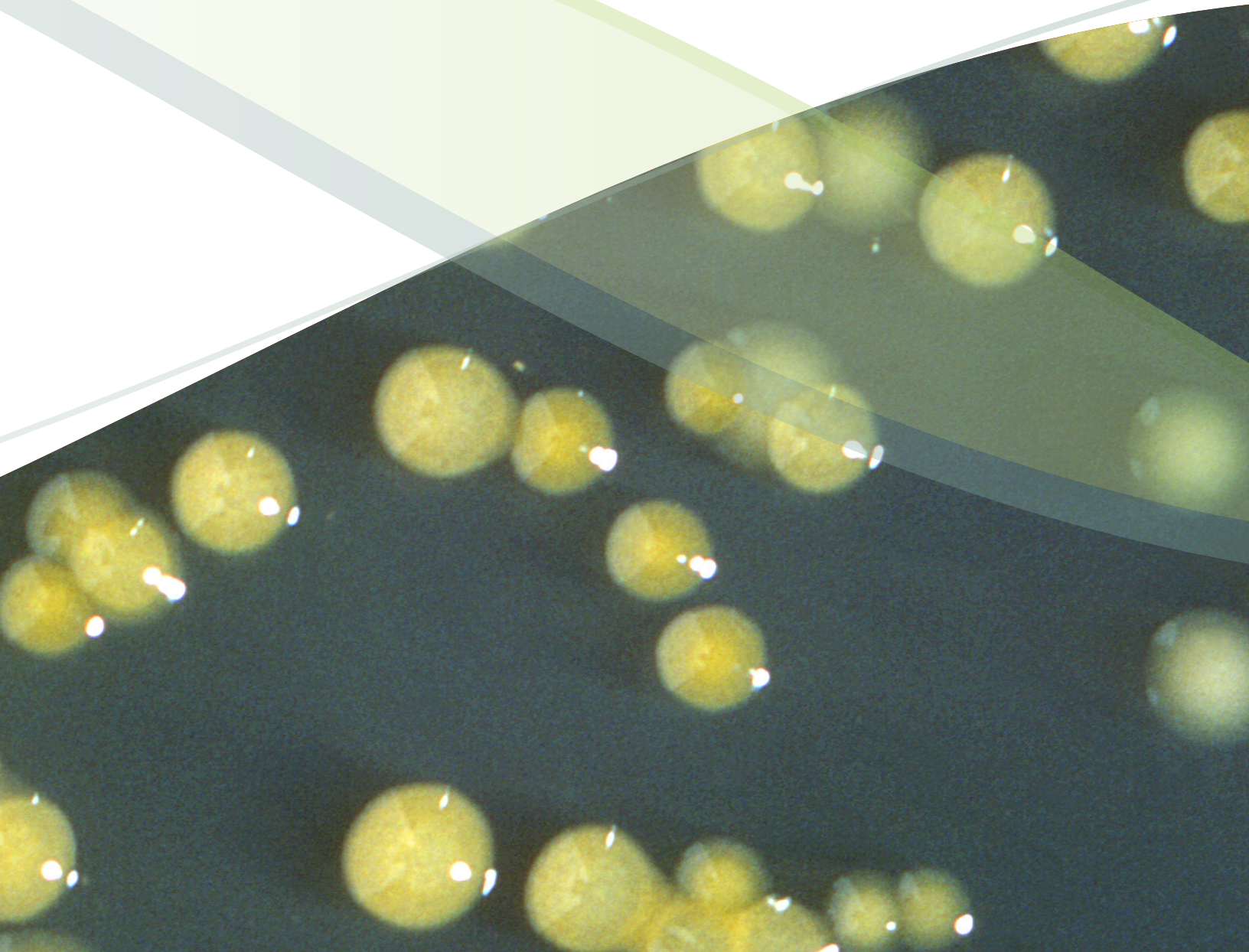
ATCC®

Multidrug-Resistant and Antimicrobial Testing Reference Strains



ATCC® MULTIDRUG-RESISTANT & ANTIMICROBIAL TESTING REFERENCE STRAINS

MULTIDRUG-RESISTANCE – A GROWING PROBLEM

In the last two decades, multidrug-resistant (MDR) strains have been attributed to numerous infections worldwide. Regrettably, current treatment for these infections is severely limited, thus necessitating the development of novel prevention methods and therapeutics.

ATCC understands the danger and growing concern behind the spread of MDR strains. To aid in the prevention and treatment of MDR-associated infections, ATCC has acquired and authenticated various clinical and environmental strains, including:

- New Delhi metallo-β-lactamase (NDM) *Enterobacter*iaceae
- *Klebsiella pneumoniae* Carbapenemase (KPC) *Enterobacter*iaceae
- Methicillin-resistant *Staphylococcus aureus* (MRSA)
- Vancomycin-resistant Enterococci (VRE)
- Extended-spectrum beta-lactamase (ESBL) strains
- Drug-resistant *Acinetobacter baumannii*
- Drug resistant *Candida albicans* (CaDR)
- Drug-resistant *Pseudomonas aeruginosa*
- Drug-resistant *Mycobacteria*
- Drug-resistant *Plasmodium falciparum*

These strains are ideal for the development, verification, and evaluation of rapid detection methods, innovative therapeutic techniques, novel antibiotics, and updated sterility protocols.

ANTIMICROBIAL SUSCEPTIBILITY TESTING

The effectiveness of existing and novel antimicrobials are commonly tested against challenge organisms with varying levels of sensitivity to known drugs. Many of these strains are currently available individually or grouped into ATCC® Microbial Panels and are afforded additional characterization for specific traits such as serotype, toxinotype, antibiotic resistance/susceptibility, and the presence or absence of significant genes.

ATCC hopes that with your diligent research and our authenticated strains, we can stop the spread of superbugs together!

TO LEARN MORE ABOUT ATCC MDR STRAINS, PLEASE VISIT OUR WEBSITE A WWW.ATCC.ORG/SUPERBUGS

CLOSTRIDIOIDES DIFFICILE – A STORY OF ANTIBIOTIC OVERUSAGE

Prolonged use of antibiotics affords an opportunistic pathogen like *C. difficile* the optimal environment to cause illness in the human gastrointestinal tract. Acquired from hospitals, surfaces, or food, individuals who develop *C. difficile* infection suffer from painful inflammation of the colon. Given the correlation between antibiotics and *C. difficile* infection, we've included a list of our highly characterized strains for your research needs.

CARBAPENEM-RESISTANT *ENTEROBACTERIACEAE*

OXACILLINASE (OXA) *ENTEROBACTERIACEAE*

ATCC® OXA-48 strains are clinical isolates confirmed to produce the OXA-48 carbapenemase. Each strain demonstrates resistance to one or more carbapenem antibiotics, including meropenem, ertapenem, and imipenem.

Table 1: OXA-48 Research Materials

Strain	Strain Description	Strain Designation	Relevant Phenotype*	Application
BAA-2523™	*Escherichia coli*	bMx# 1109131	Produces OXA-48	Quality control strain for chromID OXA-48 medium
BAA-2524™	*Klebsiella pneumoniae* subsp. *pneumoniae*	bMx# 1103199	Produces OXA-48	Quality control strain for chromID OXA-48 medium
BAA-2525™	*Providencia rettgeri*	bMX# 1103204	Produces OXA-48	Quality control strain for chromID OXA-48 medium

*Depositor statement

NEW DELHI METALLO-β-LACTAMASE (NDM) *ENTEROBACTERIACEAE*

ATCC® NDM strains are clinical isolates confirmed to carry the bla_{NDM} gene conferring resistance to carbapenem antibiotics. Each strain demonstrates multidrug-resistance to as many as 36 representative antibiotics in a variety of drug classes, including carbepenems, β-lactams, cephalosporins, quinolones, tetracyclines, glycylcyclines, aminoglycosides, and dihydrofolate reductase inhibtors.

Table 2: NDM Research Materials

ATCC® No.	Species	Designation	Presence of Select Virulence Genes
BAA-2146™	*Klebsiella pneumoniae*	1000527, 7561	bla_{NDM}+/bla_{KPC}-
BAA-2452™	*Escherichia coli*	NDM-1	bla_{NDM}+/bla_{KPC}-
BAA-2468™	*Enterobacter cloacae*	1000654	bla_{NDM}+/bla_{KPC}-
BAA-2469™	*Escherichia coli*	1001728	bla_{NDM}+/bla_{KPC}-
BAA-2470™	*Klebsiella pneumoniae subsp. pneumoniae*	1002565	bla_{NDM}+/bla_{KPC}-
BAA-2471™	*Escherichia coli*	1100101	bla_{NDM}+/bla_{KPC}-
BAA-2472™	*Klebsiella pneumoniae subsp. pneumoniae*	1100975	bla_{NDM}+/bla_{KPC}-
BAA-2473™	*Klebsiella pneumoniae*	1100770	bla_{NDM}+/bla_{KPC}-

KLEBSIELLA PNEUMONIAE CARBAPENEMASE (KPC) *ENTEROBACTERIACEAE*

ATCC® KPC strains are clinical isolates confirmed to carry the bla_{KPC} gene conferring resistance to carbapenem antibiotics. Each strain demonstrates multidrug-resistance to as many as 36 representative antibiotics in a variety of drug classes, including carbepenems, β-lactams, cephalosporins, quinolones, tetracyclines, glycylcyclines, aminoglycosides, and dihydrofolate reductase inhibtors.

Table 3: KPC Research Materials

ATCC® No.	Species	Designation	Presence of Select Virulence Genes
BAA-1705™	*Klebsiella pneumoniae*	ART 2008133 [D-05, 1338]	bla_{KPC}+/bla_{NDM}-
BAA-1898™	*Klebsiella pneumoniae*	-	bla_{KPC}+
BAA-1899™	*Klebsiella pneumoniae*	-	bla_{KPC}+
BAA-1900™	*Klebsiella pneumoniae*	-	bla_{KPC}+
BAA-1902™	*Klebsiella pneumoniae*	-	bla_{KPC}+
BAA-1903™	*Klebsiella pneumoniae*	-	bla_{KPC}+
BAA-1904™	*Klebsiella pneumoniae*	-	bla_{KPC}+
BAA-1905™	*Klebsiella pneumoniae*	-	bla_{KPC}+
BAA-2078™	*Klebsiella pneumoniae*	-	bla_{KPC}+
BAA-2082™	*Enterobacter hormaechei*	-	bla_{KPC}+
BAA-2340™	*Escherichia coli*	1101362	bla_{KPC}+/bla_{NDM}-
BAA-2341™	*Enterobacter cloacae*	1101152	bla_{KPC}+/bla_{NDM}-
BAA-2342™	*Klebsiella pneumoniae*	1101160	bla_{KPC}+/bla_{NDM}-
BAA-2343™	*Klebsiella pneumoniae*	1101172	bla_{KPC}+/bla_{NDM}-
BAA-2344™	*Klebsiella pneumoniae*	1101200	bla_{KPC}+/bla_{NDM}-
BAA-2814™	*Klebsiella pneumoniae*	KP1074	bla_{KPC-3}+

EXTENDED-SPECTRUM BETA-LACTAMASE (ESBL) STRAINS

ESBLs are enzymes that mediate resistance to extended-spectrum cephalosporins and monobactams, without affecting the structure or function of cephamycins or carbapenems. ATCC® ESBL strains were isolated from either existing strains or from clinical settings and represent eight different ESBL classes.

Table 4: ESBL Research Materials

ATCC® No.	Species	Designation	ESBL Class*
51983™	*Klebsiella oxytoca*	H51574-2	SHV-5
BAA-196™	*Escherichia coli*	J53 pMG223	TEM-10
BAA-197™	*Escherichia coli*	J53 pMG224	TEM-12
BAA-198™	*Escherichia coli*	J53 pMG225	TEM-26
BAA-199™	*Escherichia coli*	J53-2 pUD18	SHV-3
BAA-200™	*Escherichia coli*	J53-2 pUD21	SHV-4
BAA-204™	*Escherichia coli*	JC2926 pBP60-1	SHV-2
BAA-2326™	*Escherichia coli*	TY-2482	CTX-M-15
700603™	*Klebsiella pneumoniae* subsp. *pneumoniae*	K6	SHV-18

*As reported by the depositor

DRUG-RESISTANT *MYCOBACTERIA*

ATCC® drug-resistant *Mycobacteria* strains represent species isolated from either clinical or laboratory-derived sources. These strains are useful in assay development, the evaluation of novel antibiotics, and other applications.

Table 5: Drug-Resistant Mycobacteria Research Materials

ATCC® No.	Species	Designation	Drug Resistance
35727™	*Mycobacterium bovis*	TMC 602 [Ravenel-INH-R]	Isoniazid
35728™	*Mycobacterium bovis*	TMC 605 [4228-435-INH-R; Mutant of TMC 405 = ATCC 35723]	Streptomycin, isoniazid
35729™	*Mycobacterium bovis*	TMC 606 [4228-4-336-INH-R; Mutant of TMC 405 = ATCC 35723]	Isoniazid, para-amino salicylic acid
35730™	*Mycobacterium bovis*	TMC 609 [Ravenel-SM-R]	Streptomycin
35746™	*Mycobacterium bovis*	TMC 1101 [BCG Montreal, SM-R]	Streptomycin
35747™	*Mycobacterium bovis*	TMC 1103 [BCG Montreal, INH-R, CIP 105919]	Cycloserine, Pyrainamide
35748™	*Mycobacterium bovis*	TMC 1108 [BCG Pasteur SM-R]	Streptomycin
35820™	*Mycobacterium tuberculosis*	TMC 301 [H37Rv-SM-R]	Streptomycin, Cycloserine
35821™	*Mycobacterium tuberculosis*	TMC 302 [H37Rv-PAS-R]	Isoniazid, Streptomycin, Para-amino-salicylic acid, Cycloserine, Kanamycin, Rifampin, Ethambutol
35822™	*Mycobacterium tuberculosis*	TMC 303 [CIP 105794, H37RV-INH-R]	Isoniazid, Cycloserine, Kanamycin, Rifampin
35823™	*Mycobacterium tuberculosis*	TMC 304 [H37RV-SM/INH-R]	Isoniazid, Streptomycin
35824™	*Mycobacterium tuberculosis*	TMC 305 [H37Rv-PAS/SM-R]	Para-amino-salicylic acid
35825™	*Mycobacterium tuberculosis*	TMC 306 [H37Rv-PAS/SM/INH-R]	Para-amino-salicylic acid, Streptomycin, Isoniazid
35826™	*Mycobacterium tuberculosis*	TMC 307 [H37Rv-CS-R]	Cycloserine
35827™	*Mycobacterium tuberculosis*	TMC 309 [H37Rv-KM-R]	Kanamycin
35829™	*Mycobacterium tuberculosis*	TMC 313 [H37Rv-TAC-R]	Thioacetazone
35830™	*Mycobacterium tuberculosis*	TMC 314 [H37Rv-ETA-R]	Ethionamide
35831™	*Mycobacterium tuberculosis*	TMC 320 [Ameraga-SM-R]	Streptomycin
35832™	*Mycobacterium tuberculosis*	TMC 321 [Fick-SM-R]	Streptomycin
35833™	*Mycobacterium tuberculosis*	TMC 322 [Hand-SM-R]	Streptomycin
35834™	*Mycobacterium tuberculosis*	TMC 323 [Kerrigan-SM-R]	Streptomycin
35835™	*Mycobacterium tuberculosis*	TMC 326 [H37Ra-INH-R]	Isoniazid
35836™	*Mycobacterium tuberculosis*	TMC 327 [H37Ra-SM-R]	Streptomycin, Cycloserine, Kanamycin
35837	*Mycobacterium tuberculosis*	TMC 330 [CIP 105793, H37Rv-EMB-R]	Kanamycin, Rifampin, Ethambutol
35838	*Mycobacterium tuberculosis*	TMC 331 [CIP 105795, H37Rv-RIF-R]	Rifampin

*Purified nucleic acid preparations are available

DRUG-RESISTANT *ACINETOBACTER BAUMANNII*

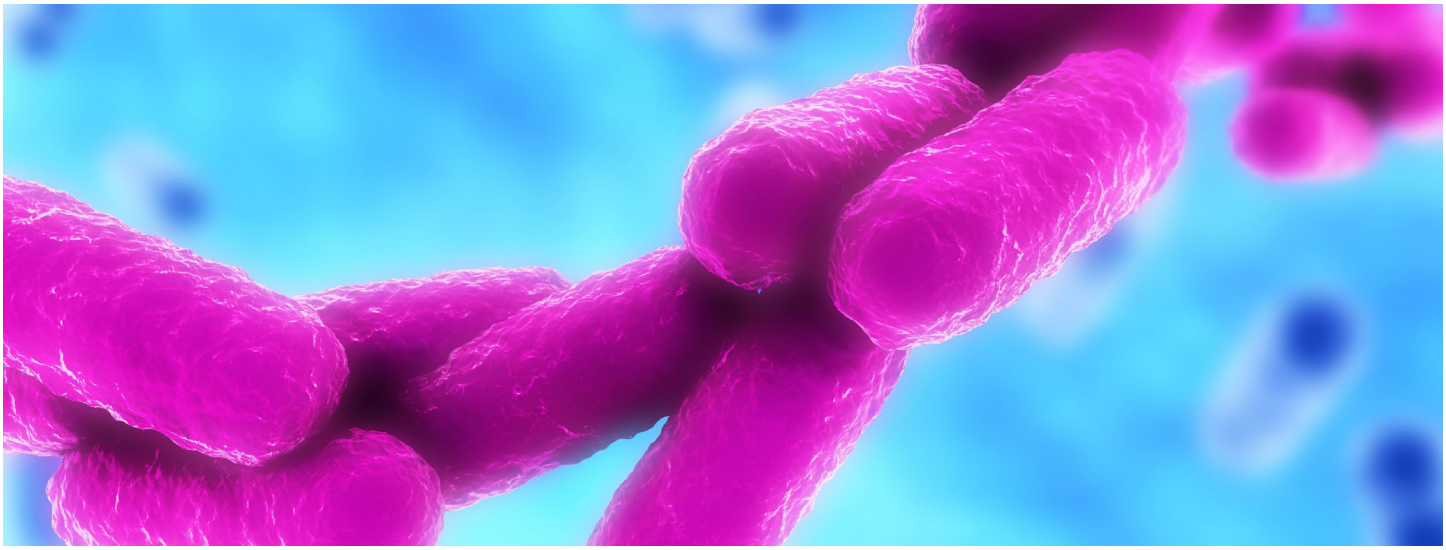
ATCC® Drug-resistant *Acinetobacter baumannii* strains are clinical isolates demonstrating multidrug-resistance to as many as 31 antibiotics. Each strain has been tested against a variety of drug classes including the penicillins, cephalosporins, carbapenems, quinolones, and aminoglycosides.

Table 6: Drug-Resistant *Acinetobacter baumannii* Research Materials

ATCC® No.	Species	Designation	Isolation
BAA-1605™	*Acinetobacter baumannii*	--	Human sputum
BAA-1789™	*Acinetobacter baumannii*	--	Tracheal aspirate
BAA-1790™	*Acinetobacter baumannii*	--	Sputum
BAA-1791™	*Acinetobacter baumannii*	--	Induced sputum
BAA-1792™	*Acinetobacter baumannii*	--	Sputum
BAA-1793™	*Acinetobacter baumannii*	--	Sputum
BAA-1794™	*Acinetobacter baumannii*	--	Sputum
BAA-1795™	*Acinetobacter baumannii*	--	Nasotracheal aspirate
BAA-1796™	*Acinetobacter baumannii*	--	Sputum
BAA-1797™	*Acinetobacter baumannii*	--	Human blood
BAA-1798™	*Acinetobacter baumannii*	--	Sputum
BAA-1799™	*Acinetobacter baumannii*	--	Sputum
BAA-1800™	*Acinetobacter baumannii*	--	Deep trachea

ACINETOBACTER BAUMANNII

Acinetobacter baumannii is an opportunistic pathogen that often causes nosocomial infections in immunologically compromised individuals. The major risk factors associated with this bacterium are the combination of drug-resistance and the capability of surviving for extended periods of time on inanimate surface, which have made *Acinetobacter baumannii* difficult to prevent and control. Further, limited therapeutic options for multidrug-resistant *Acinetobacter* infections has created a need for the development of new therapies and effective drug regimens. Get your research started today with *Acinetobacter baumannii* strains from ATCC. Visit us online at **www.atcc.org/superbugs** to browse our listing of multidrug-resistant strains.



METHICILLIN-RESISTANT *STAPHYLOCOCCUS AUREUS* (MRSA)

Choose ATCC® methicillin-resistant *Staphylococcus aureus* (MRSA) strains isolated from a wide variety of both hospital- and community-acquired sources, and confirmed to carry the mecA gene conferring resistance to methicillin. We've also included a list of three phenotypically methicillin-sensitive *Staphylococcus aureus* (MSSA) strains that tested positive for the mecA gene. These cultures are useful for studying the genetic variation between MRSA SCCmec types, the in vitro evaluation of disinfectants and novel antibiotics, and establishing the performance characteristics of molecular-based assays.

Table 7: Methicillin-Resistant *Staphylococcus aureus* (MRSA) Research Materials

ATCC® No.	Designation	SCC*mec* Type	PFGE Type[1]	spa Type		*pvl* gene amplification	Isolation Source
				Ridom	Kreiswirth		
BAA-38™	E2125	Type I	Uknown	t051	YHFGFMBQBLO	Negative	Human blood
BAA-44™	HPV107	Type I	Iberian	t051	YHFGFMBQBLO	Negative	Hospital
43300™	F-182	Type II	Unknown	t007	WGKKKKAOM	Negative	Clinical isolate
700698™	Mu3	Type II	Unknown	t002	TJMBMDMGMK	Negative	Sputum from human lung cancer patient with MRSA pneumonia
700699™	Mu50	Type II	Unknown	t002	TJMBMDMGMK	Negative	Puss & debrided tissue at human surgical incision
700787™	2947	Type II	Unknown	t002	TJMBMDMGMK	Negative	Blood culture
700788™	406	Type II	Unknown	t002	TJMBMDMGMK	Negative	Dialysis catheter
700789™	12478	Type II	Unknown	t002	TJMBMDMGMK	Negative	Human blood
BAA-41™	NYBK2464	Type II	USA 100	t002	TJMBMDMGMK	Negative	Hospital
BAA-1681™	HFH-29994	Type II	USA 100*	t002	TJMBMDMGMK	Negative	Human nares
BAA-1682™	HFH-29753	Type II	USA 100*	t002	TJMBMDMGMK	Negative	Human aspirate
BAA-1686™	HFH-30106	Type II	Not USA 100-1100*	t002	TJMBMDMGMK	Negative	Human nares
BAA-1687™	HFH-30008	Type II	Not USA 100-1100*	t640	TJMGK	Negative	Human sputum
BAA-1690™	HFH-29744	Type II	Not USA 100-1100*	t002	TJMBMDMGMK	Negative	Human wound
BAA-1692™	HFH-30123	Type II	USA 100*	t067	TJMBMDMGM	Negative	Human sinus
BAA-1694™	HFH-30172	Type II	Not USA 100-1100*	t045	TMDMGMK	Negative	Human wound
BAA-1695™	HFH-30239	Type II	Not USA 100-1100*	t214	TJMBMDMGMKK	Negative	Human sputum
BAA-1708™	HIP 10787	Type II	Unknown	t002	TJMBMDMGMK	Negative	Unknown
BAA-1720™	MRSA252	Type II	USA 200	t018	WGKAKAOMQQQ	Negative	Hospital acquired
BAA-1750™	96:281	Type II	USA 200*	t018	WGKAKAOMQQQ	Negative	Human subject
BAA-1751™	148-99	Type II	USA 600*	t266	A2AKEEEMBKB	Negative	Human subject
BAA-1753™	18626	Type II	USA 100*	t002	TJMBMDMGMK	Negative	Human subject
BAA-1760™	107-03	Type II	USA 200	t018	WGKAKAOMQQQ	Negative	Blood
BAA-1761™	GA201	Type II	USA 100*	t002	TJMBMDMGMK	Negative	Human subject
BAA-2422™	--	Type II	Unknown	t002	TJMBMDMGMK	Negative	Vertebral body of human exhibiting fever, joint pain, swelling, and back pain
33592™	1063	Type III	ST239	t037	WGKAOMQ	Negative	Blood - Hospital
BAA-40™	CPS22	Type III	Unknown	t241	WGKAOM	Negative	Nasal cavity of a child
BAA-811™	308118L	Type III	Unknown	t987	WGKAQKAOMQ	Negative	Clinical isolate - Human nasal swab
33591™	328	Type III	Unknown	t037	WGKAOMQ	Negative	Hospital
33593™	1217	Type III	ST239	t037	WGKAOMQ	Negative	Blood - Hospital
BAA-39™	HUSA304	Type III	Unknown	t1053	WGKAKAOKAOMQ	Negative	Human nose
BAA-43™	HSJ216	Type III	USA 300	t037	WGKAOMQ	Negative	Hospital
BAA-1556™	FPR3757	Type IV	USA 300	t008	YHGFMBQBLO	Positive	Wrist abscess – 36-year-old HIV-positive male
BAA-1680™	HFH-29568	Type IV	USA 300	t008	YHGFMBQBLO	Positive	Human skin
BAA-1683™	HFH-30364	Type IV	USA 400	t125	UJJJJFE	Positive	Human abscess - Hospital

[1]PFGE typing was performed using the restriction enzyme *Sma*I; PFGE typing was confirmed by ATCC unless otherwise noted (*depositor-supplied information).

Table 7: Methicillin-Resistant *Staphylococcus aureus* (MRSA) Research Materials (continued)

ATCC® No.	Designation	SCC*mec* Type	PFGE Type[1]	spa Type		*pvl* gene amplification	Isolation Source
				Ridom	Kreiswirth		
BAA-1689™	HFH-30676	Type IV	USA 500*	t064	YHGCMBQBLO	Negative	Human skin
BAA-1691™	HFH-30137	Type IV	Not USA 100-1100*	t688	TJMBMK	Negative	Human urine
BAA-1696™	HFH-30102	Type IV	USA 400*	t128	UJJFKBPE	Positive	Human wound
BAA-1697™	HFH-30493	Type IV	Not USA 100-1100*	t008	YHGCMBQBLO	Negative	Human skin
BAA-1698™	HFH-30626	Type IV	Not USA 100-1100*	t334	YGFMBLO	Negative	Human wound
BAA-1700™	HFH-33798	Type IV	Not USA 100-1100*	t024	YGFMBQBLO	Positive	Human wound
BAA-1701™	HFH-31076	Type IV	Not USA 100-1100*	t148	UJGFGMDMGGM	Negative	Human wound
BAA-1707™	MW2†	Type IV	USA 400	t125	UJJJJFE	Positive	Female patient
BAA-1717™	TCH1516	Type IV	USA 300	t622	YHGFMBLO	Positive	Adolescent patient with severe sepsis
BAA-1747™	94:1013	Type IV	USA 1000	t316	ZDMNKB	Positive	Skin lesion
BAA-1752™	182-99	Type IV	USA 400*	t125	UJJJJFE	Positive	Human subject
BAA-1754™	00:50	Type IV	USA 600	t671	UAKBEMBKB	Negative	Human subject
BAA-1755™	0-25-4	Type IV	USA 700	t126	UJGFMGGM	Negative	Human subject
BAA-1756™	0-25-37	Type IV	USA 300-0114	t008	YHGFMBQBLO	Positive	Human subject
BAA-1757™	1-1-81	Type IV	USA 400*	t175	UJFKKPFKPE	Positive	Human subject
BAA-1758™	1-1-493	Type IV	USA 800*	t088	TJMBMDMGGMK	Negative	Human subject
BAA-1762™	GA217	Type IV	USA 300	t024	YGFMBQBLO	Positive	Human subject
BAA-1763™	GA229	Type IV	USA 500	t064	YHGCMBQBLO	Negative	Human subject
BAA-1764™	7031	Type IV	USA 1100	t019	XKAKAOMQ	Positive	Abscess
BAA-1767™	510-04	Type IV	USA 1100*	t019	XKAKAOMQ	Positive	Human subject
BAA-1768™	27-05	Type IV	USA 800	t2882	TJMBMDMGDMGK	Negative	Wound
BAA-1769™	CA46	Type IV	USA 1000*	t216	ZDMDMNKB	Negative	Human subject
BAA-1771™	N4151	Type IV	USA 800*	n/a	TDMGGGK	Negative	Human subject
BAA-2096™	CL604	Type IV	USA 1100	t046	XKAKAOMQQQ	Negative	Clinical isolate – Hospital
BAA-1688™	HFH-30032	Type V	Not USA 100-1100*	t437	ZDMDMOB	Positive	Human wound
BAA-1766™	8-03	Type V	USA 700	t148	UJGFGMDMGGM	Negative	Human subject
BAA-2094™	B8-31	Type V	WA-MRSA*	t123	A2AKBEKBKB	Negative	Clinical isolate
BAA-42™	HDE288	Type VI	USA 800	t311	TJMBDMGMK	Negative	Child - Hospital pneumology ward
BAA-2312™	M10/0061	Type XI	Unknown	t843	Z[r82]MOMOOKM	Negative	85-year-old male – Hospital
BAA-2313™	M10/0148	Type XI	CC130	t373	ZMOMOKM	Negative	64-year-old female – Hospital

[1]PFGE typing was performed using the restriction enzyme SmaI; PFGE typing was confirmed by ATCC unless otherwise noted (*depositor-supplied information).

MP-2™ SCC*MEC* TYPE MRSA PANEL

A panel of 7 methicillin-resistant *Staphylococcus aureus* (MRSA) strains, each with a different SCC*mec* type.

MP-3™ PULSE-FIELD TYPE MRSA PANEL

A panel of 10 methicillin-resistant *Staphylococcus aureus* (MRSA) strains each with a different pulse-field type.

Table 8: Methicillin-Sensitive *Staphylococcus aureus* (MSSA) Research Materials

ATCC® No.	Designation	SCC*mec* Type	PFGE Type[1]	*spa* Type		*pvl* gene amplification	Isolation Source
				Ridom	Kreiswirth		
BAA-2419™	--	Type II	Unknown	t002	TJMBMDMGMK	Negative	Human subject, blood
BAA-2420™	--	Type II	Unknown	t002	TJMBMDMGMK	Negative	Human subject, synovial fluid
BAA-2421™	--	Type II	Unknown	t002	TJMBMDMGMK	Negative	Human subject, blood

VANCOMYCIN-RESISTANT ENTEROCOCCI (VRE)

ATCC® vancomycin-resistant Enterococci (VRE) strains represent the vanA, vanB, and vanC genotypes most commonly seen in clinical isolates, and four strains confirmed to lack any vancomycin resistance to serve as negative controls. This unique collection of VRE strains is useful for building and testing new methods to detect VREs in clinical and environmental settings. The table shown below describes both molecular and antimicrobial susceptibility testing performed by ATCC.

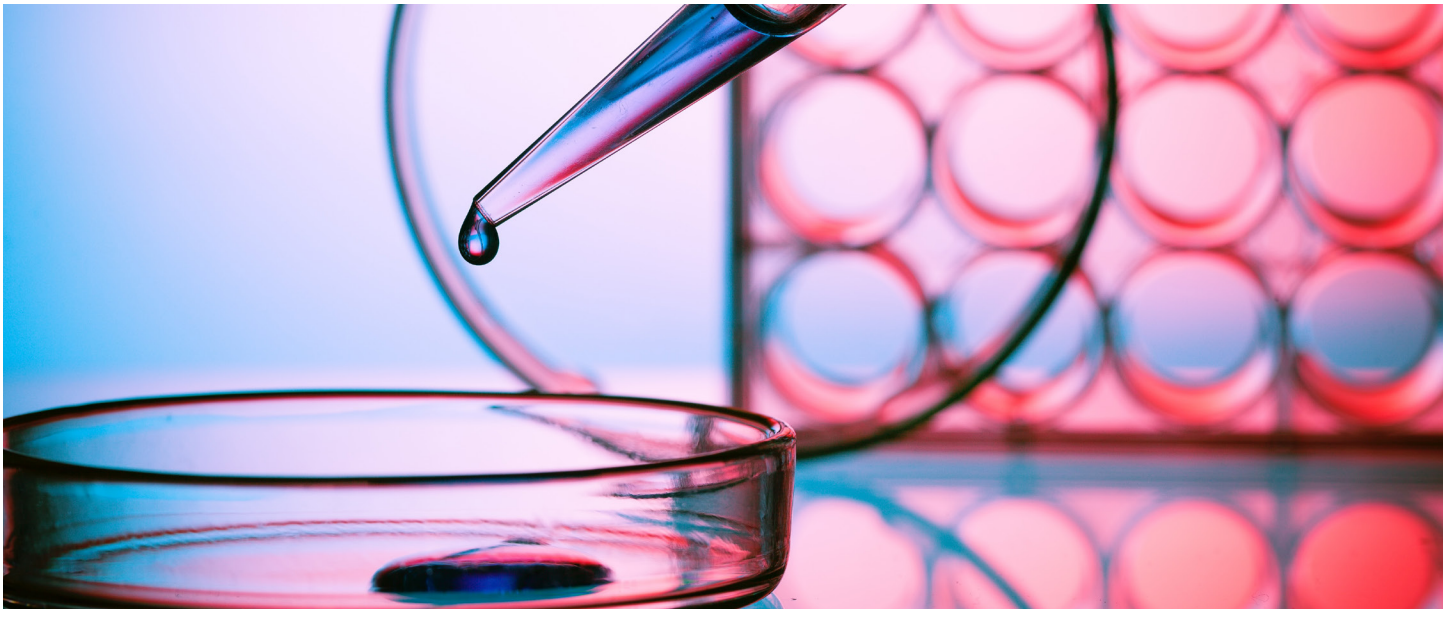
Table 9: Vancomycin-Resistant Enterococci Research Materials

ATCC® No.	*Enterococcus* species	Designation	Gene	Vancomycin
700221™	*Enterococcus faecium*	VRE	*vanA*	R
BAA-2316™	*Enterococcus faecium*	-	*vanA*	R
BAA-2317™	*Enterococcus faecium*	-	*vanA*	R
BAA-2318™	*Enterococcus faecium*	-	*vanA*	R
BAA-2319™	*Enterococcus faecium*	-	*vanA*	R
BAA-2320™	*Enterococcus faecium*	-	*vanA*	R
51299™	*Enterococcus faecalis*	NJ-3	*vanB*	R
51575™	*Enterococcus faecalis*	Taxo 239	*vanB*	R
51858™	*Enterococcus faecalis*	Vancomycin-dependent #4	*vanB*	R
BAA-2365™	*Enterococcus faecalis*	-	*vanB*	R
49608™	*Enterococcus gallinarum*	NCDO 2311 [PB18]	*vanC-1*	I
49609™	*Enterococcus gallinarum*	NCDO 1618 [B74, NCTC 8741]	*vanC-1*	I
49610™	*Enterococcus gallinarum*	NCDO 2707 [17R]	*vanC-1*	I
700425™	*Enterococcus gallinarum*	API 84-10-088 [NCDO 2315, PB24]	*vanC-1*	I
700668™	*Enterococcus casseliflavus*	UC73	*vanC-2/3*	I
49532™	*Enterococcus faecalis*	UWH 1921	None	S
49533™	*Enterococcus faecalis*	UWH 1936	None	S
BAA-2127™	*Enterococcus faecium*	AGR15	None	S
BAA-2128™	*Enterococcus faecalis*	AGR 329	None	S

R= Resistant; I= Intermediate; S= Sensitive

MP-1™ VANCOMYCIN RESISTANT ENTEROCOCCI PANEL

A panel of 15 *Enterococcus* spp. strains representing the *vanA*, *vanB*, and *vanC* genotypes, along with four strains confirmed to lack any vancomycin resistance to serve as negative controls.



DRUG-RESISTANT *CANDIDA ALBICANS* (CADR)

A select group of ATCC® *Candida albicans* strains have been tested against seven antifungal drugs, including anidulafungin, micafungin, caspofungin, 5-flucytosine, voriconazole, itraconazole, and fluconazole. These strains were isolated from clinical settings around the world and are useful in assay development, drug testing, and other applications.

Table 10: Drug-Resistant *Candida albicans* Research Materials

ATCC® No.	Designation	Anidulafungin	Micafungin	Caspofungin	5-Flucytosine	Voriconazole	Itraconazole	Fluconazole
10231™	3139	R	S	S	S	R	R	R
11651™	171D	S	S	S	S	S	R	S
14053™	NIH 3172	S	S	S	S	R	R	R
18804™	CBS 562*	S	S	S	S	S	S	S
200498™	BSMY 212	S	S	S	S	S	S	S
201148™	AS 113 BP	S	S	S	S	S	S	S
20402™	IFO 1650	S	S	S	S	S	S	S
26310™	Not available	S	S	S	S	S	S	S
28121™	304	S	S	S	S	R	R	R
28366™	73/079	S	S	S	S	S	S	S
28471™	CBS 6552	S	S	S	S	S	S	S
28516™	RV 4688	S	S	S	S	S	S	S
28956™	Not available	S	S	S	S	S	S	S
32089™	BF 78/56	S	S	S	S	R	R	R
32470™	F14094	S	S	S	S	S	S	S
32552™	VCM/F/10	S	S	S	S	R	R	S
34133™	Ca 16	S	S	S	S	S	S	S
36082™	Not available	S	S	S	S	S	S	S
38289™	Tu 62823	S	S	S	S	R	R	R
44203™	5865	S	S	S	S	S	S	S
44373™	Lecocq	S	S	S	S	S	S	S
44476™	E 71966	S	S	S	S	S	S	S
44505™	73/005	S	S	S	S	S	S	S
44506™	73/026	S	S	S	S	S	S	S
44806™	2252	S	S	S	S	S	S	S
44808™	4918	S	S	S	S	S	S	S
44829™	33 erg+	S	S	S	S	S	S	S
44858™	B 2.630	S	S	S	S	S	S	S
48130™	7N	S	S	S	S	S	R	S
56118™	CLFMC-85	S	S	S	S	S	S	S
58716™	LUMC-101	S	S	S	S	S	S	S
62376™	FC18	S	S	S	S	S	S	S
64124™	Darlington	R	R	R	S	R	R	R
66396™	1066	S	S	S	S	S	S	S
76485™	Not available	R	S	R	S	S	S	S
90028™	NCCLS 11	S	S	S	S	S	DD-S	S
90029™	NCCLS 67	S	S	S	R	S	S	S
90262™	PA 27	S	S	S	S	S	S	S
90819™	CATW 4/19	S	S	S	S	R	R	R
90873™	B62	S	S	S	S	S	S	S
96113™	NUM51	S	S	S	S	S	S	S
96268™	NRRL Y-6359	S	S	S	S	S	S	S

R= Resistant; I= Intermediate; S= Sensitive, DD-S= Dose-dependent susceptibility; *ATCC® 18804™ is a wild type strain. ATCC® MYA-2876™, SC5314, is a widely studied, genome-sequenced, wild type strain that has been included as a control for both gene sequence and drug sensitivity; **ATCC® MYA-682™ is a mutant strain that grows slowly. Values were read at 96 hours.

Table 10: Drug-Resistant *Candida albicans* Research Materials (continued)

ATCC® No.	Designation	Anidulafungin	Micafungin	Caspofungin	5-Flucytosine	Voriconazole	Itraconazole	Fluconazole
96901™	321182	S	S	S	S	S	DD-S	R
MYA-1003™	C310	R	S	S	S	R	R	R
MYA-1023™	GT 157	S	S	S	S	R	R	R
MYA-1237™	86-21	S	S	S	S	R	R	R
MYA-2310™	MEN	S	S	S	S	S	S	S
MYA-2719™	LGH1095	S	S	S	S	S	DD-S	S
MYA-274™	GDH18	S	S	S	S	S	S	S
MYA-427™	A39	S	S	S	S	R	R	R
MYA-4440™	9058373	S	S	S	S	R	R	DD-S
MYA-574™	Gu5	S	S	S	S	R	R	R
MYA-2876™	SC5314	S	S	S	S	S	S	S
MYA-682™	CAI4	S**	S**	S**	S**	S**	S**	S**

R= Resistant; I= Intermediate; S= Sensitive, DD-S= Dose-dependent susceptibility; *ATCC® 18804™ is a wild type strain. ATCC® MYA-2876™, SC5314, is a widely studied, genome-sequenced, wild type strain that has been included as a control for both gene sequence and drug sensitivity; **ATCC® MYA-682™ is a mutant strain that grows slowly. Values were read at 96 hours.

MP-8™ *CANDIDA ALBICANS* DRUG RESISTANCE PANEL

A panel of 12 strains resistant to one or more antifungal drugs (anidulafungin, micafungin, caspofungin, 5-flucytosine, voriconazole, itraconazole, and fluconazole), as well as two sensitive strains for use as negative controls (one type strain and one genome sequenced strain).

DRUG-RESISTANT *PSEUDOMONAS AERUGINOSA*

A select group of ATCC® *Pseudomonas aeruginosa* strains that have been tested against a variety of drug classes, including the penicillins, cephalosporins, carbapenems, quinolones, and aminoglycosides. These strains were isolated from human sputum samples and demonstrate resistance to as many as 15 antibiotics.

Table 11: Drug-Resistant *Pseudomonas aeruginosa* Research Materials

ATCC® No.	Species	Designation	Isolation
BAA-2108™	*Pseudomonas aeruginosa*	PGO2330	Sputum sample, human
BAA-2109™	*Pseudomonas aeruginosa*	PGO2332	Sputum sample, human
BAA-2110™	*Pseudomonas aeruginosa*	PGO2338	Sputum sample, human
BAA-2111™	*Pseudomonas aeruginosa*	PGO2354	Sputum sample, human
BAA-2112™	*Pseudomonas aeruginosa*	PGO2364	Sputum sample, human
BAA-2113™	*Pseudomonas aeruginosa*	PGO2396	Sputum sample, human
BAA-2114™	*Pseudomonas aeruginosa*	PGO2401	Sputum sample, human

DRUG-RESISTANT VECTOR-BORNE PARASITIC PROTOZOA

A select group of ATCC® vector-borne parasitic protozoan strains that have been analyzed for resistance to anti-parasitic drugs. These strains were isolated from either existing strains or from clinical settings.

Table 12: Drug-Resistant Vector-Borne Parasitic Protozoa Research Materials

ATCC® No.	Species	Designation	Isolation	Drug Resistance
30930™	*Plasmodium falciparum*	FCR-1/FVO	Adult human male, Vietnam	Chloroquine
30950™	*Plasmodium falciparum*	Honduras-1/CDC	Human, Cholutec, Honduras	Pyrimethamine
50005™	*Plasmodium falciparum*	FCR-3/Gambia Subline F-86	Derived from ATCC® 30932™	Chloroquine
50037™	*Plasmodium falciparum*	FCR-3/Gambia Clone D-3, Knobless	Derived from existing strain	Chloroquine
50072™	*Plasmodium falciparum*	Clone A-2 Knobby	Clone of ATCC® 30932™	Chloroquine
50834™	*Trypanosoma cruzi*	CA-I CL72 Lampit Resistant	Derived from ATCC® 50791™	Nifurtimox

METRONIDAZOLE-RESISTANT PARASITIC PROTOZOA

ATCC® metronidazole-resistant parasitic protozoa strains represent two species isolated from clinical or laboratory-derived sources. These strains are useful in the evaluation of novel anti-parasitic therapies, assay development, and other applications.

Table 13: Drug-Resistant Vector-Borne Parasitic Protozoa Research Materials

ATCC® No.	Species	Designation	Isolation
30238™	*Trichomonas vaginalis*	JH 32A #4	Endocervical swab
50143™	*Trichomonas vaginalis*	CDC 085	Human isolate
50151™	*Tritrichomonas foetus*	KV1/M-100	Derived from ATCC® 30924™
50152™	*Tritrichomonas foetus*	KV1-1MR-100	Derived from ATCC® 30924™

REFERENCE STRAINS USED IN ANTIMICROBIAL TESTING

ASPERGILLUS FUMIGATUS REFERENCE STRAINS

ATCC® *Aspergillus fumigatus* strains are useful for pathobiology, drug discovery and development, epidemiological studies, in-depth taxonomic investigations, and other applications. These strains have been tested against four antifungal drugs, including amphotericin B, posaconazole, voriconazole, and itraconazole. Additional information regarding MIC is available online at www.atcc.org.

Table 14: *Aspergillus fumigatus* Drug Testing Panel (ATCC® MP-12™)

		MIC (µg/mL) to Drugs			
ATCC® No.	Designation	Amphotericin B	Posaconazole	Voriconazole	Itraconazole
1022™	QM 1981	1	0.03	0.25	0.06
32820™	NCMH 77	2	<0.008	0.06	<0.015
90906™	151	2	0.015	0.25	0.06
96918™	SRRC 2006	1	0.06	0.5	0.12
MYA-3626™	T33439	1	0.03	0.25	0.12
MYA-3627™	FG1432	1	0.12	0.25	0.5
MYA-4609™	Af293	2	0.06	0.5	0.12

ANTIFUNGAL SUSCEPTIBILITY TESTING STRAINS

ATCC has established the Antifungal Susceptibility Testing Panel (ATCC® MP-5™) comprising QC and reference strains recommended for use in broth dilution procedures described in the Clinical and Laboratory Standards Institute (CLSI) document M38-A2 Reference Method for Broth Dilution Antifungal Susceptibility Testing of Filamentous Fungi, Approved Standard - Second Edition.

Table 15: Antifungal Susceptibility Testing Panel (ATCC® MP-5™)

ATCC® No.	Organism	Designation	Purpose
6258™	*Issatchenkia orientalis*	ATCC 749	QC
22019™	*Candida parapsilosis*	CBS 604	QC
204304™	*Aspergillus flavus*	MCV-C#1	Reference
MYA-3626™	*Aspergillus fumigatus*	T33439	Reference
MYA-3627™	*Aspergillus fumigatus*	FG 1432	Reference
MYA-3629™	*Fusarium* verticillioides	H66173	Reference
MYA-3630™	*Hamigera insecticola*	10831220	QC
MYA-3631™	*Aspergillus flavus*	AFL1	Reference
MYA-3633™	*Aspergillus* alabamensis	AT2	Reference
MYA-3634™	*Scedosporium apiospermum*	SC1	Reference
MYA-3635™	*Scedosporium apiospermum*	SC2	Reference
MYA-3636™	*Fusarium solani*	FS1	Reference
MYA-4438™	*Trichophyton rubrum*	MRL 666	Reference
MYA-4439™	*Trichophyton interdigitale*	MRL 1957	Reference

ATCC CERTIFIED REFERENCE MATERIALS

ATCC Certified Reference Materials are produced under an ISO 17034 accredited process, traceable to the original seed lot, and verified using polyphasic (genotypic and phenotypic) testing to confirm identity.

Table 16: Antimicrobial Effectiveness Testing Panel (ATCC® MP-16™)

ATCC® Number	Item Description	Designation	Isolation
CRM-6538™	*Staphylococcus aureus*	FDA 209	Human lesion
CRM-8739™	*Escherichia coli*	Crooks	Feces
CRM-9027™	*Pseudomonas aeruginosa*	R. Hugh 813	Outer ear infection
CRM-10231™	*Candida albicans*	3147	Man with bronchomycosis
CRM-16404™	*Aspergillus* brasiliensis	WLRI 034 (120)	Blueberry, North Carolina

REFERENCE STRAINS ASSOCIATED WITH ANTIBIOTIC OVER-USAGE

ATCC has performed additional characterization on a number of clinical *Clostridioides difficile* strains to determine toxinotype, binary toxin presence/absence, and Enzyme Immuno Assay (EIA) results. Significant strains include:

- ATCC® BAA-1870™ - An epidemic strain implicated in numerous outbreaks across North America and associated with increased severity of disease
- ATCC® BAA-1804™ - A representative of toxinotype 0 strains, which frequently cause human infections
- ATCC® BAA-1875™ - A representative of toxinotype V strains, which are commonly found in infected food-producing animals in Europe and the United States

Additional strains as well as information about each strain, such as geographic and date of isolation, are available online at www.atcc.org.

Table 17: Toxinotyped *Clostridioides difficile* Strains

ATCC® No.	Designation	Toxinotype	Binary Toxin	EIA*	Ribotype	Isolation Source
17857™	870	0	ND	+	001	Unknown
17858™	1253	0	ND	+	054	Unknown
43255™	VPI 10463	0	ND	+	087	Human - abdominal wound
43599™	2022	0	ND	+	001	Human feces - asymptomatic neonate
43600™	2149	0	ND	+	014	Human feces – antibiotic-associated pseudomembranous colitis
700792™	14797-2	0	ND	+	005	Human feces - hospitalized 13-year-old female with fulminant hepatitis and severe encephalopathy
BAA-1382™	630	0	ND	+	012	Clinical isolate
BAA-1804™	--	0	ND	+	053	Clinical isolate
BAA-1806™	--	0	ND	+	220	Clinical isolate
BAA-1808™	--	0	ND	+	020	Clinical isolate
BAA-1813™	--	0	ND	+	002	Clinical isolate
BAA-1815™	--	0	ND	+	076	Clinical isolate
BAA-1871™	4111	0	ND	+	001	Clinical isolate
BAA-1872™	4206	0	ND	+	207	Clinical isolate
BAA-1873™	5283	0	ND	+	053	Clinical isolate
BAA-1874™	4205	0	ND	+	002	Clinical isolate
BAA-2156™	LBM 0801040	0	ND	+	118	Human feces
BAA-1805™	--	IIIb	Y	+	027	Clinical isolate
BAA-1870™	4118	IIIb	Y	+	027	Clinical isolate
BAA-1803™	--	IIIc	Y	+	027	Clinical isolate
43593™	1351	*tcdA-*, *tcdB-*	ND	-	060	Human feces - asymptomatic neonate
43601™	7322	*tcdA-*, *tcdB-*	ND	-	031	Human feces - child with diarrhea

*Enzyme Immuno Assay (EIA) performed with the Wampole™ C. DIFF QUIK CHEK COMPLETE® kit or the equivalent.
ND = Not Detected

Table 17: Toxinotyped *Clostridioides difficile* Strains (continued)

ATCC® No.	Designation	Toxinotype	Binary Toxin	EIA*	Ribotype	Isolation Source
43602™	4811	*tcdA*-, *tcdB*-	ND	-	031	Human feces - adult with diarrhea
43603™	5036	*tcdA*-, *tcdB*-	ND	-	085	Human feces - child with diarrhea
700057™	VPI 11186	*tcdA*-, *tcdB*-	ND	-	038	Unknown
BAA-1801™	3232	*tcdA*-, *tcdB*-	ND	-	010	Human feces - adult with diarrhea
BAA-1807™	--	*tcdA*-, *tcdB*-	ND	-	140	Clinical isolate
BAA-1809™	--	*tcdA*-, *tcdB*-	ND	-	009	clinical isolate
BAA-1810™	--	*tcdA*-, *tcdB*-	ND	-	009	clinical isolate
BAA-1875™	5325	V	Y	+	078	Clinical isolate
43598™	1470	VIII	ND	+	017	Human feces - asymptomatic neonate
BAA-1812™	--	XII	ND	+	024	Clinical isolate
BAA-1814™	--	XXII	Y	+	251	Clinical isolate
BAA-2155™	LBM 0801058	XXII	Y	+	251	Human feces

*Enzyme Immuno Assay (EIA) performed with the Wampole™ C. DIFF QUIK CHEK COMPLETE® kit or the equivalent.
ND = Not Detected

APPENDIX

Table 18: ATCC® OXA-48 Strains – Antibiotic Profiles

Antibiotic*	BAA-2523™	BAA-2524™	BAA-2525™
Meropenem	R	R	S
Ertapenem	R	R	I
Imipenem	R	R	R

R = Resistant, S = Susceptible, I = Intermediate susceptibility

*Antibiotic susceptibility determined using E-Test Strips; results may vary depending on the assay and susceptibility cut-offs used

Table 19: ATCC® NDM-1 Strains – Antibiotic Profiles

		BAA-2146™	BAA-2452™	BAA-2468™	BAA-2469™	BAA-2470™	BAA-2471™	BAA-2472™	BAA-2473™
Penicillins	Amoxicillin/Clavulanic Acid	R	R	R	R	R	R	R	R
	Ticarcillin	R	R	R	R	R	R	R	R
	Ticarcillin/Clavulanic Acid	R	NT	R	R	R	R	R	R
	Piperacillin	R	R	R	R	R	R	R	R
	Ampicillin	R	R	R	R	R	R	R	R
	Ampicillin/Sulbactam	R	R	R	R	R	R	R	R
Cephalosporins	Cefalotin	R	R	R	R	R	R	R	R
	Cefuroxime	R	R	R	R	R	R	R	R
	Cefuroxime Axetil	R	R	R	R	R	R	R	R
	Cefo*tetan*	R	R	R	R	R	R	R	R
	Cefpodoxime	R	R	R	R	R	R	R	R
	Cefotaxime	R	R	R	R	R	R	R	R
	Ceftizoxime	R	R	R	R	R	R	R	R
	Cefazolin	R	R	R	R	R	R	R	R
	Cefoxitin	R	R	R	R	R	R	R	R
	Ceftazidime	R	R	R	R	R	R	R	R
	Ceftriaxone	R	R	R	R	R	R	R	R
	Cefepime	R	R	R	R	R	R	R	R
Carbapenems	Doripenem	R	NT	R	R	R	R	R	R
	Meropenem	R	R	R	R	R	R	R	R
	Ertapenem	R	R	R	R	R	R	R	R
	Imipenem	R	R	R	R	R	R	S	R
Quinolones	Nalidixic Acid	R	S	R	R	R	R	R	R
	Moxifloxacin	R	S	R	R	R	R	R	R
	Norfloxacin	R	S	R	R	R	R	R	R
	Ciprofloxacin	R	S	R	R	R	R	R	R
	Levofloxacin	R	S	R	R	R	R	R	R
Amino-glycosides	Amikacin	R	R	R	R	R	I	R	R
	Gentamicin	R	R	R	R	R	R	R	R
	Tobramycin	R	R	R	R	R	R	R	R
Other	Tetracycline	R	S	R	R	R	R	R	R
	Tigecycline	R	S	R	S	S	S	R	R
	Nitrofurantoin	R	S	R	S	R	I	R	R
	Aztreonam	R	R	R	R	R	R	R	R
	Trimethoprim/Sulfamethoxazole	R	S	R	R	R	R	R	R

R = Resistant, S = Susceptible, I = Intermediate susceptibility, NT = Not tested

Table 20: ATCC® KPC Strains – Antibiotic Profiles

		BAA-1705™	BAA-1898™	BAA-1899™	BAA-1900™	BAA-1902™	BAA-1903™	BAA-1904™	BAA-1905™	BAA-2078™	BAA-2082™	BAA-2340™	BAA-2341™	BAA-2342™	BAA-2343™	BAA-2344™	BAA-2814™
Penicillins	Amoxicillin/Clavulanic Acid	R	R	R	R	R	R	R	R	R	NT	R	R	R	NT	R	NT
	Ticarcillin	NT	R	R	NT	R	R	R	R	R	NT	R	R	R	NT	R	NT
	Ticarcillin/Clavulanic Acid	NT	R	R	NT	R	R	R	R	R	NT	NT	NT	NT	NT	NT	NT
	Piperacillin	R	R	R	R	R	R	R	R	R	NT	R	R	R	NT	R	NT
	Piperacillin/ Tazobactam	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	R
	Ampicillin	R	R	R	R	R	R	R	R	R	NT	R	NT	R	R	R	NT
	Ampicillin/Sulbactam	R	R	R	R	R	R	R	R	R	NT	R	NT	R	R	R	NT
Cephalosporins	Cefalotin	NT	R	R	R	R	R	R	R	R	NT	R	R	R	NT	R	NT
	Cefuroxime	NT	R	R	R	R	R	R	R	R	NT	R	R	R	NT	R	NT
	Cefuroxime Axetil	NT	R	R	R	R	R	R	R	R	NT	R	R	R	NT	R	NT
	Cefo*tetan*	NT	R	R	NT	R	R	S	R	R	NT	R	R	R	NT	R	NT
	Cefpodoxime	NT	R	R	R	R	R	R	R	R	NT	R	R	R	NT	R	NT
	Cefotaxime	NT	R	R	NT	R	R	R	R	R	NT	R	R	R	NT	R	NT
	Ceftizoxime	NT	R	R	NT	R	R	R	R	R	NT	R	R	R	NT	R	NT
	Cefazolin	R	R	R	R	R	R	R	R	R	NT	R	R	R	R	R	NT
	Cefoxitin	R	R	R	R	R	R	R	R	R	NT	R	R	R	R	R	NT
	Ceftazidime	R	R	R	R	R	R	R	R	R	NT	R	R	R	R	R	NT
	Ceftriaxone	R	R	R	R	R	R	R	R	R	NT	R	R	R	R	R	NT
	Cefepime	R	R	R	R	R	R	R	R	R	NT	R	R	R	R	R	NT
Carbapenems	Doripenem	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	R	R	R	R	R	NT
	Meropenem	R	R	R	NT	R	S	S	R	R	NT	R	R	R	NT	R	R
	Ertapenem	R	R	R	NT	R	R	R	R	NT	NT	R	R	R	R	R	NT
	Imipenem	R	R	R	NT	R	R	R	R	R	NT	R	R	R	R	R	NT
Quinolones	Nalidixic Acid	NT	R	R	NT	R	R	S	R	R	NT	R	R	R	NT	R	NT
	Moxifloxacin	NT	R	R	NT	R	R	S	R	R	NT	R	R	R	NT	R	NT
	Norfloxacin	NT	R	R	R	R	R	S	R	R	NT	R	R	R	NT	R	NT
	Ciprofloxacin	R	R	R	R	R	R	S	R	R	NT	R	R	R	R	R	NT
	Levofloxacin	R	R	R	R	R	R	S	R	R	NT	R	R	R	R	R	R
Amino-glycosides	Amikacin	R	S	S	NT	R	R	R	S	S	NT	I	S	S	I	R	R
	Gentamicin	S	S	I	I	R	S	I	R	S	NT	S	I	S	S	S	S
	Tobramycin	NT	S	R	R	R	R	R	R	I	NT	R	R	I	R	R	NT
Other	Tetracycline	I	S	S	S	S	S	S	S	S	NT	R	R	S	NT	S	NT
	Tigecycline	NT	S	S	NT	S	S	S	S	S	NT	S	R	S	NT	S	NT
	Nitrofurantoin	R	R	R	R	R	R	S	R	R	NT	S	R	R	R	R	NT
	Aztreonam	R	R	R	NT	R	R	R	R	R	NT	R	R	R	NT	R	NT
	Trimethoprim/ Sulfamethoxazole	R	R	R	R	R	R	R	R	R	NT	R	R	R	R	R	NT

R = Resistant, S = Susceptible, I = Intermediate susceptibility, NT = Not tested

Table 21: ATCC® Drug-Resistant *Acinetobacter baumannii* Strains- Antibiotic Profiles

		BAA-1605™	BAA-1789™	BAA-1790™	BAA-1791™	BAA-1792™	BAA-1793™	BAA-1794™	BAA-1795™	BAA-1796™	BAA-1797™	BAA-1798™	BAA-1799™	BAA-1800™
Penicillins	Amoxicillin/Clavulanic Acid	NT	R	R	R	R	R	R	R	R	R	R	R	R
	Ticarcillin	R	I	R	R	R	R	R	R	R	R	R	R	R
	Ticarcillin/Clavulanic acid	NT	I	R	R	R	R	R	R	R	R	R	R	R
	Piperacillin	R	R	R	R	R	R	R	R	R	R	R	R	R
	Pipericillin/Tazobactam	NT	R	R	R	R	R	R	R	R	R	R	R	R
	Ampicillin	NT	R	R	R	R	R	R	R	R	R	R	R	R
	Ampicillin/Sulbactam	NT	S	I	S	R	S	S	R	S	S	S	R	S
Cephalosporins	Cefalotin	NT	R	R	R	R	R	R	R	R	R	R	R	R
	Cefuroxime	NT	R	R	R	R	R	R	R	R	R	R	R	R
	Cefuroxime Axetil	NT	R	R	R	R	R	R	R	R	R	R	R	R
	Cefo*tetan*	NT	R	R	R	R	R	R	R	R	R	R	R	R
	Cefpodoxime	NT	R	R	R	R	R	R	R	R	R	R	R	R
	Cefotaxime	NT	R	R	R	R	R	R	R	R	R	R	R	R
	Ceftizoxime	NT	R	R	R	R	R	R	R	R	R	R	R	R
	Cefazolin	NT	R	R	R	R	R	R	R	R	R	R	R	R
	Cefoxitin	NT	R	R	R	R	R	R	R	R	R	R	R	R
	Ceftazidime	R	R	R	R	R	R	R	R	R	R	R	R	R
	Ceftriaxone	NT	R	R	R	R	R	R	R	R	R	R	R	R
	Cefepime	R	R	R	R	R	R	R	I	R	R	R	R	R
Carbapenems	Meropenem	NT	R	R	R	R	R	R	R	R	R	R	R	R
	Imipenem	R	I	R	R	R	R	R	S	R	R	R	R	R
Quinolones	Nalidixic acid	NT	R	R	R	R	R	R	R	R	R	R	R	R
	Moxifloxacin	NT	R	R	R	R	R	R	R	R	R	R	R	R
	Norfloxacin	NT	R	R	R	R	R	R	R	R	R	R	R	R
	Ciprofloxacin	R	R	R	R	R	R	R	R	R	R	R	R	R
	Levofloxacin	NT	R	R	R	R	I	I	R	I	I	R	R	I
Aminoglycosides	Amikacin	S	S	S	R	S	S	S	S	S	S	R	S	I
	Gentamicin	R	R	S	S	R	S	R	I	R	R	R	R	R
	Tobramycin	S	S	S	S	S	R	R	S	I	R	S	S	R
Other	Tetracycline	NT	R	R	R	R	R	R	R	R	R	R	R	R
	Tigecycline	NT	S	S	S	S	S	S	S	S	S	S	S	S
	Nitrofurantoin	NT	R	R	R	R	R	R	R	R	R	R	R	R
	Aztreonam	R	R	R	R	R	R	R	R	R	R	R	R	R
	Trimethoprim/ Sulfamethoxazole	NT	R	R	R	R	S	R	R	R	R	R	R	S

R = Resistant, S = Susceptible, I = Intermediate susceptibility, NT = Not tested

Table 22: ATCC® Drug-Resistant *Pseudomonas aeruginosa* Strains - Antibiotic Profiles

		BAA-2108™	BAA-2109™	BAA-2110™	BAA-2111™	BAA-2112™	BAA-2113™	BAA-2114™
Penicillins	Amoxicillin/Clavulanic acid	R	R	NT	R	R	R	R
	Piperacillin/Tazobactam	NT	S	NT	S	S	S	R
	Ampicillin	R	R	R	R	R	R	R
Cephalosporins	Cefalotin	R	R	NT	R	R	R	R
	Cefuroxime	R	R	NT	R	R	R	R
	Cefuroxime Axetil	R	R	NT	R	R	R	R
	Cefpodoxime	R	R	NT	R	R	R	R
	Cefotaxime	R	R	R	R	R	R	R
	Cefazolin	NT	R	R	R	R	R	R
	Cefoxitin	R	R	R	R	R	R	R
	Ceftazidime	S	S	S	S	S	I	S
	Ceftriaxone	NT	R	NT	R	R	R	R
	Cefepime	S	S	S	S	S	S	S
Carbapenems	Ertapenem	NT	NT	NT	NT	NT	NT	NT
	Imipenem	R	S	S	S	S	S	S
Quinolones	Norfloxacin	S	S	NT	S	S	S	S
	Ciprofloxacin	S	S	S	S	S	S	I
	Levofloxacin	I	S	S	S	S	S	I
Aminoglycosides	Amikacin	S	S	S	S	S	S	S
	Gentamicin	I	S	I	S	S	S	S
	Tobramycin	NT	S	S	S	S	S	S
Other	Tetracycline	R	R	NT	R	R	R	R
	Tigecycline	R	R	R	R	R	R	R
	Nitrofurantoin	R	R	R	R	R	R	R
	Trimethoprim/ Sulfamethoxazole	R	R	R	R	R	R	R

R = Resistant, S = Susceptible, I = Intermediate susceptibility, NT = Not tested

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AMS-122021-v04