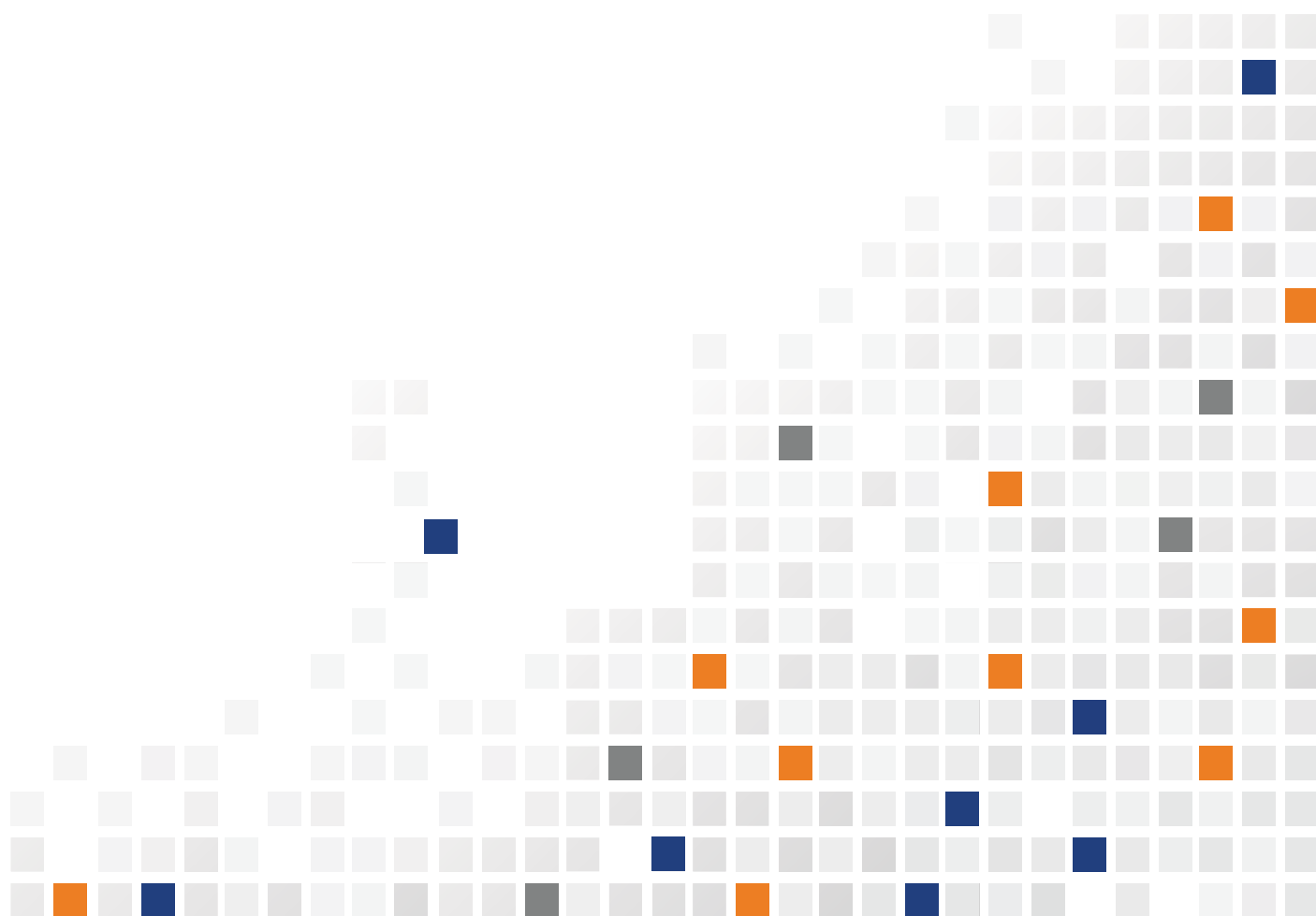




A Eurofins Discovery Partner Lab

Antimicrobial Drug Discovery

In vitro and In vivo Services – Assay lists



About Pharmacology Discovery Services (PDS)

Pharmacology Discovery Services (PDS), a partner lab of Eurofins Discovery, provides comprehensive *in vitro* and *in vivo* services for antimicrobial drug discovery. Our pathogen collection has hundreds of bacterial and fungal strains, many from the CDC and FDA Antibiotic Resistance (AR) Isolate Bank. Available services include MIC assays, assessments of *in vitro* antimicrobial characteristics, and >145 validated rodent infection models with a variety of infection types: dermal, lung, thigh, peritonitis, septicemia, urinary tract infection (UTI), and vaginal.

We have the flexibility and expertise to develop custom models and are experienced with small molecules, drug combinations, biologics, bacteriophage, nucleic acids, liposomal formulations, live microbial therapeutics, probiotic treatments, nanoparticles, and vaccines.

Facility and Accreditations

- AAALAC accredited vivarium with OLAW assurance
- In compliance with European animal welfare standards
- Biosafety Level 2 Facility



In vitro and *In vivo* Antimicrobial Services

In vitro Microbiology

MIC Testing

The Minimum Inhibitory Concentration (MIC) testing from Eurofins has over 850 strains of clinically relevant pathogens that include top priority antibiotic resistance concerns of the CDC and WHO:

- Bacteria – aerobes and anaerobes
- Fungi – yeasts, molds, dermatophytes
- Multidrug Resistant Strains – *E. coli*, *K. pneumoniae*, *N. gonorrhoeae*, *A. baumannii*, *P. aeruginosa*, *Enterococcus*, *Staphylococcus*, and *Streptococcus*

In vitro microbiology protocols generally adhere to the assay conditions from the Clinical and Laboratory Standards Institute (CLSI). Our standard methods use validated semi-automated low-volume compound dilutions to reduce the material requirement. Protocols that fully adhere to the CLSI guidelines are commonly conducted as a custom service.

Bacterial assays may be conducted with human serum to test the inhibitory or stimulatory effects of serum components on antibacterial activity.

To accelerate your MIC testing, pre-designed panels and online ordering of MIC assays are also available.

- MIC testing panels test the sets of bacterial strains of *Acinetobacter baumannii*, *Escherichia coli*, *Klebsiella pneumoniae*, *Pseudomonas aeruginosa*, and *Staphylococcus aureus* for which *in vivo* efficacy models are available.
- Online ordering of MIC assays expedite the initiation of your studies. With online ordering, you may quickly select the strains you want to test, place your order and receive results in your data portal. You may order panels that contain preselected MIC strains or create your own custom panels for easy reordering.

Characterization Assays

In vitro assays to further characterize antimicrobial compounds include:

- Time Kill Assay – to determine if a compound has microbicidal properties
- Checkerboard Assay – to assess antimicrobial potency of two compounds alone and in combination
- Resistance Emergence – a group of custom assays to measure the frequency of resistance emergence
- Membrane Lysis Assay – to detect the disruption of *S. aureus* cell membrane
- Red Blood Lysis – to test if a compound can lyse human RBCs
- Cytotoxicity Assays – to measure cytotoxicity, more than 50 human and rodent cell lines are available

In vivo Microbiology

Efficacy Evaluation

Infection Models

Our catalog has over 145 validated models with clinically relevant MDR pathogens.

- Ocular, peritonitis, pneumonia, sepsis, or urinary tract infection
- Skin, thigh, wound, or vaginal
- Models with genome sequenced MDR bacterial strains

Hosts

- Mouse, rat, or hamster
- Neutropenic or immunocompetent

Endpoints

- Survival or microbial counts
- Histopathology, cytokine, flow cytometry, quantitative RT-PCR
- Pharmacokinetics (PK)

Flexible Dosing Routes and Schedules

- ID, ICV, IM, IP, IT, IV, PO, SC, Topical, Vaginal
- Short and Long-term Continuous IV Infusion
- Adjustable Dose Schedule – qd, bid, tid, qid
- Formulation Optimization Services

Custom Models

- Collaborate with our technical staff to develop models specific to your needs.

Safety Assessment and Pharmacokinetics (PK)

Prior to efficacy testing evaluation of test agents may start with safety/tolerability tests and PK models. A recommended strategy typically begins with:

- Maximum Tolerated Dose – identify the maximum dose that doesn't display toxicity
- PK Testing – using the same route of administration as in the efficacy model
- Plasma Stability – to confirm the in-life plasma stability of a test agent

In vivo Infection Models with Bacteria

Antimicrobial models with mice

<i>Acinetobacter baumannii</i> , Gram-negative			Assay ID				
Strain	Notable AMR genes	Antibiotic resistance	MIC panel	MIC	Thigh model	Lung model	Peritonitis model
ATCC 17978	OXA-259	Susceptible	√	600100	608830	608800	-
AR-BANK#0280	OXA-66	Susceptible	√	600330	608835	608805	608855
AR-BANK#0275	OXA-23,OXA-66	CRAB	√	600325	608833	608803	-
AR-BANK#0282	OXA-23,OXA-66	CRAB	√	600332	608840	608820	-
AR-BANK#0313	OXA-23,OXA-69	CRAB	√	600363	608836	608806	-
AR-BANK#0277	OXA-24, OXA-65	CRAB	√	600327	608834	608804	-
AR-BANK#0088	NDM-1,OXA-64	CRAB	√	600320	608832	608802	608852
<i>Acinetobacter baumannii</i> Screen MIC panel			PP288				

√ Assay item part of panel, CRAB: Carbapenem Resistant *Acinetobacter baumannii*, MDR

<i>Escherichia coli</i> , Gram-negative			Assay ID					
Strain	Notable AMR genes	Antibiotic resistance	MIC panel	MIC	Thigh model	Lung model	Peritonitis model	Septicemia (IV)
ATCC 25922	-	Susceptible	√	610100	608330	-	608310	-
ATCC 700336	-	Susceptible	√	610211	608332	-	608312	608322
AR-BANK#0372	CTX-M-15	ESBL	√	610199	608349	-	-	-
AR-BANK#0349	MCR-1, CTX-M-14	ESBL, colistin	√	610164	608335	-	608333	-
AR-BANK#0048	NDM-1	CRE	√	610166	608338	-	-	-
AR-BANK#0055	NDM-1	CRE	√	610165	608340	-	608317	-
AR-BANK#0114	KPC-3	CRE	√	610178	608343	-	-	-
<i>Acinetobacter baumannii</i> Screen MIC panel			PP289					

√ Assay item part of panel, ESBL: Extended Spectrum β-lactamase producing strain, CRE: Carbapenem Resistant *Enterobacteriaceae*, MDR

<i>Klebsiella pneumoniae</i> , Gram-negative			Assay ID						
Strain	Notable AMR genes	Antibiotic resistance	MIC panel	MIC	Thigh model	Lung model	Peritonitis model	Septicemia (IV)	IC Lung model
ATCC 43816	SHV	Susceptible	√	612200	608570	608550	608540	608541	608560
ATCC 10031	-	Susceptible	√	612100	-	-	608510	-	-
BAA-1705	KPC-2	CRE	√	612120	608571	608572	608530	-	-
NCTC 13443	NDM-1	CRE	√	612180	608573	608574	-	-	-
AR-BANK#0041	NDM-1	CRE	√	612209	608577	-	608532	-	-
AR-BANK#0087	SHV-12	ESBL	√	612221	608578	-	-	-	-
AR-BANK#0097	KPC-3	CRE	√	612222	608579	-	608534	-	-
AR-BANK#0098	KPC-2	CRE	√	612223	608580	-	608535	-	-
AR-BANK#0135	VIM-1	CRE	√	612235	608582	-	-	-	-
AR-BANK#0138	NDM-7	CRE	√	612236	608581	-	-	-	-
AR-BANK#0160	OXA-48	CRE	√	612248	608583	608593	-	-	-
<i>Klebsiella pneumoniae</i> Screen MIC panel			PP290						

√ Assay item part of panel, ESBL: Extended Spectrum β-lactamase producing strain, CRE: Carbapenem Resistant *Enterobacteriaceae*, MDR, IC: the lung model performed with immunocompetent mice

In vivo Infection Models with Bacteria

Antimicrobial models with mice cont...

<i>Pseudomonas aeruginosa</i> , Gram-negative			Assay ID							
Strain	Notable AMR genes	Antibiotic resistance	MIC panel	MIC	Thigh model	Lung model	Peritonitis model	Septicemia (IV)	IC Thigh model	IC Lung model
ATCC 9027	-	Susceptible	√	614000	-	-	608610	-	-	-
ATCC 27853	-	Susceptible	√	614030	608650	608640	608620	608680	-	608681
PA6206	-	Susceptible	√	614166	608667	608632	608631	608688	608667	608633
AR-BANK#0259	-	Susceptible	√	614120	608665	-	-	-	-	-
LES 431 BCCM 27624	-	CRPA	√	614068	608655	608645	608630	-	-	-
AR-BANK#0108	VIM-2	CRPA	√	614087	608657	608647	-	-	-	-
AR-BANK#0230	VIM-2	CRPA	√	614091	608662	-	-	-	-	-
AR-BANK#0054	VIM-4	CRPA	√	614078	608651	608641	-	-	-	-
AR-BANK#0103	IMP-1	CRPA	√	614138	608654	608644	-	-	-	-
AR-BANK#0246	NDM-1	CRPA	√	614107	608664	608638	608634	608684	608674	608685
AR-BANK#0064	SPM-1	CRPA	√	614079	608652	608642	-	-	-	-
AR-BANK#0105	OXA-2	CRPA	√	614139	608656	608646	-	-	-	-
AR-BANK#0094	-	CRPA	√	614135	608653	608643	-	-	-	-
AR-BANK#0229	-	CRPA	√	614090	608661	-	-	-	-	-
AR-BANK#0234	-	CRPA	√	614095	608663	-	-	-	-	-
AR-BANK#0264	-	CRPA	√	614125	608659	608649	-	-	-	-
AR-BANK#0266	-	CRPA	√	614127	608666	608639	608636	608686	-	-
<i>Pseudomonas aeruginosa</i> Screen MIC panel			PP291							

√ Assay item part of panel, CRPA: Carbapenem Resistant *Pseudomonas aeruginosa*, MDR, IC: the lung model performed with immunocompetent mice

<i>Staphylococcus aureus</i> , Gram-positive			Assay ID							
Strain	Notable AMR genes	Antibiotic resistance	MIC panel	MIC	Thigh model	Lung model	Peritonitis model	Septicemia (IV)		
ATCC 29213	-	Susceptible	√	604110	608105	608106	-	-		
ATCC 19636	-	Susceptible	√	606000	608050	-	608010	-		
ATCC 33591	MecA	MRSA	√	605000	608130	608125	608110	-		
ATCC 33592	MecA	MRSA	√	604010	-	-	608140	-		
BAA-1556	MecA	MRSA USA 300	√	604055	608208	608209	608206	608205		
BAA-1717	MecA	MRSA USA 300	√	604045	-	-	-	608188		
VRS-2	MecA VanA	VanA VRSA	√	604147	608180	-	608182	-		
<i>Staphylococcus aureus</i> Screen MIC panel			PP292							

√ Assay item part of panel, MRSA: methicillin resistant *S. aureus*, VRSA: vancomycin resistant

In vivo Infection Models with Bacteria

Antimicrobial models with mice cont...

<i>Enterococcus faecalis</i> , Gram-positive			Assay ID		
Strain	Notable AMR genes	Antibiotic resistance	MIC	Peritonitis model	Septicemia (IV)
ATCC 29212	-	Susceptible	602050	608220	-
ATCC 51575	VanB	VRE	602100	608250	608270

VRE: vancomycin resistant *Enterococcus*

<i>Streptococcus pneumoniae</i> , Gram-positive		Assay ID			
Strain	Antibiotic resistance	MIC	Thigh model	Lung model	Peritonitis model
ATCC 6301	Susceptible	603900	-	608100	608080

<i>Streptococcus pyogenes</i> , Gram-positive		Assay ID			
Strain	Antibiotic resistance	MIC	Thigh model	Lung model	Peritonitis model
ATCC 14289	Susceptible	603950	608750	-	608700

Neisseria gonorrhoeae vaginal infection models with ovariectomized mice

<i>Neisseria gonorrhoeae</i> , Gram-negative		Assay ID	
Strains*	Antibiotic resistance**	MIC (Parental strain)	Vaginal Infection
FA-1090 ATCC 700825	STR-R	612501	608600
AR-BANK#0179 STR-R	AZM-NS, PEN-I, TET-I, STR-R	612532	608601
AR-BANK#0181 STR-R	AZM-HLR, PEN-I, TET-R, STR-R	612534	608602
HO-41, WHO-X, NCTC 13820, STR-R	AZM-I, CIP-HLR, CRO-HLR, PEN-R, TET-R, STR-R	612571	608605

*Strain FA1090 is from the ATCC. Strains AR-BANK#0179 STR-R, AR-BANK#0181 STR-R and HO-41 STR-R are streptomycin resistant derivatives of organisms from the CDC and FDA Antimicrobial Resistance Isolate Bank and from Public Health England.

**Antibiotic resistance: Azithromycin (AZM), Ceftriaxone (CRO), Penicillin (PEN), Tetracycline (TET), Streptomycin (STR). High level resistance (HLR), Resistant (R), Non susceptible (NS), Intermediate (I).

Urinary tract infection models with mice

<i>Escherichia coli</i> and <i>Klebsiella pneumoniae</i> , Gram-negative				Assay ID		
Strain	Species	Antibiotic resistance	Notable AMR genes	MIC	C3H/HeJ UTI	C3H/HeN diabetic UTI
ATCC 700336	<i>E. coli</i>	Susceptible	-	610211	608380	608379
AR-BANK#0055	<i>E. coli</i>	CRE	NDM-1	610165	608381	-
AR-BANK#0097	<i>K. pneumoniae</i>	CRE	KPC-3	612222	608390	-

CRE: Carbapenem Resistant *Enterobacteriaceae*, MDR

In vivo Infection Models with Bacteria

Dermal infection models with mice

<i>Staphylococcus aureus</i> , Gram-positive			Assay ID	
Strain	Notable AMR genes	Antibiotic resistance	MIC	Dermal infection
ATCC 19636	-	Susceptible	606000	608070
BAA-1556	MecA	MRSA USA 300, MDR	604055	608207
BAA-1717	MecA	MRSA USA 300	604045	608190

MRSA: methicillin resistant *S. aureus*

Clostridium difficile colitis models with hamster

<i>Clostridium difficile</i> , Gram-positive			Assay ID
Strain	Ribotype	MIC	Hamster colitis model
BAA-1805	Ribotype 027	620630	608910

In vivo Infection Models with Fungi

<i>Aspergillus fumigatus</i>	Assay ID		
Strain	MIC	Lung model	Systemic (IV)
ATCC 13073	640110	609110	609100

<i>Candida albicans</i>	Assay ID		
Strain	MIC	Systemic (IV)	Vulvovaginal Candidiasis
ATCC 10231	640000	609010	-
ATCC 44858	640020	609020	609050
R303	640022	609035	-
R357	640023	609040	609060

For more information, please visit: pharmacologydiscoveryservices.com

