Illumina Respiratory Pathogen ID/AMR Panel

Comprehensive detection of SARS-CoV-2 variants, common and rare respiratory pathogens, and associated antimicrobial resistance (AMR) markers

An unprecedented public health concern requires new testing capabilities

- Respiratory coinfections are a global health concern accelerated by COVID-19
- New, highly transmissible viral variants may impact effectiveness of diagnostic tests and vaccines[1]
- Increased antibiotic resistance is a global health threat

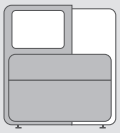
With the Respiratory Pathogen ID/AMR Panel, research labs can:

- Identify COVID-19 and determine viral variants and lineages
- Detect coinfections caused by viruses, bacteria, fungi, and parasites simultaneously
- Profile AMR gene expression to gain insights into pathogen antibiotic resistance
- Analyze a wide variety of sample types, including traditionally complex samples

- Report full genome coverage of SARS-CoV-2 and Influenza A/B viruses to surveil new variants and lineages

Streamlined, sample-to-results NGS workflow delivers results in under 24 hours

- Accurate, cost-effective detection of known and emerging respiratory pathogens with next-generation sequencing (NGS) combined with target enrichment and powerful, simple data analysis with the IDbyDNA Explify Platform

Prepare nucleic acid	Prepare cDNA	Prepare and enrich library	Sequence	Analyze data
				
Total nucleic acid extraction	Illumina RNA Prep with Enrichment with Illumina Respiratory Pathogen ID/AMR Panel		MiniSeq™ System Rapid Reagent Kit	IDbyDNA Explify Respiratory Pathogen ID/AMR Panel Platform

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Analysis powered by IDbyDNA

- Access in BaseSpace™ Sequence Hub
- Harness an easy-to-use solution for in-depth analysis with standardized interpretation using curated databases
- Issue results in four different formats:
  - Summary report (PDF)
  - Annotated mutation table for SARS-CoV-2 and Influenza A/B (TSV)
  - SARS-CoV-2 consensus genome (FASTA)
  - Detailed text-based report (JSON)

Pathogens targeted by the Respiratory Pathogen ID/AMR Panel

- Cost-effective detection of respiratory pathogens and associated antibiotic resistance genes in a single assay
- Broad targeting of DNA- and RNA-based pathogens, including 180+ bacteria, 40+ viruses, and 50+ fungi, and 1200+ AMR alleles with predicted resistance to 60 antimicrobial agents
- Comprehensive genome coverage of SARS-CoV-2 and Influenza A/B viruses enables surveillance of variants and lineages

Top targets on the Respiratory Pathogen ID/AMR Panel

Top bacteria[a]	Top viruses[a]	Top fungi[a]	Antibiotics	
Bordetella pertussis (5)	Adenovirus B, C, E	*Aspergillus fumigatus* (5)	Amoxicillin	Gentamicin
Chlamydia pneumoniae (2)	Coronavirus 229E, HKU1, NL63, OC43	*Candida auris*	Amoxicillin + Clavulanic acid	Levofloxacin
Coxiella burnetii	Cytomegalovirus (CMV)	*Coccidioides immitis* (1)	Cefazolin	Meropenem
Enterobacter cloacae complex[b]	Enterovirus D68	*Fusarium solani* (3)	Cefepime	Oxacillin
Francisella tularensis	Influenza A virus (H1N1, H3N2, avian)	*Histoplasma capsulatum*	Ceftriaxone	Sulfamethoxazole
Klebsiella pneumoniae (4)[b]	Influenza B virus	*Mucor racemosus* (2)	Clindamycin	Tetracycline
Legionella pneumophila (5)	Metapneumovirus	*Paracoccidioides brasiliensis*	Colistin	Trimethoprim
Mycobacterium tuberculosis (9)	Parainfluenza virus 1-4	*Pneumocystis jirovecii*	Erthromycin	Vancomycin
Nocardia farcinica (9)	Respiratory syncytial virus A + B	*Rhizopus oryzae* (2)		
Pseudomonas aeruginosa (2)[b]	Rhinovirus A, B, C	*Sporothrix schenckii*		
Staphylococcus aureus[b]	SARS-CoV-2	*Talaromyces marneffei*		
Streptococcus pneumoniae (7)[b]				

Number in parentheses indicates additional targeted species of the same genus
a. Denotes leading causes of respiratory infections whether viral, fungal, or bacterial. Additional organisms that are known to cause infections are also targeted.
b. AMR markers included.

AMR markers targeted by the Respiratory Pathogen ID/AMR Panel

- Accurate prediction of resistance of 16 common respiratory pathogens to 60 relevant antimicrobials based on detection of > 1200 associated AMR markers

AMR markers on the Respiratory Pathogen ID/AMR Panel				
Bacteria	*A. baumannii* *E. faecalis* *E. faecium* *E. cloacae complex* *E. coli* *K. pneumoniae* *P. aeruginosa* *S. aureus* *S. maltophilia* *S. pneumoniae*	Antibacterials	Aminoglycosides	Gentamicin, Plazomicin, Paromomycin, Tobramycin, Streptomycin, Spectinomycin, Amikacin, Neomycin
			Beta-Lactam + Beta-Lactamase Inhibitor	Amoxicillin + Clavulanic Acid, Ampicillin + Sublactam, Piperacillin + Tazobactam
			Carbapenems	Ertapenem, Meropenem, Imipenem
			Cephalosporins (1st generaton)	Cefazolin, Cefalexin
			Cephalosporins (2nd generaton)	Cefaclor, Cefoxitin
			Cephalosporins (3rd generaton)	Ceftazidime, Ceftriaxone, Cefotaxime, Cefixime
			Cephalosporins (4th generaton	Cefepime
			Diaminopyrimidine	Trimethoprim
			Fluoroquinolones	Ciprofloxacin, Norfloxacin, Levofloxacin, Ofloxacin, Moxifloxacin
			Fosfomycin	Fosfomycin
			Glycopeptides	Vancomycin
			Lincosamides	Clindamycin, Lincomycin
			Macrolides	Clarithromycin, Azithromycin, Erythromycin
			Oxazolidinones	Linezolid
			Penicillins	Amoxicillin, Ampicillin, Methicillin, Oxacillin, Penicillin
			Polymyxins	Colistin
			Sulfonamides	Sulfamethoxazole
			Tetracyclines	Tetracycline, Doxycycline
Mycobacteria	*M. tuberculosis complex* *M. abscessus*	Antimycobacterials	**First-line:** Isoniazids Polyamine Antibiotics Pyrazinamides Rifamycin Antibiotics	Isoniazid, Ethambutol, Pyrazinamide, Rifampin, Rifampicin
			Second-line: Ethionamides Para-Aminosalicylic Acids Aminoglycosides Fluoroquinolones	Ethionamide, Para-Aminosalicylic Acid, Amikacin, Kanamycin, Streptomycin, Capreomycin, Ciprofloxacin, Levofloxacin, Moxifloxacin, Norfloxacin, Ofloxacin
Viruses	Influenza A (H1N1) Influenza A (H3N2) Influenza A (H5N1) Influenza A H7N9)	Antivirals	Neuraminidase Inhibitors	Oseltamivir, Zanamivir, Peramivir, Laninamivir
			Endonuclease Inhibitors	Baloxavir

Learn more

To explore the full list of targets on the Respiratory Pathogen ID/AMR Panel, see www.illumina.com/content/dam/illumina/gcs/assembled-assets/marketing-literature/respiratory-pathogen-panel-table-470-2020-013/respiratory-pathogen-id-amr-panel-table-470-2020-013.pdf

For more information, visit www.illumina.com/products/by-type/sequencing-kits/library-prep-kits/respiratory-pathogen-id-panel.html

To learn more about SARS-CoV-2 variant analysis with the Explify Respiratory Pathogen ID/AMR Panel Data Analysis Solution, see www.idbydna.com/rpipvariantsflyer

Explore the IDbyDNA Explify Platform at www.idbydna.com/explify-platform/

References

1. Washington NL, Gangavarapu K, Zeller M, et al. Genomic epidemiology identifies emergence and rapid transmission of SARS-CoV-2 B.1.1.7 in the United States. *medRxiv*. 2021;doi:10.1101/2021.02.06.21251159.

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