



Credible Materials for Sexually Transmitted Infections Research



SEXUALLY TRANSMITTED INFECTIONS

Sexually transmitted infections (STIs) pose a major socioeconomic threat to humans around the globe. CDC estimates that 19 million new chlamydia, gonorrhea, and syphilis infections occur each year in the U.S. alone, with healthcare costs ranging as high as \$17 billion yearly.¹

While some STIs cause incurable, lifelong disease, such as Hepatitis B, Herpes, or HIV/AIDS, others cause acute infection, such as gonorrhea, trichomoniasis, or candidiasis, which can typically be cleared with antimicrobial treatment. However, with the emergence of antimicrobial-resistant organisms, new drugs and drug regimens are being explored as alternatives to traditional treatments.

In addition to the development of novel therapeutics and vaccines, early diagnosis and repeat testing during treatment are vital elements necessary for improving patient outcomes. For this reason, assay developers are actively pursuing rapid, PCR-based methods of detection to replace more subjective and time-consuming, culture-based methods of testing.

Let ATCC Genuine Cultures and ATCC Genuine Nucleics provide you with the reliability of fully authenticated cells, microorganisms, and nucleic acids for use as reference standards in the development of novel therapeutics, vaccines, and rapid detection methods. The use of high-quality ATCC reference materials in assay development allows for fast, accurate, and reproducible verification of assay performance, such as inclusivity/exclusivity testing and limits of detection.

To get you started, we have provided a list of our most popular STI strains isolated from a variety of clinical and geographic sources. To locate additional strains, please visit us online at www.atcc.org. Or, contact one of our Sales Representatives for assistance in selecting strains for inclusivity/exclusivity studies.

ATCC® GENUINE CULTURES

Table 1: *Candida albicans*

ATCC® No.	Description	Strain	Isolation
MP-8™	<i>Candida albicans</i> Drug Resistance Panel	Panel of strains exhibiting different levels of drug resistance	Human; various clinical and geographic sources
90028™	<i>Candida albicans</i>	NCCLS 11	Blood; Iowa
64124™	<i>Candida albicans</i>	Darlington	Mouth swab
14053™	<i>Candida albicans</i>	NIH 3172	Human blood; Maryland
MYA-2876™	<i>Candida albicans</i>	SC5314	Clinical specimen - human
64550™	<i>Candida albicans</i>	AD	Human skin
24433™	<i>Candida albicans</i>	Wasson	Nail infection
90029™	<i>Candida albicans</i>	NCCLS 67	Blood; Iowa
36801™	<i>Candida albicans</i>	207 [NCPF 3153]	Human
34133™	<i>Candida albicans</i>	Ca 16	Clinical specimen; Minnesota
62342™	<i>Candida albicans</i>	B41628 [NCPF 3363]	Human mouth; England

Table 2: *Chlamydia trachomatis*

ATCC® No.	Description	Strain	Isolation
VR-885™	<i>Chlamydia trachomatis</i>	UW-3/Cx; Serovar D	Human cervix - asymptomatic
VR-348B™	<i>Chlamydia trachomatis</i>	BOUR; Serovar E	Adult with probable clinical inclusion conjunctivitis and active trachoma; California
VR-880™	<i>Chlamydia trachomatis</i>	UW-12/Ur; Serovar I	Male urethra with non-gonococcal urethritis
VR-886™	<i>Chlamydia trachomatis</i>	UW-36/Cx; Serovar J	Human cervix, cervicitis; Seattle, Washington
VR-346™	<i>Chlamydia trachomatis</i>	IC-Cal-3; Serovar F	Eye of nine-day-old baby; California
VR-878™	<i>Chlamydia trachomatis</i>	UW-57/Cx; Serovar G	Human cervix (epithelial tissue), cervicitis; Seattle, Washington
VR-879™	<i>Chlamydia trachomatis</i>	UW-43/Cx; Serovar H	Human cervix (epithelial tissue), cervicitis; Seattle, Washington
VR-571B™	<i>Chlamydia trachomatis</i>	Har-13; Serovar A	Human conjunctiva from 4-year-old with trachoma
VR-887™	<i>Chlamydia trachomatis</i>	UW-31/Cx; Serovar K	Human cervix, cervicitis; Seattle, Washington
VR-1477™	<i>Chlamydia trachomatis</i>	TW-3; Serovar C	Specimen from human conjunctiva, Taiwan
VR-347™	<i>Chlamydia trachomatis</i>	Apache-2; Serovar Ba	Eye of an Apache Indian child from San Carlos; Arizona
VR-573™	<i>Chlamydia trachomatis</i>	Strain Har-36; Serovar B	Human conjunctiva from a 12 month old male with trachoma (trachoma II follicles and papillae); Saudi Arabia
VR-901B™	<i>Chlamydia trachomatis</i>	440; LGV Type 1	Lymphogranuloma venereum (LGV I)
VR-902B™	<i>Chlamydia trachomatis</i>	434; LGV Type 2	Lymphogranuloma venereum (LGV II)
VR-903™	<i>Chlamydia trachomatis</i>	404; LGV Type 3	Lymph node from human with LGV; Lymphogranuloma venereum (LGV III)



DOES CHRONIC CHLAMYDIAL PERSISTENCE OCCUR IN VIVO?

The question is still open for debate. While *Chlamydia trachomatis* has been shown to enter a dormant phase in vitro during periods of bacterial stress unfavorable for growth, proof of in vivo persistence still needs to be established. Current methods of testing measure the host's immune response, and are limited by the lowest level of antibody that can be detected in blood. Researchers suggest that both nucleic acid detection and verification of organism viability are together required to establish true in vivo persistence.²

Table 3: *Haemophilus ducreyi*

ATCC® No.	Description	Strain	Isolation
33940™	<i>Haemophilus ducreyi</i>	CIP 542 [X2]	
700724™	<i>Haemophilus ducreyi</i>	35000HP	Skin from the upper arm of an experimentally infected human subject
33921™	<i>Haemophilus ducreyi</i>	HD 9468	Clinical isolate; Nairobi, Kenya
51566™	<i>Haemophilus ducreyi</i>	CCUG 13605 [HD 82010]	Human chancroid; Paris, France
51620™	<i>Haemophilus ducreyi</i>	V-1168	Clinical isolate; Brazil
51622™	<i>Haemophilus ducreyi</i>	CF101	Clinical isolate; Seattle, Washington

Table 4: Human herpesvirus 1

ATCC® No.	Description	Strain	Isolation
VR-733™	Human herpesvirus 1	F	Facial vesicle
VR-539™	Human herpesvirus 1	MacIntyre	Brain, human, encephalitis
VR-260™	Human herpesvirus 1	HF	Vesicle fluid from patient with recurrent herpes simplex; New York
VR-1493™	Human herpesvirus 1	KOS	Lip lesion of human with cold sore
VR-1789™	Human herpesvirus 1	ATCC-2011-9	Clinical patient positive for HSV-1; Virginia

Table 5: Human herpesvirus 2

ATCC® No.	Description	Strain	Isolation
VR-734™	Human herpesvirus 2	G	Human genital infection
VR-540™	Human herpesvirus 2	MS	Brain of a 50 year old female with multiple sclerosis; Iceland
VR-1779™	Human herpesvirus 2	ATCC-2011-2	Clinical sample from a patient positive for HSV-2; Virginia
VR-1781™	Human herpesvirus 2	ATCC-2011-4	Clinical isolate; Virginia

Table 6: *Neisseria gonorrhoeae*

ATCC® No.	Description	Strain	Isolation
43069™	<i>Neisseria gonorrhoeae</i>	CDC Ng-116	Cervix; Illinois
49226™	<i>Neisseria gonorrhoeae</i>	F-18 [89-018314, CDC 10,001, P935]	
19424™	<i>Neisseria gonorrhoeae</i>	NCTC 8375 [B 5025]	
700825™	<i>Neisseria gonorrhoeae</i>	FA1090	Male patient with disseminated gonococcal infection
49981™	<i>Neisseria gonorrhoeae</i>	NHI 1	Clinical isolate
49759™	<i>Neisseria gonorrhoeae</i>	MS11-N198	Patient with gonorrhea; New York
21823™	<i>Neisseria gonorrhoeae</i>	B-585	Patient with gonorrhea; New York
35201™	<i>Neisseria gonorrhoeae</i>	C-58 [D-10]	Blood
31399™	<i>Neisseria gonorrhoeae</i>	19	Patient with symptomatic gonorrhea
BAA-1842™	<i>Neisseria gonorrhoeae</i>	PID24-1	Cervix of a woman with clinically staged severe pelvic inflammatory disease
BAA-1839™	<i>Neisseria gonorrhoeae</i>	1291	Urethral exudate of an infected 22-year-old male
BAA-1844™	<i>Neisseria gonorrhoeae</i>	DGI18	Patient with typical disseminated gonococcal infection symptoms
BAA-1847™	<i>Neisseria gonorrhoeae</i>	SK-93-1035	Blood isolate from a woman diagnosed with disseminated gonococcal infection; Seattle, Washington

Table 6: *Neisseria gonorrhoeae* (continued)

ATCC® No.	Description	Strain	Isolation
43070™	<i>Neisseria gonorrhoeae</i>	CDC Ng-98	Cervix
31148™	<i>Neisseria gonorrhoeae</i>	GC/CB/001 [CDC M-2]	Human gonorrhea patient
BAA-1837™	<i>Neisseria gonorrhoeae</i>	F62	Uncomplicated infection
BAA-1838™	<i>Neisseria gonorrhoeae</i>	FA19	Uncomplicated infection
51803™	<i>Neisseria gonorrhoeae</i>	CCUG 8657 [I]; Serogroup WI	Sweden

HOST-PATHOGEN CELL MODELS FOR GONORRHEA RESEARCH

Piliated, but not nonpiliated, *Neisseria gonorrhoeae* strain F62 variants (e.g., ATCC® BAA-1837™) actively invade the ectocervical Ect/E6E7 (ATCC® CRL-2614™) and endocervical End1/E6E7 (ATCC® CRL-2615™) epithelial cell lines. Invasion of these cells by green fluorescent protein-expressing gonococci is characterized by colocalization of gonococci with F actin.

**Table 7: *Trichomonas vaginalis***

ATCC® No.	Description	Strain	Isolation
30001™	<i>Trichomonas vaginalis</i>	C-1:NIH	Vaginal exudate from human adult female with acute vaginitis
30236™	<i>Trichomonas vaginalis</i>	JH 31A #4	Endocervical swab, Johns Hopkins Hospital; Maryland
50143™	<i>Trichomonas vaginalis</i>	CDC 085	Human; Ohio
30184™	<i>Trichomonas vaginalis</i>	123414	Vaginal swab; Tennessee
PRA-98™	<i>Trichomonas vaginalis</i>	G3	Clinical specimen - human; United Kingdom
30092™	<i>Trichomonas vaginalis</i>	11769	Human, Colorado General Hospital; Colorado
30238™	<i>Trichomonas vaginalis</i>	JH 32A #4	Endocervical swab, Johns Hopkins Hospital; Maryland
50167™	<i>Trichomonas vaginalis</i>	B7RC2	Human vagina; North Carolina
30093™	<i>Trichomonas vaginalis</i>	45422	Human, Colorado General Hospital; Colorado
30186™	<i>Trichomonas vaginalis</i>	123413	Vaginal swab; Tennessee
30187™	<i>Trichomonas vaginalis</i>	165307-1	Endocervical swab, Colorado General Hospital; Colorado
PRA-92™	<i>Trichomonas vaginalis</i>	JRS-TV-141	Clinical specimen - human; Alabama
PRA-96™	<i>Trichomonas vaginalis</i>	MT87	Clinical specimen - human; Alabama
30185™	<i>Trichomonas vaginalis</i>	129155-8	Vaginal swab; Colorado
30188™	<i>Trichomonas vaginalis</i>	RP	Human vagina; England
50138™	<i>Trichomonas vaginalis</i>	IR78	Human; Austria

**WILL TRICHOMONAS VAGINALIS BECOME DRUG RESISTANT?**

It's possible. The current class of drugs used to treat trichomoniasis are the Nitroimidazoles (e.g., metronidazole and trinitadazole). Recent analysis of 538 clinical *T. vaginalis* isolates revealed 4.3% exhibited low-level in vitro metronidazole resistance.³ Novel treatment options need to be explored to prevent the development of drug resistance through the overuse of a single class of antimicrobials.

ATCC® GENUINE NUCLEICS

Table 8: Genomic Nucleic Acids

ATCC® No.	Description	Strain	Isolation
11006D-5™	<i>Candida albicans</i> genomic DNA	[ATCC 42266, CBS 1905, CCRC 20518, CECT 1439, DBVPG 6157, IFO 1397, JCM 1543]	
VR-348BD™	<i>Chlamydia trachomatis</i> genomic DNA	BOUR; Serovar E	Adult with probable clinical inclusion conjunctivitis and active trachoma; California
VR-885D™	<i>Chlamydia trachomatis</i> genomic DNA	UW-3/Cx; Serovar D	Human cervix - asymptomatic
VR-878D™	<i>Chlamydia trachomatis</i> genomic DNA	UW-57/Cx; Serovar G	Human cervix (epithelial tissue), cervicitis; Seattle, Washington
VR-886D™	<i>Chlamydia trachomatis</i> genomic DNA	UW-36/Cx; Serovar J	Human cervix, cervicitis; Seattle, Washington
VR-901BD™	<i>Chlamydia trachomatis</i> genomic DNA	LGV Serovar I	
VR-902BD™	<i>Chlamydia trachomatis</i> genomic DNA	LGV Serovar II	
VR-903D™	<i>Chlamydia trachomatis</i> genomic DNA	LGV Serovar III	
700724D-5™	<i>Haemophilus ducreyi</i> genomic DNA	35000HP	Skin from the upper arm of an experimentally infected human subject
VR-539D™	Human herpesvirus 1 DNA	MacIntyre	Brain, human, encephalitis
VR-539DQ™	Quantitative Human herpesvirus 1 genomic DNA	MacIntyre	Brain, human, encephalitis
VR-1493D™	Human herpesvirus 1 DNA	KOS	Lip lesion of human with cold sore
VR-540DQ™	Quantitative Human herpesvirus 2 genomic DNA	MS	Brain of a 50 year old female with multiple sclerosis, Iceland, 1961
VR-540D™	Human herpesvirus 2 DNA	MS	Brain of a 50 year old female with multiple sclerosis; Iceland
VR-734D™	Human herpesvirus 2 DNA	G	Human genital infection
700825D-5™	<i>Neisseria gonorrhoeae</i> genomic DNA	FA1090	Male patient with disseminated gonococcal infection
53423D™	<i>Neisseria gonorrhoeae</i> genomic DNA	[ATCC 9793]	
53421D™	<i>Neisseria gonorrhoeae</i> genomic DNA	Supplemental deposit of ATCC® 2763™	Patient with gonorrhea
53421D-5™	<i>Neisseria gonorrhoeae</i> genomic DNA		Supplemental deposit of ATCC® 27631™ for patent purposes.
53422D™	<i>Neisseria gonorrhoeae</i> genomic DNA	Supplemental deposit of ATCC® 31426™	
700825DQ™	Quantitative <i>Neisseria gonorrhoeae</i> genomic DNA	FA1090	Male patient with disseminated gonococcal infection, 1983
30001D™	<i>Trichomonas vaginalis</i> genomic DNA	C-1:NIH	Vaginal exudate from human adult female with acute vaginitis
PRA-98D™	<i>Trichomonas vaginalis</i> genomic DNA	G3	Clinical specimen - human; United Kingdom

Table 9: Synthetic Molecular Standards

ATCC® No.	Description	Strain
VR-3232SD™	Hepatitis B virus	Fragments from the highly conserved precore, core, P, S, and X regions
VR-3233SD™	Hepatitis C virus	Fragments from 5'UTR and X-tail region (3'UTR)
VR-3240SD™	Human papillomavirus 16	Full length genome of human papillomavirus type 16 derived from a plasmid clone (ATCC® 45113D)
VR-3241SD™	Human papillomavirus 18	Full length genome of human papillomavirus type 18 derived from a plasmid clone (ATCC® 45152D)
VR-3256SD™	Human papillomavirus 31	Full length genome of human papillomavirus type 31 derived from a plasmid clone (ATCC® 65446D)
BAA-2641SD™	<i>Mycoplasma genitalium</i>	Fragments from the 16S gene, <i>mgpA</i> , and <i>gap</i>
BAA-2642SD™	<i>Treponema pallidum</i>	Fragments from the <i>polA</i> , <i>tpr</i> , 23S gene, <i>arp</i> , 16S gene, <i>flaA</i> , 47kDa protein gene, and <i>bmp</i>

ATCC® CELL LINES CONTAINING VIRAL NUCLEIC ACID SEQUENCES

Table 10: Human papillomavirus (HPV)

ATCC® No.	Designation	Organism	Source	Comments
CRL-1550™	Ca Ski	Human	Cervix, epidermoid carcinoma; derived from metastatic site: small intestine	Ca Ski cells are reported to contain an integrated human papillomavirus type 16 genome (HPV-16, about 600 copies per cell) as well as sequences related to HPV-18.
HTB-33™	ME-180	Human	Cervix, epidermoid carcinoma; derived from metastatic site: omentum	ME-180 cells contain human papillomavirus (HPV) DNA with greater homology to HPV-68 than HPV-18.
CRL-1594™	C-4 I	Human	Cervix, carcinoma	The C-4 I cell line contains human papillomavirus type 18 (HPV-18) DNA sequences, and expresses HPV-18 RNA.
CRL-1595™	C-4 II	Human	Cervix, carcinoma	The C-4 II cell line contains human papillomavirus type 18 (HPV-18) DNA sequences, and expresses HPV-18 RNA.
CRL-11609™	RWPE-1	Human	Prostate, normal epithelial	RWPE-1 cells are comprised of epithelial cells derived from the peripheral zone of a histologically normal adult human prostate, which were transfected with a single copy of the human papilloma virus 18 (HPV-18).
HTB-35™	SiHa	Human	Cervix, squamous cell carcinoma	The SiHa cell line is reported to contain an integrated human papillomavirus type 16 genome (HPV-16, 1 to 2 copies per cell).
HTB-34™	MS751	Human	Cervix, epidermoid carcinoma; derived from metastatic site: lymph node	MS751 cells have been reported to contain human papilloma virus 18 (HPV-18) sequences. More recently, it has been shown that MS751 cells contain a partial HPV-45 genome, and that HPV-45 sequences from the E6/E7 region are expressed as poly(A)+ RNA.
CCL-2™	HeLa	Human	Cervix, adenocarcinoma	HeLa cells have been reported to contain human papilloma virus 18 (HPV-18) sequences.

Table 11: Hepatitis B virus (HBV)

ATCC® No.	Designation	Organism	Source	Comments
CRL-8024™	PLC/PRF/5	Human	Liver, hepatoma	The PLC/PRF/5 cells secrete hepatitis virus B surface antigen (HBsAg).
HB-8064™	Hep 3B2.1-7	Human	Liver, hepatocellular carcinoma	The Hep 3B2.1-7 cell line contains an integrated hepatitis B virus genome.
CRL-2233™	SNU-398	Human	Liver, hepatocellular carcinoma	Hepatitis B virus (HBV) DNA was detected by Southern blot hybridization. HBV genomic RNA was not expressed.
CRL-2236™	SNU-475	Human	Liver, grade II-IV/V hepatocellular carcinoma	Hepatitis B virus (HBV) DNA was detected by Southern blot hybridization. HBV genomic RNA was not expressed.
CRL-2235™	SNU-182	Human	Liver, grade III/IV hepatocellular carcinoma	Hepatitis B virus (HBV) DNA was detected by Southern blot hybridization. HBV genomic RNA was not expressed.
CRL-2238™	SNU-423	Human	Liver, grade III/IV pleomorphic hepatocellular carcinoma	Hepatitis B virus (HBV) DNA was detected by Southern blot hybridization. HBV genomic RNA was not expressed.
CRL-2237™	SNU-387	Human	Liver, grade IV/V pleomorphic hepatocellular carcinoma	Hepatitis B virus (HBV) DNA was detected by Southern blot hybridization. HBV genomic RNA was not expressed.

Table 12: Human Immunodeficiency Virus (HIV)

ATCC®	Designation	Organism	Source	Comments
CRL-8993™	8E5	Human	Lymphocyte, peripheral blood	The 8E5 cells contain a single defective proviral genome of HTLV III (HIV, LAV), and express most human immunodeficiency virus (HIV, HTLV III, LAV) structural proteins. No infectious virus is produced; however, co-cultivation with Leu-3 + cells leads to syncytia formation.
CRL-8543™	H9/HTLV-IIIB	Human	Lymphoblast, acute lymphoblastic leukemia	The H9/HTLV-IIIB cells produce HTLV III, and express HTLV III (HIV) genes.

ATCC® MOLECULARLY-CLONED VIRUSES

Table 13: Human papillomavirus (HPV)

ATCC®	Designation	Organism	Source	Comments
40549™	HPV 56 clone 2C	Purified plasmid DNA	Papilloma virus type 56, complete genome	DNA from human cervical intraepithelial neoplasia I
45113™	pHPV-16	Plasmid in <i>E. coli</i>	Papilloma virus type 16, complete genome	
65446™	pHPV31	Plasmid in <i>E. coli</i>	Papilloma virus type 31, complete genome	DNA from human cervical dysplasia

Table 14: Hepatitis B virus (HBV)

ATCC®	Designation	Organism	Source	Comments
31518™	pEco63	Plasmid in <i>E. coli</i>	Hepatitis B virus, complete genome	
39630™	AM6 [EC-AM6, pAM6]	Plasmid in <i>E. coli</i>	Hepatitis B virus, complete genome	Isolated from plasma (subtype adw) from an HBsAg-positive donor)
45020D™	AM6 [EC-AM6, pAM6]	Purified plasmid DNA	Hepatitis B virus, complete genome	Isolated from plasma (subtype adw) from an HBsAg-positive donor)

Table 15: Human immunodeficiency virus (HIV)


ATCC®	Designation	Organism	Source	Comments
53069™	pBT-1	Plasmid in <i>E. coli</i>	Human immunodeficiency virus 1, complete genome	Cloned from human immunodeficiency virus 1BRU


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