza A (flu A) nucleoprotein (NP) mouse monoclonal antibody (mAb)</a>	Influenza A (nucleoprotein (NP)) antigen binding, ELISA validated as capture antibody and detection antibody. Pair recommendation with other Influenza A (nucleoprotein (NP)) antibodies in nucleoprotein (NP) level test of Infectious disease (Flu) and related syndrome evaluation.	

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### Influenza B (Flu B)

Cat No.	Pathogen	Target	Disease	Cat No.of Antigen	Bioactivity validation of Antigen	Cat No.of Antibodies	Bioactivity validation of Antibodies	Order
<a href="#">GMP-IVD-P002-Tg001</a>	Influenza B (Flu B)	nucleoprotein (NP)	Flu	<a href="#">GMP-IVD-P002-Tg001-Ag01: Recombinant Influenza B (Flu B) nucleoprotein (NP) Protein</a>	Influenza B (nucleoprotein (NP)) antibodies binding, Immunogen in Sandwich Elisa, lateral-flow tests, and other immunoassays as control material in nucleoprotein (NP) level test of Infectious disease (Flu) and related syndrome evaluation.	<a href="#">GMP-IVD-P002-Tg001-Ab01;</a> <a href="#">GMP-IVD-P002-Tg001-Ab02:</a> <a href="#">Anti-Influenza B (Flu B) nucleoprotein (NP) mouse monoclonal antibody (mAb)</a>	Influenza B (nucleoprotein (NP)) antigen binding, ELISA validated as capture antibody and detection antibody. Pair recommendation with other Influenza B (nucleoprotein (NP)) antibodies in nucleoprotein (NP) level test of Infectious disease (Flu) and related syndrome evaluation.	

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### Human immunodeficiency virus 1 (HIV-1)

Cat No.	Pathogen	Target	Disease	Cat No.of Antigen	Bioactivity validation of Antigen	Cat No.of Antibodies	Bioactivity validation of Antibodies	Order
<a href="#">GMP-IVD-P003-Tg001</a>	Human immunodeficiency virus 1 (HIV-1)	GP41 Protein	Acquired immunodeficiency syndrome(AIDS)	<a href="#">GMP-IVD-P003-Tg001-Ag01: Recombinant Human immunodeficiency virus 1 (HIV-1) GP41 Protein Protein</a>	Human immunodeficiency virus 1 (GP41 Protein) antibodies binding, Immunogen in Sandwich Elisa, lateral-flow tests, and other immunoassays as control material in GP41 Protein level test of Infectious disease (Acquired immunodeficiency syndrome(AIDS)) and related syndrome evaluation.	<a href="#">GMP-IVD-P003-Tg001-Ab01;</a> <a href="#">GMP-IVD-P003-Tg001-Ab02:</a> <a href="#">Anti-Human immunodeficiency virus 1 (HIV-1) GP41 Protein mouse monoclonal antibody (mAb)</a>	Human immunodeficiency virus 1 (GP41 Protein) antigen binding, ELISA validated as capture antibody and detection antibody. Pair recommendation with other Human immunodeficiency virus 1 (GP41 Protein) antibodies in GP41 Protein level test of Infectious disease (Acquired immunodeficiency syndrome(AIDS)) and related syndrome evaluation.	

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### Human immunodeficiency virus 2 (HIV-2)

Cat No.	Pathogen	Target	Disease	Cat No.of Antigen	Bioactivity validation of Antigen	Cat No.of Antibodies	Bioactivity validation of Antibodies	Order
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Cat No.	Pathogen	Target	Disease	Cat No.of Antigen	Bioactivity validation of Antigen	Cat No.of Antibodies	Bioactivity validation of Antibodies	Order
GMP-IVD-P004-Tg001	Human immunodeficiency virus 2 (HIV-2)	GP36 Protein	Acquired immunodeficiency syndrome(AIDS)	GMP-IVD-P004-Tg001-Ag01: Recombinant Human immunodeficiency virus 2 (HIV-2) GP36 Protein	Human immunodeficiency virus 2 (GP36 Protein) antibodies binding, Immunogen in Sandwich Elisa, lateral-flow tests, and other immunoassays as control material in GP36 Protein level test of Infectious disease (Acquired immunodeficiency syndrome(AIDS)) and related syndrome evaluation.	GMP-IVD-P004-Tg001-Ab01; GMP-IVD-P004-Tg001-Ab02: Anti-Human immunodeficiency virus 2 (HIV-2) GP36 Protein mouse monoclonal antibody (mAb)	Human immunodeficiency virus 2 (GP36 Protein) antigen binding, ELISA validated as capture antibody and detection antibody. Pair recommendation with other Human immunodeficiency virus 2 (GP36 Protein) antibodies in GP36 Protein level test of Infectious disease (Acquired immunodeficiency syndrome(AIDS)) and related syndrome evaluation.	


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#### immunodeficiency virus 1/2 (HIV1/2)

Cat No.	Pathogen	Target	Disease	Cat No.of Antigen	Bioactivity validation of Antigen	Cat No.of Antibodies	Bioactivity validation of Antibodies	Order
GMP-IVD-P005-Tg001	immunodeficiency virus 1/2 (HIV1/2)	HIV p24 antigen	AIDS	GMP-IVD-P005-Tg001-Ag01: Recombinant immunodeficiency virus 1/2 (HIV1/2) HIV p24 antigen Protein	immunodeficiency virus 1/2 (HIV p24 antigen) antibodies binding, Immunogen in Sandwich Elisa, lateral-flow tests, and other immunoassays as control material in HIV p24 antigen level test of Infectious disease (AIDS) and related syndrome evaluation.	GMP-IVD-P005-Tg001-Ab01; GMP-IVD-P005-Tg001-Ab02: Anti-immunodeficiency virus 1/2 (HIV1/2) HIV p24 antigen mouse monoclonal antibody (mAb)	immunodeficiency virus 1/2 (HIV p24 antigen) antigen binding, ELISA validated as capture antibody and detection antibody. Pair recommendation with other immunodeficiency virus 1/2 (HIV p24 antigen) antibodies in HIV p24 antigen level test of Infectious disease (AIDS) and related syndrome evaluation.	


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#### immunodeficiency virus-O antigen (HIV-O)

Cat No.	Pathogen	Target	Disease	Cat No.of Antigen	Bioactivity validation of Antigen	Cat No.of Antibodies	Bioactivity validation of Antibodies	Order
GMP-IVD-P006-Tg001	immunodeficiency virus-O antigen (HIV-O)	O-antigen	AIDS	GMP-IVD-P006-Tg001-Ag01: Recombinant immunodeficiency virus-O antigen (HIV-O) O-antigen Protein	immunodeficiency virus-O antigen (O-antigen) antibodies binding, Immunogen in Sandwich Elisa, lateral-flow tests, and other immunoassays as control material in O-antigen level test of Infectious disease (AIDS) and related syndrome evaluation.	GMP-IVD-P006-Tg001-Ab01; GMP-IVD-P006-Tg001-Ab02: Anti-immunodeficiency virus-O antigen (HIV-O) O-antigen mouse monoclonal antibody (mAb)	immunodeficiency virus-O antigen (O-antigen) antigen binding, ELISA validated as capture antibody and detection antibody. Pair recommendation with other immunodeficiency virus-O antigen (O-antigen) antibodies in O-antigen level test of Infectious disease (AIDS) and related syndrome evaluation.	

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#### hepatitis C virus (HCV)

Cat No.	Pathogen	Target	Disease	Cat No.of Antigen	Bioactivity validation of Antigen	Cat No.of Antibodies	Bioactivity validation of Antibodies	Order
GMP-IVD-P007-Tg001	hepatitis C virus (HCV)	Recombinant HCV NS3-NS4-NS5 fusion Protein (His Tag)	Hepatitis C	GMP-IVD-P007-Tg001-Ag01: Recombinant hepatitis C virus (HCV) Recombinant HCV NS3-NS4-NS5 fusion Protein (His Tag) Protein	HCV core antigen (Recombinant HCV NS3-NS4-NS5 fusion Protein (His Tag)) antibodies binding, Immunogen in Sandwich Elisa, lateral-flow tests, and other immunoassays as control material in Recombinant HCV NS3-NS4-NS5 fusion Protein (His Tag) level test of Infectious disease (Hepatitis C) and related syndrome evaluation.	GMP-IVD-P007-Tg001-Ab01; GMP-IVD-P007-Tg001-Ab02: Anti-hepatitis C virus (HCV) Recombinant HCV NS3-NS4-NS5 fusion Protein (His Tag) mouse monoclonal antibody (mAb)	HCV core antigen (Recombinant HCV NS3-NS4-NS5 fusion Protein (His Tag)) antigen binding, ELISA validated as capture antibody and detection antibody. Pair recommendation with other HCV core antigen (Recombinant HCV NS3-NS4-NS5 fusion Protein (His Tag)) antibodies in Recombinant HCV NS3-NS4-NS5 fusion Protein (His Tag) level test of Infectious disease (Hepatitis C) and related syndrome evaluation.	

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#### Treponema Pallidum (TP)

Cat No.	Pathogen	Target	Disease	Cat No.of Antigen	Bioactivity validation of Antigen	Cat No.of Antibodies	Bioactivity validation of Antibodies	Order
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Cat No.	Pathogen	Target	Disease	Cat No.of Antigen	Bioactivity validation of Antigen	Cat No.of Antibodies	Bioactivity validation of Antibodies	Order
<a href="#">GMP-IVD-P008-Tg001</a>	Treponema Pallidum (TP)	Recombinant TP P15-P17-P47 fusion Protein (His Tag)	syphilis	<a href="#">GMP-IVD-P008-Tg001-Ag01: Recombinant Treponema Pallidum (TP) Recombinant TP P15-P17-P47 fusion Protein (His Tag) Protein</a>	Treponema Pallidum (Recombinant TP P15-P17-P47 fusion Protein (His Tag)) antibodies binding, Immunogen in Sandwich Elisa, lateral-flow tests, and other immunoassays as control material in Recombinant TP P15-P17-P47 fusion Protein (His Tag) level test of Infectious disease (syphilis) and related syndrome evaluation.	<a href="#">GMP-IVD-P008-Tg001-Ab01;</a> <a href="#">GMP-IVD-P008-Tg001-Ab02: Anti-Treponema Pallidum (TP) Recombinant TP P15-P17-P47 fusion Protein (His Tag) mouse monoclonal antibody (mAb)</a>	Treponema Pallidum (Recombinant TP P15-P17-P47 fusion Protein (His Tag)) antigen binding, ELISA validated as capture antibody and detection antibody. Pair recommendation with other Treponema Pallidum (Recombinant TP P15-P17-P47 fusion Protein (His Tag)) antibodies in Recombinant TP P15-P17-P47 fusion Protein (His Tag) level test of Infectious disease (syphilis) and related syndrome evaluation.	



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#### Toxoplasma gondii (T. gondii)

Cat No.	Pathogen	Target	Disease	Cat No.of Antigen	Bioactivity validation of Antigen	Cat No.of Antibodies	Bioactivity validation of Antibodies	Order
<a href="#">GMP-IVD-P009-Tg001</a>	Toxoplasma gondii (T. gondii)	P30	Toxoplasmosis	<a href="#">GMP-IVD-P009-Tg001-Ag01: Recombinant Toxoplasma gondii (T. gondii) P30 Protein</a>	toxoplasma gondii (P30) antibodies binding, Immunogen in Sandwich Elisa, lateral-flow tests, and other immunoassays as control material in P30 level test of Infectious disease (Toxoplasmosis) and related syndrome evaluation.	<a href="#">GMP-IVD-P009-Tg001-Ab01;</a> <a href="#">GMP-IVD-P009-Tg001-Ab02: Anti-Toxoplasma gondii (T. gondii) P30 mouse monoclonal antibody (mAb)</a>	toxoplasma gondii (P30) antigen binding, ELISA validated as capture antibody and detection antibody. Pair recommendation with other toxoplasma gondii (P30) antibodies in P30 level test of Infectious disease (Toxoplasmosis) and related syndrome evaluation.	


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#### rubella virus

Cat No.	Pathogen	Target	Disease	Cat No.of Antigen	Bioactivity validation of Antigen	Cat No.of Antibodies	Bioactivity validation of Antibodies	Order
<a href="#">GMP-IVD-P010-Tg001</a>	rubella virus	CAPSID (C)	Rubella or German measles or three-day measles	<a href="#">GMP-IVD-P010-Tg001-Ag01: Recombinant rubella virus CAPSID (C) Protein</a>	rubella virus (CAPSID (C)) antibodies binding, Immunogen in Sandwich Elisa, lateral-flow tests, and other immunoassays as control material in CAPSID (C) level test of Infectious disease (Rubella or German measles or three-day measles) and related syndrome evaluation.	<a href="#">GMP-IVD-P010-Tg001-Ab01;</a> <a href="#">GMP-IVD-P010-Tg001-Ab02: Anti-rubella virus CAPSID (C) mouse monoclonal antibody (mAb)</a>	rubella virus (CAPSID (C)) antigen binding, ELISA validated as capture antibody and detection antibody. Pair recommendation with other rubella virus (CAPSID (C)) antibodies in CAPSID (C) level test of Infectious disease (Rubella or German measles or three-day measles) and related syndrome evaluation.	
<a href="#">GMP-IVD-P010-Tg002</a>	rubella virus	Nucleoprotein	Rubella	<a href="#">GMP-IVD-P010-Tg002-Ag01: Recombinant rubella virus Nucleoprotein Protein</a>	rubella virus (Nucleoprotein) antibodies binding, Immunogen in Sandwich Elisa, lateral-flow tests, and other immunoassays as control material in Nucleoprotein level test of Infectious disease (Rubella) and related syndrome evaluation.	<a href="#">GMP-IVD-P010-Tg002-Ab01;</a> <a href="#">GMP-IVD-P010-Tg002-Ab02: Anti-rubella virus Nucleoprotein mouse monoclonal antibody (mAb)</a>	rubella virus (Nucleoprotein) antigen binding, ELISA validated as capture antibody and detection antibody. Pair recommendation with other rubella virus (Nucleoprotein) antibodies in Nucleoprotein level test of Infectious disease (Rubella) and related syndrome evaluation.	


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#### Cytomegalovirus (CMV)

Cat No.	Pathogen	Target	Disease	Cat No.of Antigen	Bioactivity validation of Antigen	Cat No.of Antibodies	Bioactivity validation of Antibodies	Order
<a href="#">GMP-IVD-P011-Tg001</a>	Cytomegalovirus (CMV)	pp65	chickenpox, herpes simplex and mononucleosis	<a href="#">GMP-IVD-P011-Tg001-Ag01: Recombinant Cytomegalovirus (CMV) pp65 Protein</a>	Cytomegalovirus (pp65) antibodies binding, Immunogen in Sandwich Elisa, lateral-flow tests, and other immunoassays as control material in pp65 level test of Infectious disease (chickenpox, herpes simplex and mononucleosis) and related syndrome evaluation.	<a href="#">GMP-IVD-P011-Tg001-Ab01;</a> <a href="#">GMP-IVD-P011-Tg001-Ab02: Anti-Cytomegalovirus (CMV) pp65 mouse monoclonal antibody (mAb)</a>	Cytomegalovirus (pp65) antigen binding, ELISA validated as capture antibody and detection antibody. Pair recommendation with other Cytomegalovirus (pp65) antibodies in pp65 level test of Infectious disease (chickenpox, herpes simplex and mononucleosis) and related syndrome evaluation.	


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#### herpes simplex virus (HSV)

Cat No.	Pathogen	Target	Disease	Cat No.of Antigen	Bioactivity validation of Antigen	Cat No.of Antibodies	Bioactivity validation of Antibodies	Order
GMP-IVD-P012-Tg001	herpes simplex virus (HSV)	glycoprotein G	HSV-1 and HSV-2, can cause oral or genital infection. Most often, HSV-1 causes gingivostomatitis, herpes labialis, and herpes keratitis. HSV-2 usually causes genital lesions. Generally, recurrent eruptions are less severe and occur less frequently over time.	GMP-IVD-P012-Tg001-Ag01: Recombinant herpes simplex virus (HSV) Protein	herpes simplex virus antibodies binding, Immunogen in Sandwich Elisa, lateral-flow tests, and other immunoassays as control material in herpes simplex virus level test of Infectious disease (HSV-1 and HSV-2, can cause oral or genital infection. Most often, HSV-1 causes gingivostomatitis, herpes labialis, and herpes keratitis. HSV-2 usually causes genital lesions. Generally, recurrent eruptions are less severe and occur less frequently over time.) and related syndrome evaluation.	GMP-IVD-P012-Tg001-Ab01; GMP-IVD-P012-Tg001-Ab02: Anti-herpes simplex virus (HSV) mouse monoclonal antibody (mAb)	herpes simplex virus antigen binding, ELISA validated as capture antibody and detection antibody. Pair recommendation with other herpes simplex virus antibodies in herpes simplex virus level test of Infectious disease (HSV-1 and HSV-2, can cause oral or genital infection. Most often, HSV-1 causes gingivostomatitis, herpes labialis, and herpes keratitis. HSV-2 usually causes genital lesions. Generally, recurrent eruptions are less severe and occur less frequently over time.) and related syndrome evaluation.	


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#### Herpes simplex virus 1 (HSV-1)

Cat No.	Pathogen	Target	Disease	Cat No.of Antigen	Bioactivity validation of Antigen	Cat No.of Antibodies	Bioactivity validation of Antibodies	Order
GMP-IVD-P013-Tg001	Herpes simplex virus 1 (HSV-1)	glycoprotein G (gG-1)	oral herpes	GMP-IVD-P013-Tg001-Ag01: Recombinant Herpes simplex virus 1 (HSV-1) glycoprotein G (gG-1) Protein	Herpes simplex virus 1 (glycoprotein G (gG-1)) antibodies binding, Immunogen in Sandwich Elisa, lateral-flow tests, and other immunoassays as control material in glycoprotein G (gG-1) level test of Infectious disease (oral herpes) and related syndrome evaluation.	GMP-IVD-P013-Tg001-Ab01; GMP-IVD-P013-Tg001-Ab02: Anti-Herpes simplex virus 1 (HSV-1) glycoprotein G (gG-1) mouse monoclonal antibody (mAb)	Herpes simplex virus 1 (glycoprotein G (gG-1)) antigen binding, ELISA validated as capture antibody and detection antibody. Pair recommendation with other Herpes simplex virus 1 (glycoprotein G (gG-1)) antibodies in glycoprotein G (gG-1) level test of Infectious disease (oral herpes) and related syndrome evaluation.	


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#### Herpes simplex virus 2 (HSV-2)

Cat No.	Pathogen	Target	Disease	Cat No.of Antigen	Bioactivity validation of Antigen	Cat No.of Antibodies	Bioactivity validation of Antibodies	Order
GMP-IVD-P014-Tg001	Herpes simplex virus 2 (HSV-2)	glycoprotein G (gG-2)	genital herpes	GMP-IVD-P014-Tg001-Ag01: Recombinant Herpes simplex virus 2 (HSV-2) glycoprotein G (gG-2) Protein	Herpes simplex virus 2 (glycoprotein G (gG-2)) antibodies binding, Immunogen in Sandwich Elisa, lateral-flow tests, and other immunoassays as control material in glycoprotein G (gG-2) level test of Infectious disease (genital herpes) and related syndrome evaluation.	GMP-IVD-P014-Tg001-Ab01; GMP-IVD-P014-Tg001-Ab02: Anti-Herpes simplex virus 2 (HSV-2) glycoprotein G (gG-2) mouse monoclonal antibody (mAb)	Herpes simplex virus 2 (glycoprotein G (gG-2)) antigen binding, ELISA validated as capture antibody and detection antibody. Pair recommendation with other Herpes simplex virus 2 (glycoprotein G (gG-2)) antibodies in glycoprotein G (gG-2) level test of Infectious disease (genital herpes) and related syndrome evaluation.	

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#### Bacillus anthracis (B. anthracis)

Cat No.	Pathogen	Target	Disease	Cat No.of Antigen	Bioactivity validation of Antigen	Cat No.of Antibodies	Bioactivity validation of Antibodies	Order
GMP-IVD-P015-Tg001	Bacillus anthracis (B. anthracis)	protective antigen (PA)	Anthrax	GMP-IVD-P015-Tg001-Ag01: Recombinant Bacillus anthracis (B. anthracis) protective antigen (PA) Protein	anthrax bacillus (protective antigen (PA)) antibodies binding, Immunogen in Sandwich Elisa, lateral-flow tests, and other immunoassays as control material in protective antigen (PA) level test of Infectious disease (Anthrax) and related syndrome evaluation.	GMP-IVD-P015-Tg001-Ab01; GMP-IVD-P015-Tg001-Ab02: Anti-Bacillus anthracis (B. anthracis) protective antigen (PA) mouse monoclonal antibody (mAb)	anthrax bacillus (protective antigen (PA)) antigen binding, ELISA validated as capture antibody and detection antibody. Pair recommendation with other anthrax bacillus (protective antigen (PA)) antibodies in protective antigen (PA) level test of Infectious disease (Anthrax) and related syndrome evaluation.	

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#### Ebola virus (EV)

Cat No.	Pathogen	Target	Disease	Cat No.of Antigen	Bioactivity validation of Antigen	Cat No.of Antibodies	Bioactivity validation of Antibodies	Order
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Cat No.	Pathogen	Target	Disease	Cat No.of Antigen	Bioactivity validation of Antigen	Cat No.of Antibodies	Bioactivity validation of Antibodies	Order
<a href="#">GMP-IVD-P016-Tg001</a>	ebola virus (EV)	nucleoprotein (NP)	Ebola Virus Disease	<a href="#">GMP-IVD-P016-Tg001-Ag01: Recombinant ebola virus (EV) nucleoprotein (NP) Protein</a>	ebola virus (nucleoprotein (NP)) antibodies binding, Immunogen in Sandwich Elisa, lateral-flow tests, and other immunoassays as control material in nucleoprotein (NP) level test of Infectious disease (Ebola Virus Disease) and related syndrome evaluation.	<a href="#">GMP-IVD-P016-Tg001-Ab01;</a> <a href="#">GMP-IVD-P016-Tg001-Ab02:</a> <a href="#">Anti-ebola virus (EV) nucleoprotein (NP) mouse monoclonal antibody (mAb)</a>	ebola virus (nucleoprotein (NP)) antigen binding, ELISA validated as capture antibody and detection antibody. Pair recommendation with other ebola virus (nucleoprotein (NP)) antibodies in nucleoprotein (NP) level test of Infectious disease (Ebola Virus Disease) and related syndrome evaluation.	


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#### Vaccinia virus (cowpox virus)

Cat No.	Pathogen	Target	Disease	Cat No.of Antigen	Bioactivity validation of Antigen	Cat No.of Antibodies	Bioactivity validation of Antibodies	Order
<a href="#">GMP-IVD-P017-Tg001</a>	Vaccinia virus (cowpox virus)	A27L	Cowpox	<a href="#">GMP-IVD-P017-Tg001-Ag01: Recombinant Vaccinia virus (cowpox virus) A27L Protein</a>	Vaccinia virus (cowpox virus) A27L antibodies binding, Immunogen in Sandwich Elisa, lateral-flow tests, and other immunoassays as control material in A27L level test of Infectious disease (Cowpox) and related syndrome evaluation.	<a href="#">GMP-IVD-P017-Tg001-Ab01;</a> <a href="#">GMP-IVD-P017-Tg001-Ab02:</a> <a href="#">Anti-Vaccinia virus (cowpox virus) A27L mouse monoclonal antibody (mAb)</a>	Vaccinia virus (cowpox virus) A27L antigen binding, ELISA validated as capture antibody and detection antibody. Pair recommendation with other Vaccinia virus (cowpox virus) A27L antibodies in A27L level test of Infectious disease (Cowpox) and related syndrome evaluation.	
<a href="#">GMP-IVD-P017-Tg002</a>	Vaccinia virus (cowpox virus)	h3l	Cowpox	<a href="#">GMP-IVD-P017-Tg002-Ag01: Recombinant Vaccinia virus (cowpox virus) h3l Protein</a>	Vaccinia virus (cowpox virus) h3l antibodies binding, Immunogen in Sandwich Elisa, lateral-flow tests, and other immunoassays as control material in h3l level test of Infectious disease (Cowpox) and related syndrome evaluation.	<a href="#">GMP-IVD-P017-Tg002-Ab01;</a> <a href="#">GMP-IVD-P017-Tg002-Ab02:</a> <a href="#">Anti-Vaccinia virus (cowpox virus) h3l mouse monoclonal antibody (mAb)</a>	Vaccinia virus (cowpox virus) h3l antigen binding, ELISA validated as capture antibody and detection antibody. Pair recommendation with other Vaccinia virus (cowpox virus) h3l antibodies in h3l level test of Infectious disease (Cowpox) and related syndrome evaluation.	
<a href="#">GMP-IVD-P017-Tg003</a>	Vaccinia virus (cowpox virus)	b5r	Cowpox	<a href="#">GMP-IVD-P017-Tg003-Ag01: Recombinant Vaccinia virus (cowpox virus) b5r Protein</a>	Vaccinia virus (cowpox virus) b5r antibodies binding, Immunogen in Sandwich Elisa, lateral-flow tests, and other immunoassays as control material in b5r level test of Infectious disease (Cowpox) and related syndrome evaluation.	<a href="#">GMP-IVD-P017-Tg003-Ab01;</a> <a href="#">GMP-IVD-P017-Tg003-Ab02:</a> <a href="#">Anti-Vaccinia virus (cowpox virus) b5r mouse monoclonal antibody (mAb)</a>	Vaccinia virus (cowpox virus) b5r antigen binding, ELISA validated as capture antibody and detection antibody. Pair recommendation with other Vaccinia virus (cowpox virus) b5r antibodies in b5r level test of Infectious disease (Cowpox) and related syndrome evaluation.	


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#### West Nile virus (WNV)

Cat No.	Pathogen	Target	Disease	Cat No.of Antigen	Bioactivity validation of Antigen	Cat No.of Antibodies	Bioactivity validation of Antibodies	Order
<a href="#">GMP-IVD-P018-Tg001</a>	West Nile virus (WNV)	envelope (E)	West Nile fever	<a href="#">GMP-IVD-P018-Tg001-Ag01: Recombinant West Nile virus (WNV) envelope (E) Protein</a>	West Nile virus (envelope (E)) antibodies binding, Immunogen in Sandwich Elisa, lateral-flow tests, and other immunoassays as control material in envelope (E) level test of Infectious disease (West Nile fever) and related syndrome evaluation.	<a href="#">GMP-IVD-P018-Tg001-Ab01;</a> <a href="#">GMP-IVD-P018-Tg001-Ab02:</a> <a href="#">Anti-West Nile virus (WNV) envelope (E) mouse monoclonal antibody (mAb)</a>	West Nile virus (envelope (E)) antigen binding, ELISA validated as capture antibody and detection antibody. Pair recommendation with other West Nile virus (envelope (E)) antibodies in envelope (E) level test of Infectious disease (West Nile fever) and related syndrome evaluation.	



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#### Adenovirus

Cat No.	Pathogen	Target	Disease	Cat No.of Antigen	Bioactivity validation of Antigen	Cat No.of Antibodies	Bioactivity validation of Antibodies	Order
<a href="#">GMP-IVD-P019-Tg001</a>	adenovirus	Hexon	cold-like symptoms, fever, sore throat, bronchitis, pneumonia, diarrhea, and pink eye (conjunctivitis)	<a href="#">GMP-IVD-P019-Tg001-Ag01: Recombinant adenovirus Hexon Protein</a>	adenovirus (Hexon) antibodies binding, Immunogen in Sandwich Elisa, lateral-flow tests, and other immunoassays as control material in Hexon level test of Infectious disease (cold-like symptoms, fever, sore throat, bronchitis, pneumonia, diarrhea, and pink eye (conjunctivitis)) and related syndrome evaluation.	<a href="#">GMP-IVD-P019-Tg001-Ab01;</a> <a href="#">GMP-IVD-P019-Tg001-Ab02:</a> <a href="#">Anti-adenovirus (Hexon) mouse monoclonal antibody (mAb)</a>	adenovirus Hexon antigen binding, ELISA validated as capture antibody and detection antibody. Pair recommendation with other (Hexon) antibodies in Hexon level test of Infectious disease (cold-like symptoms, fever, sore throat, bronchitis, pneumonia, diarrhea, and pink eye (conjunctivitis)) and related syndrome evaluation.	


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**Plasmodium [Plasmodium falciparum] [Plasmodium knowlesi] [Plasmodium malariae] [Plasmodium ovale] [Plasmodium vivax]**

Cat No.	Pathogen	Target	Disease	Cat No.of Antigen	Bioactivity validation of Antigen	Cat No.of Antibodies	Bioactivity validation of Antibodies	Order
GMP-IVD-P020-Tg001	Plasmodium [Plasmodium falciparum] [Plasmodium knowlesi] [Plasmodium malariae] [Plasmodium ovale] [Plasmodium vivax]	merozoite surface protein (MSP)	malaria	GMP-IVD-P020-Tg001-Ag01: Recombinant Plasmodium merozoite surface protein (MSP) Protein	Plasmodium (Circumsporozoite Protein (CSP)) antibodies binding, Immunogen in Sandwich Elisa, lateral-flow tests, and other immunoassays as control material in CSP level test of Infectious disease(malaria) and related syndrome evaluation.	GMP-IVD-P020-Tg001-Ab01; GMP-IVD-P020-Tg001-Ab02: Anti-Plasmodium merozoite surface protein (MSP) mouse monoclonal antibody (mAb)	Plasmodium malaria (Circumsporozoite Protein (CSP)) antigen binding, ELISA validated as capture antibody and detection antibody. Pair recommendation with other Plasmodium (Circumsporozoite Protein (CSP)) antibodies in CSP level test of Infectious disease (malaria) and related syndrome evaluation.	
GMP-IVD-P020-Tg002	Plasmodium [Plasmodium falciparum] [Plasmodium knowlesi] [Plasmodium malariae] [Plasmodium ovale] [Plasmodium vivax]	Circumsporozoite Protein (CSP)	malaria	GMP-IVD-P020-Tg002-Ag01: Recombinant Plasmodium Circumsporozoite Protein (CSP) Protein	malaria (Circumsporozoite Protein (CSP)) antibodies binding, Immunogen in Sandwich Elisa, lateral-flow tests, and other immunoassays as control material in MSP level test of Infectious disease (malaria) and related syndrome evaluation.	GMP-IVD-P020-Tg002-Ab01; GMP-IVD-P020-Tg002-Ab02: Anti-Plasmodium Circumsporozoite Protein (CSP) mouse monoclonal antibody (mAb)	malaria (Circumsporozoite Protein (CSP)) antigen binding, ELISA validated as capture antibody and detection antibody. Pair recommendation with other malaria (Circumsporozoite Protein (CSP)) antibodies in MSP level test of Infectious disease (malaria) and related syndrome evaluation.	


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**Astrovirus**

Cat No.	Pathogen	Target	Disease	Cat No.of Antigen	Bioactivity validation of Antigen	Cat No.of Antibodies	Bioactivity validation of Antibodies	Order
GMP-IVD-P021-Tg001	Astrovirus	capsid proteins	gastroenteritis	GMP-IVD-P021-Tg001-Ag01: Recombinant Astrovirus capsid proteins Protein	Astrovirus (capsid proteins) antibodies binding, Immunogen in Sandwich Elisa, lateral-flow tests, and other immunoassays as control material in capsid proteins level test of Infectious disease (gastroenteritis) and related syndrome evaluation.	GMP-IVD-P021-Tg001-Ab01; GMP-IVD-P021-Tg001-Ab02: Anti-Astrovirus capsid proteins mouse monoclonal antibody (mAb)	Astrovirus (capsid proteins) antigen binding, ELISA validated as capture antibody and detection antibody. Pair recommendation with other Astrovirus (capsid proteins) antibodies in capsid proteins level test of Infectious disease (gastroenteritis) and related syndrome evaluation.	


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**Norovirus (NV)**

Cat No.	Pathogen	Target	Disease	Cat No.of Antigen	Bioactivity validation of Antigen	Cat No.of Antibodies	Bioactivity validation of Antibodies	Order
GMP-IVD-P022-Tg001	Norovirus (NV)	VP1	vomiting and diarrhea	GMP-IVD-P022-Tg001-Ag01: Recombinant Norovirus (NV) VP1 Protein	Norovirus (VP1) antibodies binding, Immunogen in Sandwich Elisa, lateral-flow tests, and other immunoassays as control material in VP1 level test of Infectious disease (vomiting and diarrhea) and related syndrome evaluation.	GMP-IVD-P022-Tg001-Ab01; GMP-IVD-P022-Tg001-Ab02: Anti-Norovirus (NV) VP1 mouse monoclonal antibody (mAb)	Norovirus (VP1) antigen binding, ELISA validated as capture antibody and detection antibody. Pair recommendation with other Norovirus (VP1) antibodies in VP1 level test of Infectious disease (vomiting and diarrhea) and related syndrome evaluation.	

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**Campylobacter jejuni (C. jejuni)**

Cat No.	Pathogen	Target	Disease	Cat No.of Antigen	Bioactivity validation of Antigen	Cat No.of Antibodies	Bioactivity validation of Antibodies	Order
GMP-IVD-P023-Tg001	Campylobacter jejuni (C. jejuni)	Outer Membrane Protein (OMP)	gastroenteritis	GMP-IVD-P023-Tg001-Ag01: Recombinant Campylobacter jejuni (C. jejuni) Outer Membrane Protein (OMP)	Campylobacter jejuni (Outer Membrane Protein (OMP)) antibodies binding, Immunogen in Sandwich Elisa, lateral-flow tests, and other immunoassays as control material in Outer Membrane Protein (OMP) level test of Infectious disease (gastroenteritis) and related syndrome evaluation.	GMP-IVD-P023-Tg001-Ab01; GMP-IVD-P023-Tg001-Ab02: Anti-Campylobacter jejuni (C. jejuni) Outer Membrane Protein (OMP) mouse monoclonal antibody (mAb)	Campylobacter jejuni (Outer Membrane Protein (OMP)) antigen binding, ELISA validated as capture antibody and detection antibody. Pair recommendation with other Campylobacter jejuni (Outer Membrane Protein (OMP)) antibodies in Outer Membrane Protein (OMP) level test of Infectious disease (gastroenteritis) and related syndrome evaluation.	

Cat No.	Pathogen	Target	Disease	Cat No.of Antigen	Bioactivity validation of Antigen	Cat No.of Antibodies	Bioactivity validation of Antibodies	Order
<a href="#">GMP-IVD-P023-Tg002</a>	Campylobacter jejuni (C. jejuni)	Flagellar L-ring protein (FLGH)	gastroenteritis	<a href="#">GMP-IVD-P023-Tg002-Ag01: Recombinant Campylobacter jejuni (C. jejuni) Flagellar L-ring protein (FLGH) Protein</a>	Campylobacter jejuni (Flagellar L-ring protein (FLGH)) antibodies binding, Immunogen in Sandwich Elisa, lateral-flow tests, and other immunoassays as control material in Flagellar L-ring protein (FLGH) level test of Infectious disease (gastroenteritis) and related syndrome evaluation.	<a href="#">GMP-IVD-P023-Tg002-Ab01: GMP-IVD-P023-Tg002-Ab02: Anti-Campylobacter jejuni (C. jejuni) Flagellar L-ring protein (FLGH) mouse monoclonal antibody (mAb)</a>	Campylobacter jejuni (Flagellar L-ring protein (FLGH)) antigen binding, ELISA validated as capture antibody and detection antibody. Pair recommendation with other Campylobacter jejuni (Flagellar L-ring protein (FLGH)) antibodies in Flagellar L-ring protein (FLGH) level test of Infectious disease (gastroenteritis) and related syndrome evaluation.	


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#### Listeria monocytogenes (L. monocytogenes)

Cat No.	Pathogen	Target	Disease	Cat No.of Antigen	Bioactivity validation of Antigen	Cat No.of Antibodies	Bioactivity validation of Antibodies	Order
<a href="#">GMP-IVD-P024-Tg001</a>	Listeria monocytogenes (L. monocytogenes)	Listeriolysin O (LLO)	Listeriosis	<a href="#">GMP-IVD-P024-Tg001-Ag01: Recombinant Listeria monocytogenes (L. monocytogenes) Listeriolysin O (LLO) Protein</a>	Listeria monocytogenes (Listeriolysin O (LLO)) antibodies binding, Immunogen in Sandwich Elisa, lateral-flow tests, and other immunoassays as control material in Listeriolysin O (LLO) level test of Infectious disease (Listeriosis) and related syndrome evaluation.	<a href="#">GMP-IVD-P024-Tg001-Ab01: GMP-IVD-P024-Tg001-Ab02: Anti-Listeria monocytogenes (L. monocytogenes) Listeriolysin O (LLO) mouse monoclonal antibody (mAb)</a>	Listeria monocytogenes (Listeriolysin O (LLO)) antigen binding, ELISA validated as capture antibody and detection antibody. Pair recommendation with other Listeria monocytogenes (Listeriolysin O (LLO)) antibodies in Listeriolysin O (LLO) level test of Infectious disease (Listeriosis) and related syndrome evaluation.	


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#### Rotavirus

Cat No.	Pathogen	Target	Disease	Cat No.of Antigen	Bioactivity validation of Antigen	Cat No.of Antibodies	Bioactivity validation of Antibodies	Order
<a href="#">GMP-IVD-P025-Tg001</a>	rotavirus	VP6	watery diarrhea and vomiting	<a href="#">GMP-IVD-P025-Tg001-Ag01: Recombinant rotavirus VP6 Protein</a>	rotavirus (VP6) antibodies binding, Immunogen in Sandwich Elisa, lateral-flow tests, and other immunoassays as control material in VP6 level test of Infectious disease (watery diarrhea and vomiting) and related syndrome evaluation.	<a href="#">GMP-IVD-P025-Tg001-Ab01: GMP-IVD-P025-Tg001-Ab02: Anti-rotavirus VP6 mouse monoclonal antibody (mAb)</a>	rotavirus (VP6) antigen binding, ELISA validated as capture antibody and detection antibody. Pair recommendation with other rotavirus (VP6) antibodies in VP6 level test of Infectious disease (watery diarrhea and vomiting) and related syndrome evaluation.	

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#### Salmonella typhi

Cat No.	Pathogen	Target	Disease	Cat No.of Antigen	Bioactivity validation of Antigen	Cat No.of Antibodies	Bioactivity validation of Antibodies	Order
<a href="#">GMP-IVD-P026-Tg001</a>	Salmonella typhi	outer membrane channel protein (Tolc) OMP 50 (Salmonella typhi)	Salmonellosis	<a href="#">GMP-IVD-P026-Tg001-Ag01: Recombinant Salmonella typhi outer membrane channel protein (Tolc) OMP 50 (Salmonella typhi) Protein</a>	salmonella (outer membrane channel protein (Tolc) OMP 50 (Salmonella typhi)) antibodies binding, Immunogen in Sandwich Elisa, lateral-flow tests, and other immunoassays as control material in outer membrane channel protein (Tolc) OMP 50 (Salmonella typhi) level test of Infectious disease (Salmonellosis) and related syndrome evaluation.	<a href="#">GMP-IVD-P026-Tg001-Ab01: GMP-IVD-P026-Tg001-Ab02: Anti-Salmonella typhi outer membrane channel protein (Tolc) OMP 50 (Salmonella typhi) mouse monoclonal antibody (mAb)</a>	salmonella (outer membrane channel protein (Tolc) OMP 50 (Salmonella typhi)) antigen binding, ELISA validated as capture antibody and detection antibody. Pair recommendation with other salmonella (outer membrane channel protein (Tolc) OMP 50 (Salmonella typhi)) antibodies in outer membrane channel protein (Tolc) OMP 50 (Salmonella typhi) level test of Infectious disease (Salmonellosis) and related syndrome evaluation.	

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#### Candida albicans (C. albicans)

Cat No.	Pathogen	Target	Disease	Cat No.of Antigen	Bioactivity validation of Antigen	Cat No.of Antibodies	Bioactivity validation of Antibodies	Order
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Cat No.	Pathogen	Target	Disease	Cat No.of Antigen	Bioactivity validation of Antigen	Cat No.of Antibodies	Bioactivity validation of Antibodies	Order
GMP-IVD-P027-Tg001	Candida albicans (C. albicans)	enolase (Candida albicans)	Candidiasis	GMP-IVD-P027-Tg001-Ag01: Recombinant Candida albicans (C. albicans) enolase (Candida albicans) Protein	candida (enolase (Candida albicans)) antibodies binding, Immunogen in Sandwich Elisa, lateral-flow tests, and other immunoassays as control material in enolase (Candida albicans) level test of Infectious disease (Candidiasis) and related syndrome evaluation.	GMP-IVD-P027-Tg001-Ab01; GMP-IVD-P027-Tg001-Ab02: Anti-Candida albicans (C. albicans) enolase (Candida albicans) mouse monoclonal antibody (mAb)	candida (enolase (Candida albicans)) antigen binding, ELISA validated as capture antibody and detection antibody. Pair recommendation with other candida (enolase (Candida albicans)) antibodies in enolase (Candida albicans) level test of Infectious disease (Candidiasis) and related syndrome evaluation.	


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#### Human papilloma virus (HPV)

Cat No.	Pathogen	Target	Disease	Cat No.of Antigen	Bioactivity validation of Antigen	Cat No.of Antibodies	Bioactivity validation of Antibodies	Order
GMP-IVD-P028-Tg001	Human papilloma virus (HPV)	HPV 16 L1 capsid protein	cervical and other cancers	GMP-IVD-P028-Tg001-Ag01: Recombinant Human papilloma virus (HPV) HPV 16 L1 capsid protein Protein	papilloma virus (HPV 16 L1 capsid protein) antibodies binding, Immunogen in Sandwich Elisa, lateral-flow tests, and other immunoassays as control material in HPV 16 L1 capsid protein level test of Infectious disease (cervical and other cancers) and related syndrome evaluation.	GMP-IVD-P028-Tg001-Ab01; GMP-IVD-P028-Tg001-Ab02: Anti-Human papilloma virus (HPV) HPV 16 L1 capsid protein mouse monoclonal antibody (mAb)	papilloma virus (HPV 16 L1 capsid protein) antigen binding, ELISA validated as capture antibody and detection antibody. Pair recommendation with other papilloma virus (HPV 16 L1 capsid protein) antibodies in HPV 16 L1 capsid protein level test of Infectious disease (cervical and other cancers) and related syndrome evaluation.	


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#### Hepatitis b virus (HBV)

Cat No.	Pathogen	Target	Disease	Cat No.of Antigen	Bioactivity validation of Antigen	Cat No.of Antibodies	Bioactivity validation of Antibodies	Order
GMP-IVD-P029-Tg001	Hepatitis b virus (HBV)	HBsAg (hepatitis B surface antigen)	Hepatitis B	GMP-IVD-P029-Tg001-Ag01: Recombinant Hepatitis b virus (HBV) HBsAg Protein	Hepatitis B s antigen (HBsAg) antibodies binding, Immunogen in Sandwich Elisa, lateral-flow tests, and other immunoassays as control material in HBsAg level test of Infectious disease (Hepatitis B) and related syndrome evaluation.	GMP-IVD-P029-Tg001-Ab01; GMP-IVD-P029-Tg001-Ab02: Anti-Hepatitis B virus (HBV) HBsAg mouse monoclonal antibody (mAb)	Hepatitis B s antigen (HBsAg) antigen binding, ELISA validated as capture antibody and detection antibody. Pair recommendation with other Hepatitis B s antigen (HBsAg) antibodies in HBsAg level test of Infectious disease (Hepatitis B) and related syndrome evaluation.	
GMP-IVD-P029-Tg002	Hepatitis B virus (HBV)	HBeAg (hepatitis B e-antigen)	Hepatitis B	GMP-IVD-P029-Tg002-Ag01: Recombinant Hepatitis B virus (HBV) HBeAg Protein	Hepatitis B e antigen (HBeAg) antibodies binding, Immunogen in Sandwich Elisa, lateral-flow tests, and other immunoassays as control material in HBeAg level test of Infectious disease (Hepatitis B) and related syndrome evaluation.	GMP-IVD-P029-Tg002-Ab01; GMP-IVD-P029-Tg002-Ab02: Anti-Hepatitis B virus (HBV) HBeAg mouse monoclonal antibody (mAb)	Hepatitis B e antigen (HBeAg) antigen binding, ELISA validated as capture antibody and detection antibody. Pair recommendation with other hepatitis B e antigen (HBeAg) antibodies in HBeAg level test of Infectious disease (Hepatitis B) and related syndrome evaluation.	
GMP-IVD-P029-Tg003	Hepatitis B virus (HBV)	HBcAg (hepatitis B Core antigen)	Hepatitis B	GMP-IVD-P029-Tg003-Ag01: Recombinant Hepatitis B virus (HBV) HBcAg Protein	Hepatitis B core antigen (HBcAg) antibodies binding, Immunogen in Sandwich Elisa, lateral-flow tests, and other immunoassays as control material in HBcAg level test of Infectious disease (Hepatitis B) and related syndrome evaluation.	GMP-IVD-P029-Tg003-Ab01; GMP-IVD-P029-Tg003-Ab02: Anti-Hepatitis B virus (HBV) HBcAg mouse monoclonal antibody (mAb)	Hepatitis B core antigen (HBcAg) antigen binding, ELISA validated as capture antibody and detection antibody. Pair recommendation with other hepatitis B core antigen (HBcAg) antibodies in HBcAg level test of Infectious disease (Hepatitis B) and related syndrome evaluation.	

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#### Hepatitis B virus-PreS1 (HBV-PreS1)

Cat No.	Pathogen	Target	Disease	Cat No.of Antigen	Bioactivity validation of Antigen	Cat No.of Antibodies	Bioactivity validation of Antibodies	Order
GMP-IVD-P030-Tg001	Hepatitis B virus-PreS1 (HBV-PreS1)	PreS1	Hepatitis B	GMP-IVD-P030-Tg001-Ag01: Recombinant Hepatitis B virus-PreS1 (HBV-PreS1) PreS1 Protein	Hepatitis B virus-PreS1 (PreS1) antibodies binding, Immunogen in Sandwich Elisa, lateral-flow tests, and other immunoassays as control material in PreS1 level test of Infectious disease (Hepatitis B) and related syndrome evaluation.	GMP-IVD-P030-Tg001-Ab01; GMP-IVD-P030-Tg001-Ab02: Anti-Hepatitis B virus-PreS1 (HBV-PreS1) PreS1 mouse monoclonal antibody (mAb)	Hepatitis B virus-PreS1 (PreS1) antigen binding, ELISA validated as capture antibody and detection antibody. Pair recommendation with other Hepatitis B virus-PreS1 (PreS1) antibodies in PreS1 level test of Infectious disease (Hepatitis B) and related syndrome evaluation.	

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**Food source pathogenic bacteria resistant**

Cat No.	Pathogen	Target	Disease	Cat No.of Antigen	Bioactivity validation of Antigen	Cat No.of Antibodies	Bioactivity validation of Antibodies	Order
<a href="#">GMP-IVD-P031-Tg001</a>	NA	NA	Food source pathogenic bacteria resistant	<a href="#">GMP-IVD-P031-Tg001-Ag01: Recombinant Food source pathogenic bacteria resistant Protein</a>	Food source pathogenic bacteria resistant antibodies binding, Immunogen in Sandwich Elisa, lateral-flow tests, and other immunoassays as control material in Food source pathogenic bacteria resistant level test of Infectious disease (Food source pathogenic bacteria resistant) and related syndrome evaluation.	<a href="#">GMP-IVD-P031-Tg001-Ab01;</a> <a href="#">GMP-IVD-P031-Tg001-Ab02:</a> <a href="#">Anti-Food source pathogenic bacteria resistant mouse monoclonal antibody (mAb)</a>	Food source pathogenic bacteria resistant antigen binding, ELISA validated as capture antibody and detection antibody. Pair recommendation with other Food source pathogenic bacteria resistant antibodies in Food source pathogenic bacteria resistant level test of Infectious disease (Food source pathogenic bacteria resistant) and related syndrome evaluation.	



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**Rift Valley Fever (RVF)**

Cat No.	Pathogen	Target	Disease	Cat No.of Antigen	Bioactivity validation of Antigen	Cat No.of Antibodies	Bioactivity validation of Antibodies	Order
<a href="#">GMP-IVD-P032-Tg001</a>	Rift Valley Fever (RVF)	nucleoprotein (NP)	Rift Valley Fever	<a href="#">GMP-IVD-P032-Tg001-Ag01: Recombinant Rift Valley Fever (RVF) nucleoprotein (NP) Protein</a>	Rift Valley Fever (nucleoprotein (NP)) antibodies binding, Immunogen in Sandwich Elisa, lateral-flow tests, and other immunoassays as control material in nucleoprotein (NP) level test of Infectious disease(Rift Valley Fever) and related syndrome evaluation.	<a href="#">GMP-IVD-P032-Tg001-Ab01;</a> <a href="#">GMP-IVD-P032-Tg001-Ab02:</a> <a href="#">Anti-Rift Valley Fever (RVF) nucleoprotein (NP) mouse monoclonal antibody (mAb)</a>	Rift Valley Fever (nucleoprotein (NP)) antigen binding, ELISA validated as capture antibody and detection antibody. Pair recommendation with other Rift Valley Fever (nucleoprotein (NP)) antibodies in nucleoprotein (NP) level test of Infectious disease (Rift Valley Fever) and related syndrome evaluation.	


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**Epstein-Barr virus (EBV)**

Cat No.	Pathogen	Target	Disease	Cat No.of Antigen	Bioactivity validation of Antigen	Cat No.of Antibodies	Bioactivity validation of Antibodies	Order
<a href="#">GMP-IVD-P033-Tg001</a>	Epstein-Barr virus (EBV)	Nuclear Antigen (EBNA1)	infectious mononucleosis	<a href="#">GMP-IVD-P033-Tg001-Ag01: Recombinant Epstein-Barr virus (EBV) Nuclear Antigen (EBNA1) Protein</a>	Epstein-Barr virus (Nuclear Antigen (EBNA1)) antibodies binding, Immunogen in Sandwich Elisa, lateral-flow tests, and other immunoassays as control material in Nuclear Antigen (EBNA1) level test of Infectious disease(infectious mononucleosis) and related syndrome evaluation.	<a href="#">GMP-IVD-P033-Tg001-Ab01;</a> <a href="#">GMP-IVD-P033-Tg001-Ab02:</a> <a href="#">Anti-Epstein-Barr virus (EBV) Nuclear Antigen (EBNA1) mouse monoclonal antibody (mAb)</a>	Epstein-Barr virus (Nuclear Antigen (EBNA1)) antigen binding, ELISA validated as capture antibody and detection antibody. Pair recommendation with other Epstein-Barr virus (Nuclear Antigen (EBNA1)) antibodies in Nuclear Antigen (EBNA1) level test of Infectious disease (infectious mononucleosis) and related syndrome evaluation.	
<a href="#">GMP-IVD-P033-Tg002</a>	Epstein-Barr virus (EBV)	capsid antigen (EB-VCA)	infectious mononucleosis	<a href="#">GMP-IVD-P033-Tg002-Ag01: Recombinant Epstein-Barr virus (EBV) capsid antigen (EB-VCA) Protein</a>	Epstein-Barr virus (capsid antigen (EB-VCA)) antibodies binding, Immunogen in Sandwich Elisa, lateral-flow tests, and other immunoassays as control material in capsid antigen (EB-VCA) level test of Infectious disease(infectious mononucleosis) and related syndrome evaluation.	<a href="#">GMP-IVD-P033-Tg002-Ab01;</a> <a href="#">GMP-IVD-P033-Tg002-Ab02:</a> <a href="#">Anti-Epstein-Barr virus (EBV) capsid antigen (EB-VCA) mouse monoclonal antibody (mAb)</a>	Epstein-Barr virus (capsid antigen (EB-VCA)) antigen binding, ELISA validated as capture antibody and detection antibody. Pair recommendation with other Epstein-Barr virus (capsid antigen (EB-VCA)) antibodies in capsid antigen (EB-VCA) level test of Infectious disease (infectious mononucleosis) and related syndrome evaluation.	


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**Vibrio cholerae (V. cholerae)**

Cat No.	Pathogen	Target	Disease	Cat No.of Antigen	Bioactivity validation of Antigen	Cat No.of Antibodies	Bioactivity validation of Antibodies	Order
<a href="#">GMP-IVD-P035-Tg001</a>	Vibrio cholerae (V. cholerae)	cytotoxin B (CtxB)	Cholera	<a href="#">GMP-IVD-P035-Tg001-Ag01: Recombinant Vibrio cholerae (V. cholerae) cytotoxin B (CtxB) Protein</a>	Vibrio cholerae (cytotoxin B (CtxB)) antibodies binding, Immunogen in Sandwich Elisa, lateral-flow tests, and other immunoassays as control material in cytotoxin B (CtxB) level test of Infectious disease(Cholera) and related syndrome evaluation.	<a href="#">GMP-IVD-P035-Tg001-Ab01;</a> <a href="#">GMP-IVD-P035-Tg001-Ab02:</a> <a href="#">Anti-Vibrio cholerae (V. cholerae) cytotoxin B (CtxB) mouse monoclonal antibody (mAb)</a>	Vibrio cholerae (cytotoxin B (CtxB)) antigen binding, ELISA validated as capture antibody and detection antibody. Pair recommendation with other Vibrio cholerae (cytotoxin B (CtxB)) antibodies in cytotoxin B (CtxB) level test of Infectious disease (Cholera) and related syndrome evaluation.	


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**Mycobacterium tuberculosis (M. tuberculosis)**

Cat No.	Pathogen	Target	Disease	Cat No.of Antigen	Bioactivity validation of Antigen	Cat No.of Antibodies	Bioactivity validation of Antibodies	Order
GMP-IVD-P036-Tg001	Mycobacterium tuberculosis (M. tuberculosis)	M. tb	Tuberculosis (TB)	GMP-IVD-P036-Tg001-Ag01: Recombinant Mycobacterium tuberculosis (M. tuberculosis) M. tb Protein	Mycobacterium tuberculosis (M. tb) antibodies binding, Immunogen in Sandwich Elisa, lateral-flow tests, and other immunoassays as control material in M. tb level test of Infectious disease(Tuberculosis (TB)) and related syndrome evaluation.	GMP-IVD-P036-Tg001-Ab01; GMP-IVD-P036-Tg001-Ab02: Anti-Mycobacterium tuberculosis (M. tuberculosis) M. tb mouse monoclonal antibody (mAb)	Mycobacterium tuberculosis (M. tb) antigen binding, ELISA validated as capture antibody and detection antibody. Pair recommendation with other Mycobacterium tuberculosis (M. tb) antibodies in M. tb level test of Infectious disease (Tuberculosis (TB)) and related syndrome evaluation.	


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**Cryptosporidium parvum (Cp23 )**

Cat No.	Pathogen	Target	Disease	Cat No.of Antigen	Bioactivity validation of Antigen	Cat No.of Antibodies	Bioactivity validation of Antibodies	Order
GMP-IVD-P037-Tg001	Cryptosporidium parvum (Cp23 )	Crypto	cryptosporidiosis	GMP-IVD-P037-Tg001-Ag01: Recombinant Cryptosporidium parvum (Cp23 ) Crypto Protein	Cryptosporidium (Crypto) antibodies binding, Immunogen in Sandwich Elisa, lateral-flow tests, and other immunoassays as control material in Crypto level test of Infectious disease(cryptosporidiosis) and related syndrome evaluation.	GMP-IVD-P037-Tg001-Ab01; GMP-IVD-P037-Tg001-Ab02: Anti-Cryptosporidium parvum (Cp23 ) Crypto mouse monoclonal antibody (mAb)	Cryptosporidium (Crypto) antigen binding, ELISA validated as capture antibody and detection antibody. Pair recommendation with other Cryptosporidium (Crypto) antibodies in Crypto level test of Infectious disease (cryptosporidiosis) and related syndrome evaluation.	



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**Respiratory syncytial virus (RSV)**

Cat No.	Pathogen	Target	Disease	Cat No.of Antigen	Bioactivity validation of Antigen	Cat No.of Antibodies	Bioactivity validation of Antibodies	Order
GMP-IVD-P038-Tg001	Respiratory syncytial virus (RSV)	major surface glycoproteins (G and F)	cold	GMP-IVD-P038-Tg001-Ag01: Recombinant Respiratory syncytial virus (RSV) major surface glycoproteins (G and F) Protein	Respiratory syncytial virus (major surface glycoproteins (G and F)) antibodies binding, Immunogen in Sandwich Elisa, lateral-flow tests, and other immunoassays as control material in major surface glycoproteins (G and F) level test of Infectious disease(cold) and related syndrome evaluation.	GMP-IVD-P038-Tg001-Ab01; GMP-IVD-P038-Tg001-Ab02: Anti-Respiratory syncytial virus (RSV) major surface glycoproteins (G and F) mouse monoclonal antibody (mAb)	Respiratory syncytial virus (major surface glycoproteins (G and F)) antigen binding, ELISA validated as capture antibody and detection antibody. Pair recommendation with other Respiratory syncytial virus (major surface glycoproteins (G and F)) antibodies in major surface glycoproteins (G and F) level test of Infectious disease (cold) and related syndrome evaluation.	

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**Rhinoviruses (RV)**

Cat No.	Pathogen	Target	Disease	Cat No.of Antigen	Bioactivity validation of Antigen	Cat No.of Antibodies	Bioactivity validation of Antibodies	Order
GMP-IVD-P039-Tg001	Rhinoviruses (RV)	VP1	common cold	GMP-IVD-P039-Tg001-Ag01: Recombinant Rhinoviruses (RV) VP1 Protein	Rhinoviruses (VP1) antibodies binding, Immunogen in Sandwich Elisa, lateral-flow tests, and other immunoassays as control material in VP1 level test of Infectious disease(common cold) and related syndrome evaluation.	GMP-IVD-P039-Tg001-Ab01; GMP-IVD-P039-Tg001-Ab02: Anti-Rhinoviruses (RV) VP1 mouse monoclonal antibody (mAb)	Rhinoviruses (VP1) antigen binding, ELISA validated as capture antibody and detection antibody. Pair recommendation with other Rhinoviruses (VP1) antibodies in VP1 level test of Infectious disease (common cold) and related syndrome evaluation.	
GMP-IVD-P039-Tg002	Rhinoviruses (RV)	VP3	common cold	GMP-IVD-P039-Tg002-Ag01: Recombinant Rhinoviruses (RV) VP3 Protein	Rhinoviruses (VP3) antibodies binding, Immunogen in Sandwich Elisa, lateral-flow tests, and other immunoassays as control material in VP3 level test of Infectious disease(common cold) and related syndrome evaluation.	GMP-IVD-P039-Tg002-Ab01; GMP-IVD-P039-Tg002-Ab02: Anti-Rhinoviruses (RV) VP3 mouse monoclonal antibody (mAb)	Rhinoviruses (VP3) antigen binding, ELISA validated as capture antibody and detection antibody. Pair recommendation with other Rhinoviruses (VP3) antibodies in VP3 level test of Infectious disease (common cold) and related syndrome evaluation.	

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**dengue nonstructural 1 (DEN-NS1)**

Cat No.	Pathogen	Target	Disease	Cat No.of Antigen	Bioactivity validation of Antigen	Cat No.of Antibodies	Bioactivity validation of Antibodies	Order
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Cat No.	Pathogen	Target	Disease	Cat No.of Antigen	Bioactivity validation of Antigen	Cat No.of Antibodies	Bioactivity validation of Antibodies	Order
<a href="#">GMP-IVD-P040-Tg001</a>	dengue nonstructural 1 (DEN-NS1)	nonstructural protein 1 (NS1)	dengue	<a href="#">GMP-IVD-P040-Tg001-Ag01: Recombinant dengue nonstructural 1 (DEN-NS1) nonstructural protein 1 (NS1) Protein</a>	dengue nonstructural 1 (nonstructural protein 1 (NS1)) antibodies binding, Immunogen in Sandwich Elisa, lateral-flow tests,and other immunoassays as control material in nonstructural protein 1 (NS1) level test of Infectious disease(dengue) and related syndrome evaluation.	<a href="#">GMP-IVD-P040-Tg001-Ab01;</a> <a href="#">GMP-IVD-P040-Tg001-Ab02:</a> <a href="#">Anti-dengue nonstructural 1 (DEN-NS1) nonstructural protein 1 (NS1) mouse monoclonal antibody (mAb)</a>	dengue nonstructural 1 (nonstructural protein 1 (NS1)) antigen binding, ELISA validated as capture antibody and detection antibody. Pair recommendation with other dengue nonstructural 1 (nonstructural protein 1 (NS1)) antibodies in nonstructural protein 1 (NS1) level test of Infectious disease (dengue) and related syndrome evaluation.	


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#### Enterovirus 71-IgM (EV71-IgM)

Cat No.	Pathogen	Target	Disease	Cat No.of Antigen	Bioactivity validation of Antigen	Cat No.of Antibodies	Bioactivity validation of Antibodies	Order
<a href="#">GMP-IVD-P041-Tg001</a>	Enterovirus 71-IgM (EV71-IgM)	VP1	neurological diseases	<a href="#">GMP-IVD-P041-Tg001-Ag01: Recombinant Enterovirus 71-IgM (EV71-IgM) VP1 Protein</a>	Enterovirus 71-IgM (VP1) antibodies binding, Immunogen in Sandwich Elisa, lateral-flow tests,and other immunoassays as control material in VP1 level test of Infectious disease(neurological diseases ) and related syndrome evaluation.	<a href="#">GMP-IVD-P041-Tg001-Ab01;</a> <a href="#">GMP-IVD-P041-Tg001-Ab02:</a> <a href="#">Anti-Enterovirus 71-IgM (EV71-IgM) VP1 mouse monoclonal antibody (mAb)</a>	Enterovirus 71-IgM (VP1) antigen binding, ELISA validated as capture antibody and detection antibody. Pair recommendation with other Enterovirus 71-IgM (VP1) antibodies in VP1 level test of Infectious disease (neurological diseases ) and related syndrome evaluation.	


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#### streptolysin O (SLO)

Cat No.	Pathogen	Target	Disease	Cat No.of Antigen	Bioactivity validation of Antigen	Cat No.of Antibodies	Bioactivity validation of Antibodies	Order
<a href="#">GMP-IVD-P042-Tg001</a>	streptolysin O (SLO)	streptolysin O	Streptococcus pyogenes infection	<a href="#">GMP-IVD-P042-Tg001-Ag01: Recombinant streptolysin O (SLO) streptolysin O Protein</a>	streptolysin O (streptolysin O) antibodies binding, Immunogen in Sandwich Elisa, lateral-flow tests,and other immunoassays as control material in streptolysin O level test of Infectious disease(Streptococcus pyogenes infection) and related syndrome evaluation.	<a href="#">GMP-IVD-P042-Tg001-Ab01;</a> <a href="#">GMP-IVD-P042-Tg001-Ab02:</a> <a href="#">Anti-streptolysin O (SLO) streptolysin O mouse monoclonal antibody (mAb)</a>	streptolysin O (streptolysin O) antigen binding, ELISA validated as capture antibody and detection antibody. Pair recommendation with other streptolysin O (streptolysin O) antibodies in streptolysin O level test of Infectious disease (Streptococcus pyogenes infection) and related syndrome evaluation.	


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#### Mycoplasma pneumoniae

Cat No.	Pathogen	Target	Disease	Cat No.of Antigen	Bioactivity validation of Antigen	Cat No.of Antibodies	Bioactivity validation of Antibodies	Order
<a href="#">GMP-IVD-P043-Tg001</a>	Mycoplasma pneumoniae	M-P1-10	pneumonia	<a href="#">GMP-IVD-P043-Tg001-Ag01: Recombinant Mycoplasma pneumoniae M-P1-10 Protein</a>	Mycoplasma pneumoniae P1 adhesion protein (M-P1-10) antibodies binding, Immunogen in Sandwich Elisa, lateral-flow tests,and other immunoassays as control material in M-P1-10 level test of Infectious disease(pneumonia) and related syndrome evaluation.	<a href="#">GMP-IVD-P043-Tg001-Ab01;</a> <a href="#">GMP-IVD-P043-Tg001-Ab02:</a> <a href="#">Anti-Mycoplasma pneumoniae M-P1-10 mouse monoclonal antibody (mAb)</a>	Mycoplasma pneumoniae P1 adhesion protein (M-P1-10) antigen binding, ELISA validated as capture antibody and detection antibody. Pair recommendation with other Mycoplasma pneumoniae P1 adhesion protein (M-P1-10) antibodies in M-P1-10 level test of Infectious disease (pneumonia) and related syndrome evaluation.	

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#### Helicobacter pylori (H. pylori)

Cat No.	Pathogen	Target	Disease	Cat No.of Antigen	Bioactivity validation of Antigen	Cat No.of Antibodies	Bioactivity validation of Antibodies	Order
<a href="#">GMP-IVD-P044-Tg001</a>	Helicobacter pylori (H. pylori)	CagA	peptic ulcer and gastritis	<a href="#">GMP-IVD-P044-Tg001-Ag01: Recombinant Helicobacter pylori (H. pylori) CagA Protein</a>	Helicobacter pylori cytotoxin-related protein A (CagA) antibodies binding, Immunogen in Sandwich Elisa, lateral-flow tests,and other immunoassays as control material in CagA level test of Infectious disease(peptic ulcer and gastritis) and related syndrome evaluation.	<a href="#">GMP-IVD-P044-Tg001-Ab01;</a> <a href="#">GMP-IVD-P044-Tg001-Ab02:</a> <a href="#">Anti-Helicobacter pylori (H. pylori) CagA mouse monoclonal antibody (mAb)</a>	Helicobacter pylori cytotoxin-related protein A (CagA) antigen binding, ELISA validated as capture antibody and detection antibody. Pair recommendation with other Helicobacter pylori cytotoxin-related protein A (CagA) antibodies in CagA level test of Infectious disease (peptic ulcer and gastritis) and related syndrome evaluation.	

Cat No.	Pathogen	Target	Disease	Cat No.of Antigen	Bioactivity validation of Antigen	Cat No.of Antibodies	Bioactivity validation of Antibodies	Order
<a href="#">GMP-IVD-P044-Tg002</a>	Helicobacter pylori (H. pylori)	Flagellin A (FlaA)	peptic ulcer and gastritis	<a href="#">GMP-IVD-P044-Tg002-Ag01: Recombinant Helicobacter pylori (H. pylori) FlaA Protein</a>	Helicobacter pylori flagellin A (FlaA) antibodies binding, Immunogen in Sandwich Elisa, lateral-flow tests, and other immunoassays as control material in FlaA level test of Infectious disease(peptic ulcer and gastritis) and related syndrome evaluation.	<a href="#">GMP-IVD-P044-Tg002-Ab01;</a> <a href="#">GMP-IVD-P044-Tg002-Ab02:</a> <a href="#">Anti-Helicobacter pylori (H. pylori) FlaA mouse monoclonal antibody (mAb)</a>	Helicobacter pylori flagellin A (FlaA) antigen binding, ELISA validated as capture antibody and detection antibody. Pair recommendation with other Helicobacter pylori flagellin A (FlaA) antibodies in FlaA level test of Infectious disease (peptic ulcer and gastritis) and related syndrome evaluation.	
<a href="#">GMP-IVD-P044-Tg003</a>	Helicobacter pylori (H. pylori)	Flagellin B (FlaB)	peptic ulcer and gastritis	<a href="#">GMP-IVD-P044-Tg003-Ag01: Recombinant Helicobacter pylori (H. pylori) FlaB Protein</a>	Helicobacter pylori flagellin B (FlaB) antibodies binding, Immunogen in Sandwich Elisa, lateral-flow tests, and other immunoassays as control material in FlaB level test of Infectious disease(peptic ulcer and gastritis) and related syndrome evaluation.	<a href="#">GMP-IVD-P044-Tg003-Ab01;</a> <a href="#">GMP-IVD-P044-Tg003-Ab02:</a> <a href="#">Anti-Helicobacter pylori (H. pylori) FlaB mouse monoclonal antibody (mAb)</a>	Helicobacter pylori flagellin B (FlaB) antigen binding, ELISA validated as capture antibody and detection antibody. Pair recommendation with other Helicobacter pylori flagellin B (FlaB) antibodies in FlaB level test of Infectious disease (peptic ulcer and gastritis) and related syndrome evaluation.	
<a href="#">GMP-IVD-P044-Tg004</a>	Helicobacter pylori (H. pylori)	Vac A	peptic ulcer and gastritis	<a href="#">GMP-IVD-P044-Tg004-Ag01: Recombinant Helicobacter pylori (H. pylori) Vac A Protein</a>	Helicobacter pylori vacuolar cytotoxin A (Vac A) antibodies binding, Immunogen in Sandwich Elisa, lateral-flow tests, and other immunoassays as control material in Vac A level test of Infectious disease(peptic ulcer and gastritis) and related syndrome evaluation.	<a href="#">GMP-IVD-P044-Tg004-Ab01;</a> <a href="#">GMP-IVD-P044-Tg004-Ab02:</a> <a href="#">Anti-Helicobacter pylori (H. pylori) Vac A mouse monoclonal antibody (mAb)</a>	Helicobacter pylori vacuolar cytotoxin A (Vac A) antigen binding, ELISA validated as capture antibody and detection antibody. Pair recommendation with other Helicobacter pylori vacuolar cytotoxin A (Vac A) antibodies in Vac A level test of Infectious disease (peptic ulcer and gastritis) and related syndrome evaluation.	
<a href="#">GMP-IVD-P044-Tg005</a>	Helicobacter pylori (H. pylori)	Ure B	peptic ulcer and gastritis	<a href="#">GMP-IVD-P044-Tg005-Ag01: Recombinant Helicobacter pylori (H. pylori) Ure B Protein</a>	Helicobacter pylori urease B (Ure B) antibodies binding, Immunogen in Sandwich Elisa, lateral-flow tests, and other immunoassays as control material in Ure B level test of Infectious disease(peptic ulcer and gastritis) and related syndrome evaluation.	<a href="#">GMP-IVD-P044-Tg005-Ab01;</a> <a href="#">GMP-IVD-P044-Tg005-Ab02:</a> <a href="#">Anti-Helicobacter pylori (H. pylori) Ure B mouse monoclonal antibody (mAb)</a>	Helicobacter pylori urease B (Ure B) antigen binding, ELISA validated as capture antibody and detection antibody. Pair recommendation with other Helicobacter pylori urease B (Ure B) antibodies in Ure B level test of Infectious disease (peptic ulcer and gastritis) and related syndrome evaluation.	
<a href="#">GMP-IVD-P044-Tg006</a>	Helicobacter pylori (H. pylori)	HSP	peptic ulcer and gastritis	<a href="#">GMP-IVD-P044-Tg006-Ag01: Recombinant Helicobacter pylori (H. pylori) HSP Protein</a>	Helicobacter pylori heat shock protein (HSP) antibodies binding, Immunogen in Sandwich Elisa, lateral-flow tests, and other immunoassays as control material in HSP level test of Infectious disease(peptic ulcer and gastritis) and related syndrome evaluation.	<a href="#">GMP-IVD-P044-Tg006-Ab01;</a> <a href="#">GMP-IVD-P044-Tg006-Ab02:</a> <a href="#">Anti-Helicobacter pylori (H. pylori) HSP mouse monoclonal antibody (mAb)</a>	Helicobacter pylori heat shock protein (HSP) antigen binding, ELISA validated as capture antibody and detection antibody. Pair recommendation with other Helicobacter pylori heat shock protein (HSP) antibodies in HSP level test of Infectious disease (peptic ulcer and gastritis) and related syndrome evaluation.	
<a href="#">GMP-IVD-P044-Tg007</a>	Helicobacter pylori (H. pylori)	outer membrane protein 1 (OMP-1)	peptic ulcer and gastritis	<a href="#">GMP-IVD-P044-Tg007-Ag01: Recombinant Helicobacter pylori (H. pylori) OMP-1 Protein</a>	Helicobacter pylori outer membrane protein 1 (OMP-1) antibodies binding, Immunogen in Sandwich Elisa, lateral-flow tests, and other immunoassays as control material in OMP-1 level test of Infectious disease(peptic ulcer and gastritis) and related syndrome evaluation.	<a href="#">GMP-IVD-P044-Tg007-Ab01;</a> <a href="#">GMP-IVD-P044-Tg007-Ab02:</a> <a href="#">Anti-Helicobacter pylori (H. pylori) OMP-1 mouse monoclonal antibody (mAb)</a>	Helicobacter pylori outer membrane protein 1 (OMP-1) antigen binding, ELISA validated as capture antibody and detection antibody. Pair recommendation with other Helicobacter pylori outer membrane protein 1 (OMP-1) antibodies in OMP-1 level test of Infectious disease (peptic ulcer and gastritis) and related syndrome evaluation.	
<a href="#">GMP-IVD-P044-Tg008</a>	Helicobacter pylori (H. pylori)	outer membrane protein 2 (OMP-2)	peptic ulcer and gastritis	<a href="#">GMP-IVD-P044-Tg008-Ag01: Recombinant Helicobacter pylori (H. pylori) OMP-2 Protein</a>	Helicobacter pylori outer membrane protein 3 (OMP-2) antibodies binding, Immunogen in Sandwich Elisa, lateral-flow tests, and other immunoassays as control material in OMP-2 level test of Infectious disease(peptic ulcer and gastritis) and related syndrome evaluation.	<a href="#">GMP-IVD-P044-Tg008-Ab01;</a> <a href="#">GMP-IVD-P044-Tg008-Ab02:</a> <a href="#">Anti-Helicobacter pylori (H. pylori) OMP-2 mouse monoclonal antibody (mAb)</a>	Helicobacter pylori outer membrane protein 3 (OMP-2) antigen binding, ELISA validated as capture antibody and detection antibody. Pair recommendation with other Helicobacter pylori outer membrane protein 3 (OMP-2) antibodies in OMP-2 level test of Infectious disease (peptic ulcer and gastritis) and related syndrome evaluation.	

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#### Prion

Cat No.	Pathogen	Target	Disease	Cat No.of Antigen	Bioactivity validation of Antigen	Cat No.of Antibodies	Bioactivity validation of Antibodies	Order
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Cat No.	Pathogen	Target	Disease	Cat No.of Antigen	Bioactivity validation of Antigen	Cat No.of Antibodies	Bioactivity validation of Antibodies	Order
GMP-IVD-P045-Tg001	Prion	PrP	Transmissible spongiform encephalopathies	GMP-IVD-P045-Tg001-Ag01: Recombinant Prion PrP Protein	Prion (PrP) antibodies binding, Immunogen in Sandwich Elisa, lateral-flow tests,and other immunoassays as control material in PrP level test of Infectious disease(Transmissible spongiform encephalopathies) and related syndrome evaluation.	GMP-IVD-P045-Tg001-Ab01; GMP-IVD-P045-Tg001-Ab02: Anti-Prion PrP mouse monoclonal antibody (mAb)	Prion (PrP) antigen binding, ELISA validated as capture antibody and detection antibody. Pair recommendation with other Prion (PrP) antibodies in PrP level test of Infectious disease (Transmissible spongiform encephalopathies) and related syndrome evaluation.	

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#### STDs

Cat No.	Pathogen	Target	Disease	Cat No.of Antigen	Bioactivity validation of Antigen	Cat No.of Antibodies	Bioactivity validation of Antibodies	Order
GMP-IVD-P046-Tg001	NA	STDs	Sexually transmitted diseases	GMP-IVD-P046-Tg001-Ag01: Recombinant STDs Protein	Sexually transmitted diseases (STDs) antibodies binding, Immunogen in Sandwich Elisa, lateral-flow tests,and other immunoassays as control material in STDs level test of Infectious disease(Sexually transmitted diseases) and related syndrome evaluation.	GMP-IVD-P046-Tg001-Ab01; GMP-IVD-P046-Tg001-Ab02: Anti-STDs mouse monoclonal antibody (mAb)	Sexually transmitted diseases (STDs) antigen binding, ELISA validated as capture antibody and detection antibody. Pair recommendation with other Sexually transmitted diseases (STDs) antibodies in STDs level test of Infectious disease (Sexually transmitted diseases) and related syndrome evaluation.	

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#### ARTI

Cat No.	Pathogen	Target	Disease	Cat No.of Antigen	Bioactivity validation of Antigen	Cat No.of Antibodies	Bioactivity validation of Antibodies	Order
GMP-IVD-P047-Tg001	NA	ARTI	acute respiratory infectious diseases	GMP-IVD-P047-Tg001-Ag01: Recombinant ARTI Protein	acute respiratory infectious diseases (ARTI) antibodies binding, Immunogen in Sandwich Elisa, lateral-flow tests,and other immunoassays as control material in ARTI level test of Infectious disease(acute respiratory infectious diseases) and related syndrome evaluation.	GMP-IVD-P047-Tg001-Ab01; GMP-IVD-P047-Tg001-Ab02: Anti-ARTI mouse monoclonal antibody (mAb)	acute respiratory infectious diseases (ARTI) antigen binding, ELISA validated as capture antibody and detection antibody. Pair recommendation with other acute respiratory infectious diseases (ARTI) antibodies in ARTI level test of Infectious disease (acute respiratory infectious diseases) and related syndrome evaluation.	

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#### SARS-CoV2

Cat No.	Pathogen	Target	Disease	Cat No.of Antigen	Bioactivity validation of Antigen	Cat No.of Antibodies	Bioactivity validation of Antibodies	Order
GMP-IVD-P049-Tg001	SARS-CoV2	Nucleocapsid	COVID-19	GMP-IVD-P048-Tg001-Ag01: Recombinant SARS-CoV2 Nucleocapsid Protein	SARS-CoV2 Nucleocapsid antibodies binding, Immunogen in Sandwich Elisa, lateral-flow tests,and other immunoassays as control material in Nucleocapsid level test of Infectious disease(COVID-19) and related syndrome evaluation.	GMP-IVD-P048-Tg001-Ab01; GMP-IVD-P048-Tg001-Ab02: Anti-SARS-CoV2 Nucleocapsid mouse monoclonal antibody (mAb)	SARS-CoV2 Nucleocapsid antigen binding, ELISA validated as capture antibody and detection antibody. Pair recommendation with other SARS-CoV2 Nucleocapsid antibodies in Nucleocapsid level test of Infectious disease (COVID-19) and related syndrome evaluation.	

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#### GeneMedi and other company's P24 antibody pairs validation with HIV PSV in sandwich ELISA

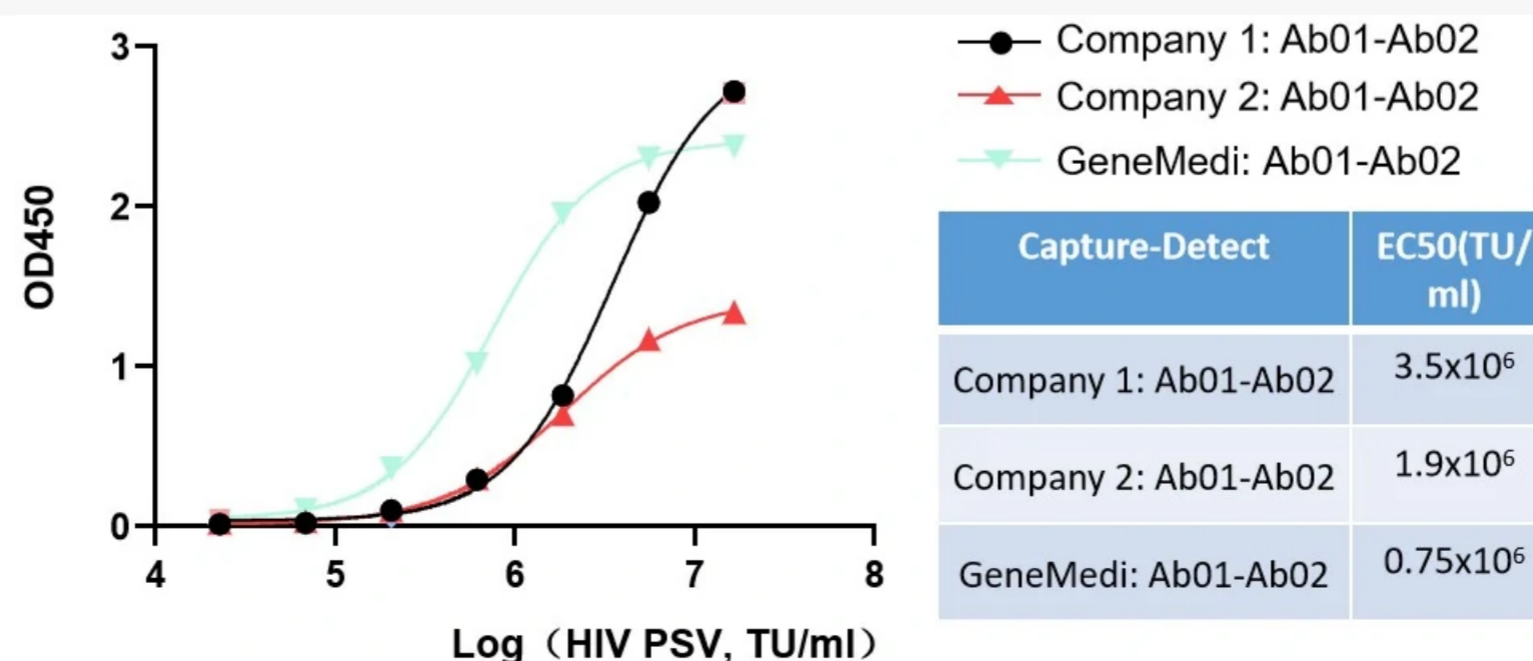


Figure. GeneMedi and other company's P24 antibody pairs validation with HIV PSV (GMVP-LVc10) in sandwich ELISA. GeneMedi's P24 antibody pair has a larger linear range and better sensitivity, and represents the best EC50. GeneMedi's Ab01: GMP-HIV1-Ab01, GeneMedi's Ab02: GMP-HIV1-Ab02.

### Abstract

Infectious diseases are a significant burden on public health and economic stability of societies all over the world. They have been among the leading causes of death and disability and presented growing challenges to health security and human progress for centuries. Infectious diseases are generally caused by microorganisms. The routes of their entry into host is mostly by the mouth, eyes, genital openings, nose, and the skin. Damage to tissues mainly results from the growth and metabolic processes of infectious agents intracellular or within body fluids, with the production and release of toxins or enzymes that interfere with the normal functions of organs and/or systems [1]. Advances in basic science research and development of molecular technology and diagnostics have enhanced understanding of disease etiology, pathogenesis, and molecular epidemiology, which provide basis for appropriate detection, prevention, and control measures as well as rational design of vaccine [2]. The diagnosis of infectious diseases is particularly critical for the prevention and control of the epidemic. Here we introduce the insights and detection methods of infectious disease, aiming to provide some helps for clinical diagnosis as well as epidemic prevention and control of infectious diseases.

### 1. Introduction of human infectious diseases caused by living pathogens

Infectious diseases arise upon contact with an infectious agent. Five major infectious agents have been identified: bacteria, viruses, fungi, protozoans and parasites [3, 4]. Various factors can be identified that create opportunities for infectious agents to invade human hosts. These include global urbanization, increase in population density, poverty, social unrest, travel, land clearance, farming, hunting, keeping domestic pets, deforestation, climate change, and other human activities that destroy microbial habitat [5, 6]. Human engagement in activities that interfere with ecological and environmental conditions continues, thereby increasing the risk of contact with new pathogens. These pathogens are mostly transmitted through intermediate animal hosts such as rodents [7, 8], which gain increased contact with humans as a result of environmental and human behavioral factors. In most cases, a combination of risk factors accounts for infectious disease emergence and/or outbreak of epidemic. Here we list some past emerging infectious disease epidemics and probable factors for the outbreak in Table 1.

Table 1. Some past infectious disease epidemics and possible outbreak factors

Year	Emerging disease	Pathogenic agent	Main probable factor	Genemedi's diagnostic antibodies and antigens
2019	2019-novel-coronavirus pneumonia	2019-nCoV/SARS-CoV-2	Dynamic balances and imbalances, within complex globally distributed ecosystems comprising humans, animals, pathogens, and the environment. May be because of hunting and feeding on infected wild animals (viverrids)	Antigens: Nucleocapsid (N protein), Spike(S protein), RBD, S1+S2 ECD, Envelope (E protein), 3C-like Proteinase (Mpro), RdRP(Nsp12), etc. Antibodies: N protein antibody (GMP-V-2019nCoV-NAb001~004) , Spike protein antibody (GMP-V-2019nCoV-SAb001~004)
1976-2020	Ebola haemorrhagic fever	Filovirus Ebola virus	Rainforest penetration by humans/close contact with infected game (hunting) or with host reservoirs (bats)/infected biological products/nosocomial/needle spread	Antibodies: Anti-ebola virus (EV) nucleoprotein (NP) mouse monoclonal antibody (mAb) Antigens: Recombinant ebola virus (EV) nucleoprotein (NP) Protein
1889, 1890, 1918, 1957	Pandemic Influenza	Paramyxovirus influenza A	Animal-human virus reassortment and antigenic shift	Antibodies: Anti-Influenza A NP mouse monoclonal antibody Antigens: Recombinant Influenza A NP Protein (Flu A/B, His Tag)
2003	Severe acute respiratory syndrome (SARS)	SARS Coronavirus	Hunting and feeding on infected wild animals (viverrids)	
1997	Highly pathogenic avian influenza (HPAI)	H5N1 virus	Animal-animal influenza virus gene reassortment; emergence of H5N1 avian influenza, extensive chicken farming	Antibodies: Anti-Avian Influenza Virus Type A H5N1 subtype Nucleocapsid Protein (NP) mouse monoclonal antibody (mAb) Anti-Avian Influenza Virus Type A H5N1 subtype Haemagglutinin (HA) mouse monoclonal antibody (mAb) Antigens: Recombinant Avian Influenza Virus Type A H5N1 subtype NP Protein Recombinant Avian Influenza Virus Type A H5N1 subtype Haemagglutinin (HA) Protein
1996	Haemorrhagic colitis	Escherichia coli O157:H7	Ingestion of contaminated food, undercooked beef, and raw milk	
1988	Herpes	Herpes simplex virus 1/2(HSV-1/HSV-2)	Indirect contact transmission, saliva, liquid from herpes, blood, mother to baby at birth.	Antibodies: Anti-herpes simplex virus (HSV) mouse monoclonal antibody (mAb) Antigens: Recombinant herpes simplex virus (HSV) Protein
1987	Rift Valley fever (RVF)	Bunyavirus RVF virus	Dramatic increase in mosquito vector breeding sites (by dam filling); weather (rainfall) and cattle migration (guided by artificial water holes)	Antibodies: Anti-Rift Valley Fever (RVF) nucleoprotein (NP) mouse monoclonal antibody (mAb) Antigens: Recombinant Rift Valley Fever (RVF) nucleoprotein (NP) Protein
1987	Hepatitis C	Hepatitis c virus (HCV)	Blood, acupuncture, drug taking, etc	Antibodies: Anti-hepatitis C virus (HCV) Recombinant HCV NS3-NS4-NS5 fusion Protein (His Tag) mouse monoclonal antibody (mAb) Antigens: Recombinant hepatitis C virus (HCV) Recombinant HCV NS3-NS4-NS5 fusion Protein (His Tag) Protein
1983	Crimean-Congo haemorrhagic fever	CCHF virus	Ecological changes favouring increased human exposure to ticks of sheep and small wild animals	
1981	Acquired immunodeficiency syndrome (AIDS)	Human immunodeficiency virus (HIV)	Sexual contact/exposure to blood or tissues of an infected person	Antibodies: Anti-Human immunodeficiency virus 1 (HIV-1) GP41 Protein mouse monoclonal antibody (mAb) Antigens: Recombinant Human immunodeficiency virus 1 (HIV-1) GP41 Protein Protein

1976	Malaria	<a href="#">Plasmodium falciparum</a>	Human behaviour/rainfall and drainage problems/mosquito breeding/neglect of eradication policy, economics, and growing interchange of populations	Antigens: <a href="#">Recombinant Plasmodium merozoite surface protein (MSP) Protein</a> <a href="#">Recombinant Plasmodium Circumsporozoite Protein (CSP) Protein</a> Antibodies: <a href="#">Anti-Plasmodium merozoite surface protein (MSP) mouse monoclonal antibody (mAb)</a> <a href="#">Anti-Plasmodium Circumsporozoite Protein (CSP) mouse monoclonal antibody (mAb)</a>
1969	Lassa fever	<a href="#">Arenavirus Lassa virus</a>	Hospital exposure to index case—rodent exposure	
1965	Hepatitis B	<a href="#">Hepatitis b virus (HBV)</a>	sexual contact, sharing needles, syringes, or other drug-injection equipment, mother to baby at birth.	Antigens: <a href="#">Recombinant Hepatitis b virus (HBV) HBsAg Protein</a> <a href="#">Recombinant Hepatitis B virus (HBV) HBeAg Protein</a> <a href="#">Recombinant Hepatitis B virus (HBV) HBcAg Protein</a> Antibodies: <a href="#">Anti-Hepatitis B virus (HBV) HBsAg mouse monoclonal antibody (mAb)</a> <a href="#">Anti-Hepatitis B virus (HBV) HBeAg mouse monoclonal antibody (mAb)</a> <a href="#">Anti-Hepatitis B virus (HBV) HBcAg mouse monoclonal antibody (mAb)</a>
1959	Bolivian haemorrhagic fever (BHF)	<a href="#">ArenavirusMachupo virus</a>	Population increase of rats gathering food	
1958	Argentine haemorrhagic fever	<a href="#">ArenavirusJunin virus</a>	Changes in agricultural practices of corn harvest (maize mechanization)	
1953	Dengue haemorrhagic fever (DHF)	<a href="#">Dengue viruses 1, 2, 3, and 4</a>	Increasing human population density in cities in a way that favours vector breeding sites (water storage)	
1949	Cervical cancer	<a href="#">Human papilloma virus (HPV)</a>	Contact infection, Sexual contact	Antibodies: <a href="#">Recombinant Human papilloma virus (HPV) HPV 16 L1 capsid protein Protein</a> Antibodies: <a href="#">Anti-Human papilloma virus (HPV) HPV 16 L1 capsid protein mouse monoclonal antibody (mAb)</a>

## 2. The strategies used in diagnosis of human Infectious diseases

### 2.1 Molecular Methods

The development of molecular methods for the direct identification of a specific viral genome from the clinical sample is one of the greatest achievements of the 21st century. Clearly nucleic acid amplification techniques including Reverse Transcription-Polymerase Chain Reaction (RT-PCR), nucleic acid sequence-based amplification (NASBA) and Lawrence Livermore Microbial Detection Array (LLMDA) are proven technology leaders for rapid detection and molecular identification for most known human viruses [9].

RT-PCR assays for virus detection provides faster results than end-point assays and in many cases have sensitivities equal to or better than culture [10]. The novel coronavirus, 2019-nCoV, was detected through real-time RT-PCR with primers against two segments of its RNA genome [11]. The particular primer sets and specific guideline for detection of COVID-19 through RT-PCR were made available by the Center for Disease Control (CDC) USA, according to CDC [12]. However, high mutation rates may lead to extensive changes in viral nucleic acid sequences making dedicated PCR primer use irrelevant, therefore there is high demand for the development of rapid and universal virus identification and detection technologies. In contrast, although NASBA assay is considered sensitive; it has not been widely used because of the difficulties in the preparation of NASBA master mix in-house and the high cost of commercial kits. A new molecular biology-based microbial detection method for rapid identification of multiple virus types in the same sample has been developed by a research group at Lawrence Livermore National Laboratory. Lawrence Livermore Microbial Detection Array (LLMDA) detects viruses using probes against genomic DNA sequence within 24 hours [13,14]. In addition, the oligonucleotide probes were selected to enable detection of novel, divergent species with homology to sequenced organisms [14].

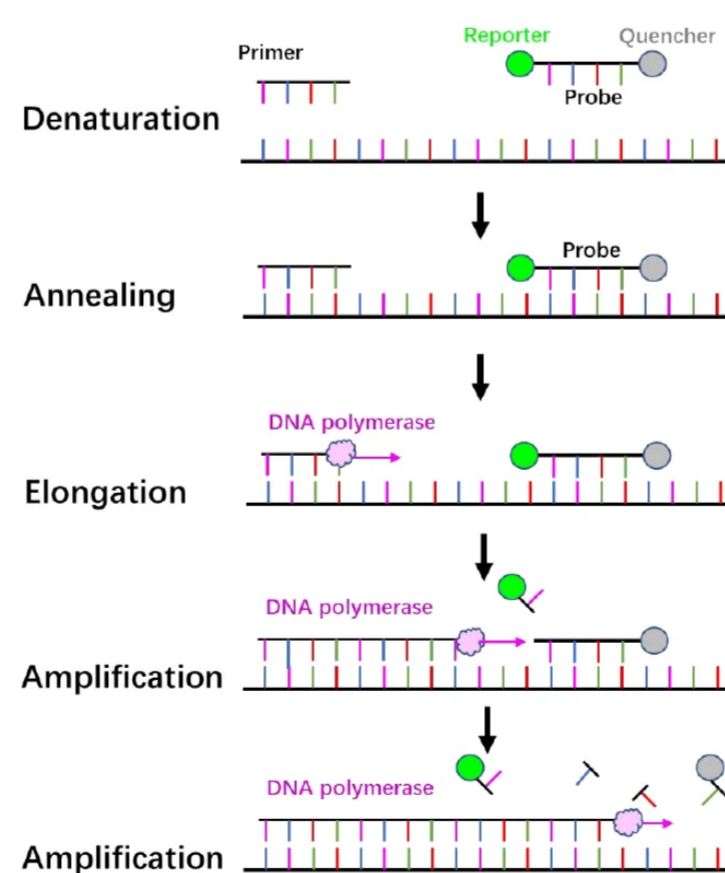


Figure 1. Principle of RT-PCR.

### 2.2 Immuno-assays

The nucleic acid diagnostic tool currently employed is with good sensitivity and excellent specificity. However, due to its high false negative, time-consuming, high level equipment and technical personnel demand, the immunological antigen or antibody detection has been paid more and more attention because of its quick detection speed, low and simple technical requirements of detection. At present, the detection methods mainly include Enzyme-linked immunosorbent assays (ELISAs), colloidal gold immunochromatography (GICA) and magnetic

particle chemiluminescence.

### 2.2.1 Enzyme-Linked Immunosorbent Assays (ELISA)

Enzyme-linked immunosorbent assays (ELISAs) incorporate the sensitivity of simple enzyme assays with the specificity of antibodies, by employing antigens or antibodies coupled to an easily-assayed enzyme. As such ELISA is much more rapid method than immunoblotting to detect specific viral protein from a cell, tissue, organ, or body fluid. There are two main variations of ELISAs: antigen-capture ELISA (detecting viral proteins), involve attachment of a capture antibody to a solid matrix for the viral protein of interest, while antibody-capture ELISA measures the specific antibody level in a sample, by coating viral antigen protein on a solid surface. There are two principles based on antigen-capture and antibody-capture ELISAs. In a general, ELISAs are considered a highly sensitive method that can detect a fairly low number of proteins at the range of picomolar to nanomolar range ( $10^{-12}$  to  $10^{-9}$  moles per liter). ELISA has been one of the most widely used serologic tests for detecting antibody to HIV-1. ELISA method was found useful as a diagnostic tool to detect influenza viral antigen much quicker than other conventional virus detection methods [15]. In another previous study, comparison of ELISA, with conventional methods has demonstrated ELISA superiority for the rapid detection and identification of influenza A virus [16]. A simplified and standardized neutralization enzyme immunoassay (Nt-EIA) was developed to detect measles virus growth in Vero cells and to quantify measles neutralizing antibody [17]. Newer EIA formats for hepatitis C virus diagnostics have been constantly evaluated [18,19]. As such ELISAs are being used for plethora of application both in experimental and diagnostic virology including HIV-1, dengue, and influenza [20-22]. On the other hand, although rapid than traditional plaque assays or TCID<sub>50</sub>, ELISA assays sometimes could be quite expensive, due to the cost of reagents used. Unfortunately, sometimes required antibodies may not be commercially developed as well. In contrast, attempts to develop antibodies in-house may be quite expensive. Additional variability may also be introduced due to high background signals generated by non-specific binding, or cross-reactivity with non-viral protein targets.

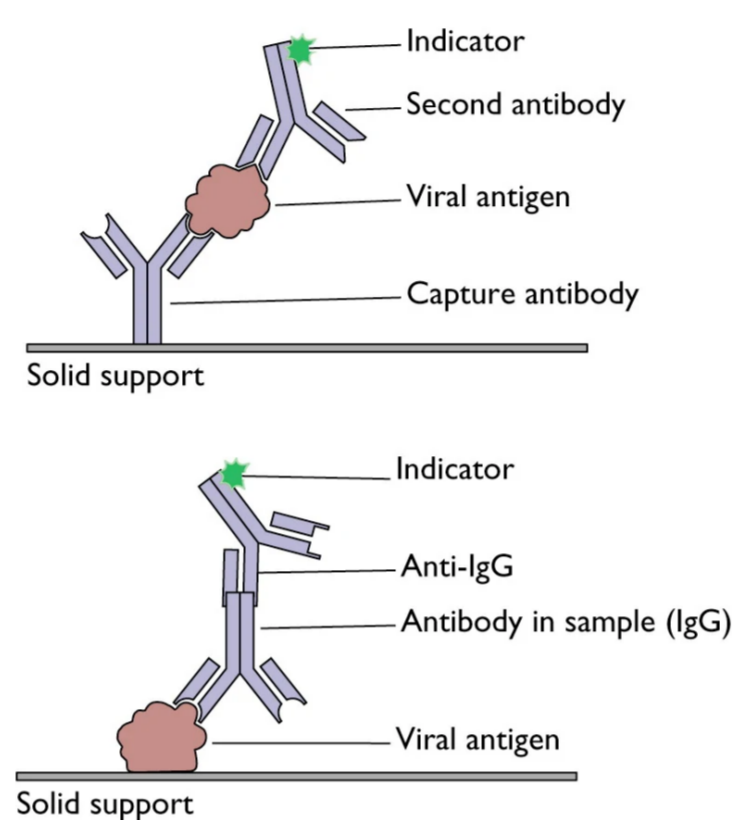


Figure 2. A schematic representation of two principles based on antigen or antibody capture ELISA<sup>[23]</sup>

### 2.2.2 Colloidal gold immunochromatography (GICA)

Based on the specific immune response of antigen and antibody, colloidal gold particles were used as one of the tracer markers. Driven by solvent chromatography, the markers had an immune response on the C/T line, and the detection results could be obtained according to the color of the T line. GICA samples can be whole blood, serum or plasma, and studies have shown that the colloidal gold reagent has a high consistency in detecting whole blood, plasma or serum [24]. At present, there are seven kinds of colloidal gold kits approved by the State Food and Drug Administration, which are all detection antibodies, but there is no detection kit for antigens. RT-PCR was used as the control method, and the sensitivity and specificity of IgM/IgG antibody were different, and the highest detection rate of the two combined detection was 66.1% (125/189) [25]. This method can be used for enterprise resumption, students return to school, community crowd screening and other scenarios. Only a drop of fingertip blood is needed, and the detection results can be observed visually in 15 minutes, which is rapid and simple without special instruments. However, the detection has its disadvantages such as window period, without quantification, exposure risk, low sensitivity and vulnerability to environmental factors, and nucleic acid detection combination result is required for verification.

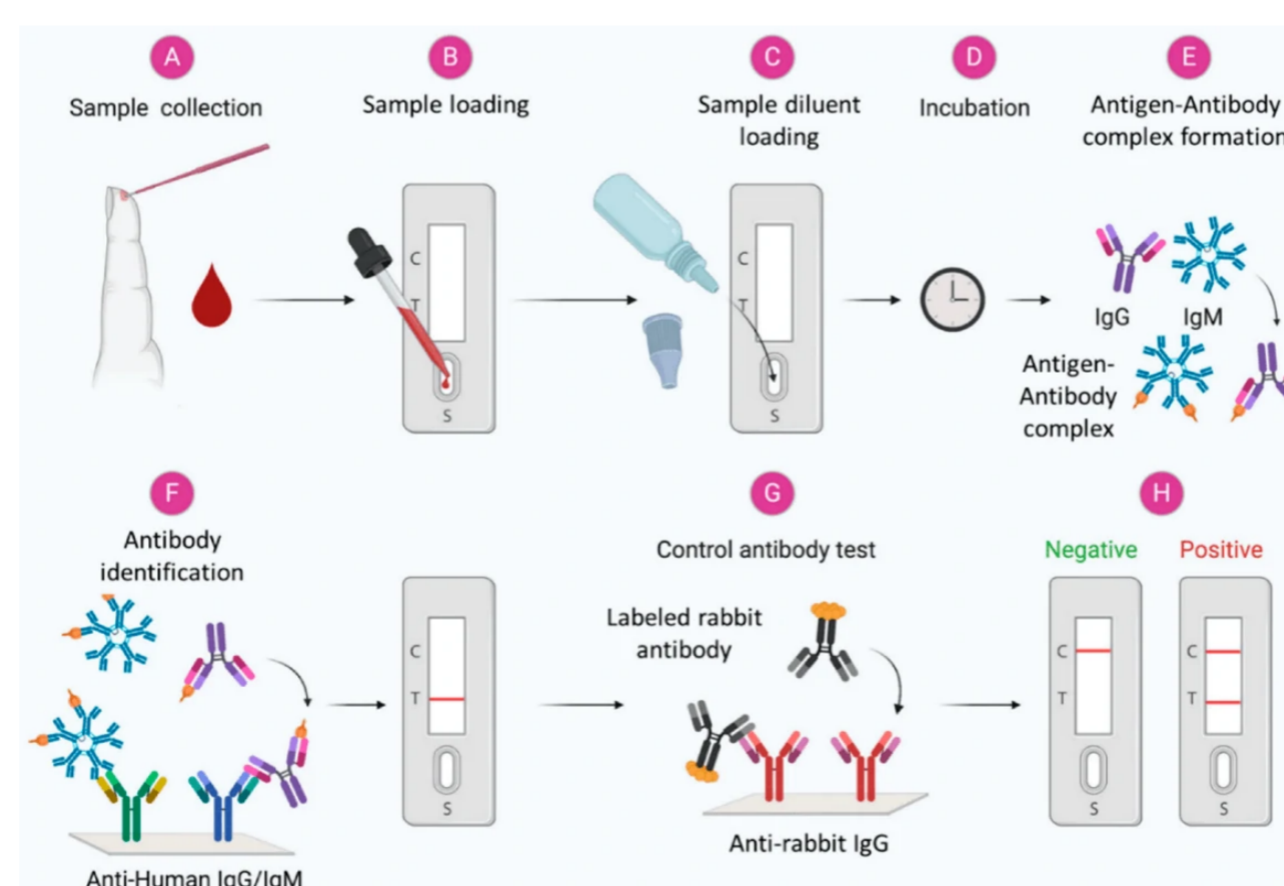


Figure 3. Scheme showing the general steps in the antibody-based diagnosis of viral infections from blood samples<sup>[26]</sup>

### 2.2.3 Magnetic particle chemiluminescence

Magnetic particle chemiluminescence is an emerging technique to capture specific IgM/IgG antibodies in samples using magnetic particles fixed on the surface of recombinant antigens. The antigen-antibody complex was precipitated by external magnetic field, and the captured antigen-antibody complex was identified by enzyme-labeled secondary antibody, and the luminescent intensity was determined by chemiluminescence instrument after adding the luminescent agent, and then quantitative analysis was carried out. It is characterized by high sensitivity, high specificity and wide detection range, etc. There are currently seven approved magnetic particle chemiluminescence detection kits, the first one developed by Bioscience, with an automatic chemiluminescence analyzer, capable of detecting at a speed of 240 T/H with an initial reporting time of 30 min [27].



### 2.3 Viral Culture

Virus culture, isolation and identification are the gold standards for laboratory identification of pathogens. However, viral culture results do not yield timely results to inform clinical management. Shell-vial tissue culture results may take 1-3 days, while traditional tissue-cell viral culture results may take 3-10 days. Due to the long incubation time, high technical requirements, and must be carried out in a level III safe biological laboratory, it is not suitable for rapid virus diagnosis during the epidemic period [28].

### 2.4 Immunofluorescence (IF) Assay

Immunofluorescence (IF) technique is widely used for rapid detection of virus infections by identifying virus antigens in clinical specimens. IF staining is usually considered very rapid (about 1 to 2 hr) and overall gives a sensitive and specific viral identification [29-32]. Unfortunately, IF technique may not be able to confirm the identity of all virus strains, for instance viruses of the "enterovirus" group; since most monoclonal antibodies (MAbs) for enteroviral identification have been shown to lack sensitivity, while cross-reactivity with rhinoviruses is extremely common [33]. In contrast, IF has been successfully used for better management of influenza virus infection and surveillance of influenza virus activity [30, 31]. As recommended by CDC, when influenza activity is low, positive results should be confirmed by direct immunofluorescence assay (DFA), viral culture, or RT-PCR, as false positive test results are more likely; while during peak influenza activity confirmatory testing using DFA, viral culture, or PCR must always be considered because a negative test may not rule out influenza viral infection. Interestingly, although IF is generally considered less sensitive than ELISA and PCR, a recent publication reports DFA as an optimal method for rapid identification of varicella-zoster virus (VZV), when compared with conventional cell culture [34]. In contrast, the Herpes simplex virus (HSV) DFA test accuracy was found very low (sensitivity 61%, specificity 99%), when tested to identify mucocutaneous HSV infection in children [35]. Furthermore, a monoclonal antibody designated CHA 437 was developed against HSV showed no cross-reactivity against the varicella-zoster virus, cytomegalovirus, or Epstein-Barr virus, however direct specimen testing resulted in overall low sensitivity (84.6%) and specificity (95.7%) [36]. On the other hand, an antigen detection assay for severe acute respiratory syndrome (SARS) coronavirus (CoV) could detect SARS-CoV in 11 out of 17 (65%) samples from SARS patients. As such IF technique is well-accepted laboratory diagnostics test, however, sometime these assays could be quite expensive, due to the cost of antibodies used. Additional variability may also be introduced due to non-specific binding, or cross-reactivity of commercially available antibodies [37].

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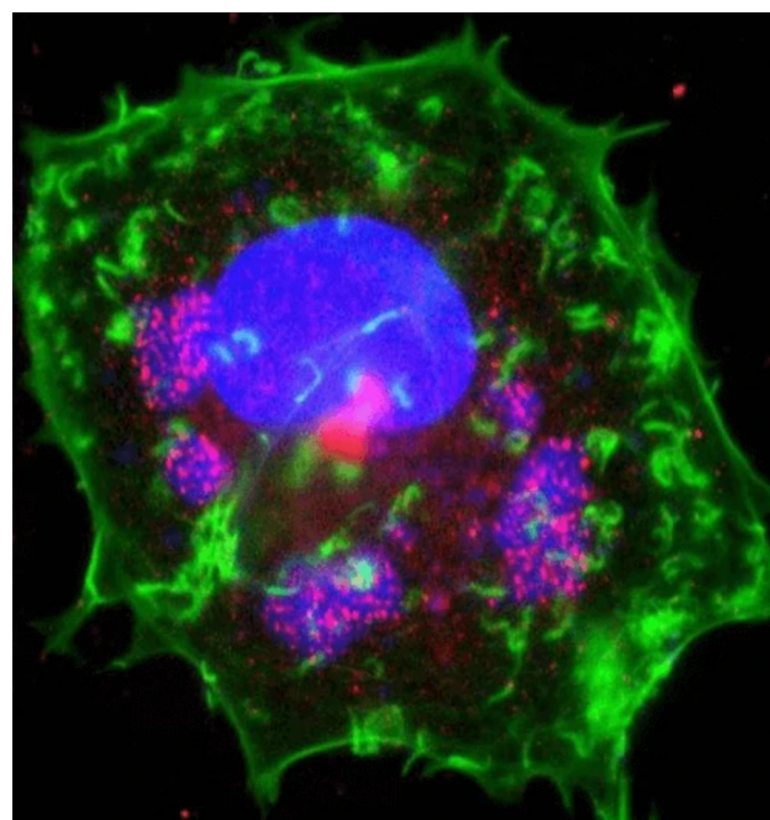


Figure 4. Immunofluorescence staining of vaccinia virus infected cell [38]. Areas of virus assembly within the cell are pink. Host and viral DNA (deoxyribonucleic acid) is blue. The host cell's DNA is contained within its nucleus (large oval). Actin protein filaments, which make up part of the cytoskeleton, are green.

### 2.5 Immunoblotting (WB)

Immunoblotting technique detects specific viral proteins isolated from a cell, tissue, organ, or body fluid. The development of sensitive and specific tests for human immunodeficiency virus type 1 (HIV-1) progressed rapidly after this retrovirus was found to be responsible for causing AIDS [39]. Immunoblotting has been one of the reference confirmatory tests for the diagnosis of HIV infection or after inconclusive enzyme immunoassay (EIA) results. Although difficulty in interpretation of immunoblotting results and the cost led to a reduction in overall use of WB technique, nevertheless immunoblots are still commonly used for various purposes, including clinical diagnosis of HIV-1, seroprevalence surveys, and for blood-donor screening. In addition, immunoblot assays have been used to confirm the anti-hepatitis C virus (HCV) reactivity [40]. In recent years immunoblotting has been established as an important prerequisite for the functional studies to understand protein composition of the purified viral particles, since it allows the analysis of specific proteins which result in better understanding of the infection process and the pathogenesis of viruses [41,42].

### 2.6 Transmission Electron Microscopy (TEM)

Most viruses are very small to be seen directly under a light microscope, and therefore could only be viewed with TEM (transmission electron microscopy). In 1948, smallpox and chicken pox were first differentiated by TEM [43] and thereafter early virus classifications depended heavily on TEM analysis. In particular many intestinal viruses were discovered by negative staining TEM microscopy [44, 45]. Although TEM has gradually been replaced by more sensitive methods such as PCR, nevertheless it still remains essential for several aspects of virology including discovery, description and titration of viruses. One of the major advantages of using TEM is that it does not require virus-specific reagents; this is of particular importance in an outbreak setting where the etiologic agent is unknown and therefore specific reagents may not be available to determine correct detection tests. Negative stained TEM technique continues to be a valuable tool for the discovery and identification of novel viruses including Ebola virus, henipavirus (Hendra and Nipah) and SARS [46-50]. A human monkeypox outbreak was detected in the US by TEM [51]. Nevertheless, due to the high instrument cost and the amount of space and facilities required, TEM is still only available in certain facilities.

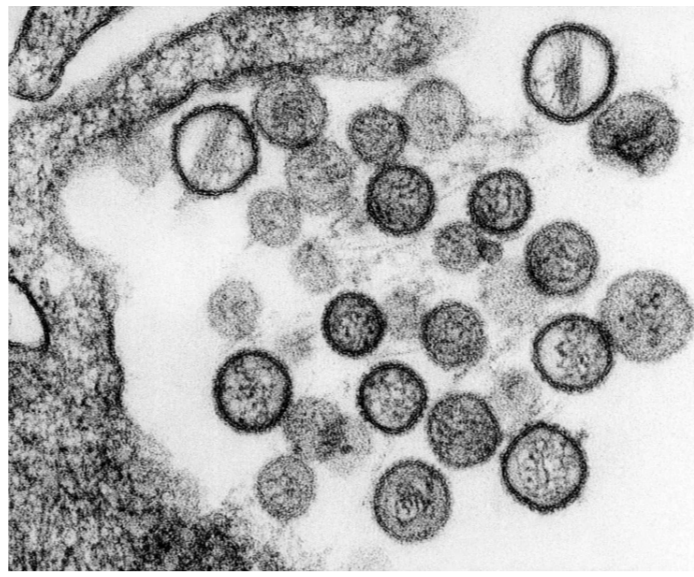


Figure 5. Transmission Electron Microscopy of hantavirus virions<sup>[52]</sup>

## Summary

Infectious diseases are a real public health threat, outbreaks can have serious social, political, and economic effects. A complex number of factors relating to human behavior and activities, pathogen evolution, poverty, and changes in the environment as well as dynamic human interactions with animals have been found to contribute to infectious disease emergence and transmission. Aggressive research is warranted to unravel important characteristics of pathogens necessary for diagnostics, therapeutics, and vaccine development. Here we describe some strategies for the diagnosis of human infectious diseases, hoping to be helpful for clinical diagnosis and epidemic prevention and control of infectious diseases. To date, multiple diagnostic techniques have been developed. Various diagnostic tools show both significances and limitations. Conventional approaches to quantify infective viral particles are labor-intensive, time-consuming, and often associated with poor reproducibility. Immunological tests generally provide quick results, however, is quite expensive due to the requirement of antigen-specific antibody. While RT-PCR may be able to provide results within a matter of hours, it is laborious, requires a skilled operator, and is sensitive to contamination. TEM-based quantification, although highly accurate in determining the shape and the total number of viral particles, often considered time-consuming, extremely expensive and impractical for high sample numbers. Moreover, TEM sample preparation is tedious, and the technique requires sophisticated instrument and a skilled operator. To alleviate these limitations, there is still a need to develop new cost-effective analytical methods that can allow users to quickly and easily determine virus concentrations and reduce constrictions coupled with current assays. Nevertheless, any such emerging methods must be carefully evaluated in terms of their efficiency, precision and linear range. The evaluation of each diagnostic technique and approval from the FDA are necessary before practical application.

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