



*Changing the paradigm
for universal TB-DST with*

**Mycobacterium Tuberculosis Whole Genome Sequencing
Drug Resistance Panel**



WGS in TB

NEED

Tuberculosis patients need timely diagnosis and care

HURDLE

Current culture and molecular tests look for limited information or take weeks to give results

ADVANTAGE

WGS can be a single-test to identify all relevant diagnostic information on TB infections

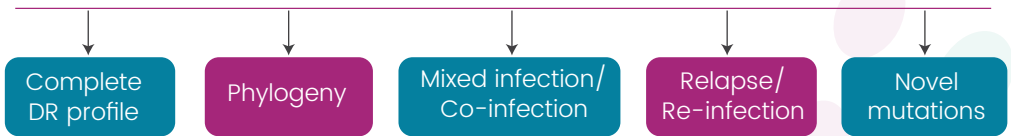
ACCEPTABILITY

WGS is gaining global acceptability being recommended by WHO

WGS for Complete Profiling of TB

A comprehensive drug sensitivity test for tuberculosis covering 18 antibiotics.

WGS



Highlights



DST: DST results for 18 antibiotics



Accuracy: Sensitivity: 99.8%; Specificity: 85–98%



TAT: 15–21 days



Validation: Tested and validated on >10,000 genomes and >300 clinical samples



Microbial identification: Strain level identification of TB



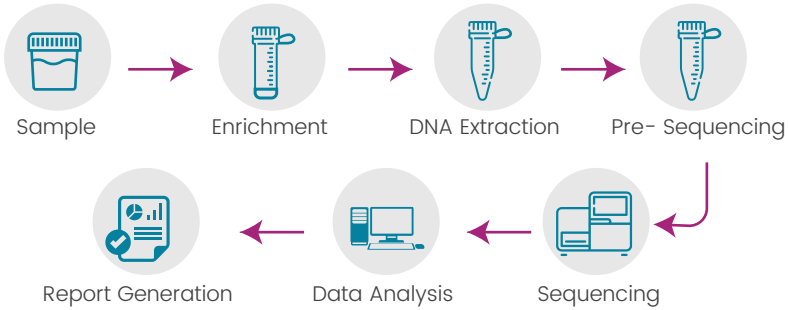
Affordable: Comparable or lower testing costs



One-test: Single test to identify treatment

WGS: Whole genome sequencing, TB: Tuberculosis, DST: Drug sensitivity testing, DR: Drug resistance World Health Organization. The use of next-generation sequencing technologies for the detection of mutations associated with drug resistance in *Mycobacterium tuberculosis* complex. Technical guide. 2018. Coll F, Phelan J, Hill-Cawthorne GA, et al. Genome-wide analysis of multi- and extensively drug-resistant *Mycobacterium tuberculosis*. *Nat Genet.* 2018;50(2):307–316.

WGS Process



Why WGS for TB ?



- Comprehensive genomic analysis
- More than identification of drug resistance
- Recognized & recommended by authorities
- Useful for drugs such as PZA, DLM, BDQ
- Correlates with phenotypic susceptibility

WGS: Whole genome sequencing, TB: Tuberculosis, PZA: Pyrazinamide, DLM: Delamanid, BDQ: Bedaquiline
 World Health Organization. The use of next-generation sequencing technologies for the detection of mutations associated with drug resistance in *Mycobacterium tuberculosis* complex: Technical guide. 2018.
 National TB Elimination Program, Ministry of Health and Family Welfare. Guidelines on Programmatic Management of Drug Resistant TB (PMDT) in India. 2021. Coll F, Phelan J, Hill-Cawthorne GA, et al. Genome-wide analysis of multi- and extensively drug-resistant *Mycobacterium tuberculosis*. *Nat Genet.* 2018;50(2):307–316.

“ Early detection of TB and its drug resistance profiling can help reduce incidence and treat patients effectively. ”

Comparing WGS with Current Day Testing

Analysis	Antibiotic Coverage	TAT	Other Information
WGS	18 antibiotics	15–21 days*	Strain information, Mixed information, Co-infection
Culture DST	13–15 antibiotics	3–6 weeks	
CBNAAT	1–2 antibiotics	4 hours	
LPA	Targeted for 1st & 2nd line	1–2 days	

*for smear positive samples

Report Illustration

SAMPLE SUMMARY

Sample ID **1** | Test ID **OmegaTB** | Patient ID **MRN-XXXX** | Client **XXX** | Registered **19-02-2022** | Reported **17-03-2022**

CLINICAL SUMMARY

Mycobacterium tuberculosis detected : **Detected** | Lineage : **Beijing** | Genomic DST profile : **MDR-TB** | Coverage : **214.41** | Proportion of genome covered : **1.00**

DRUG RESISTANCE PROFILE

First Line		Group A		Group B		Group C	
Drug	Interpretation	Drug	Interpretation	Drug	Interpretation	Drug	Interpretation
Isoniazid (INH)	Resistant*	Ofloxacin (OFX)	Sensitive**	Clofazimine (CLO)	Sensitive**	Streptomycin (SM)	Resistant*
Rifampicin (RMP)	Resistant*	Moxifloxacin (MOX)	Sensitive**			Pyrazinamide (PZA)	Resistant*
Ethambutol (EMB)	Resistant*	Gatifloxacin (GAT)	Sensitive**			Amikacin (AMK)	Sensitive**
		Linezolid (LZD)	Sensitive**			Delamanid (DMD)	Sensitive**
		Bedaquiline (BDQ)	Sensitive**				

MUTATION TABLE

Position	Ref Allele	Alternate Allele	Type	Prequency	Coverage	Substitution	Gene Symbol	Gene Name	Drug	PMID	High Confidence SNP
761155	C	T	SNP	40.99	161	Ser450Leu (tcg/tTg)	Rv0667	rpoB	RMP	21300839	yes
781687	A	G	SNP	37.01	281	Lys43Arg (aag/aGg)	Rv0682	rpsL	SM	22646308	yes
2155168	C	G	SNP	45.37	227	Ser315Thr (agc/aCc)	Rv1908c	katG	INH	8878604	yes

GENOME SEQUENCING SUMMARY

Library type **150x2 paired end** | Library Date **12.03.2022** | Library QC **Pass** | Genome Sequencer **Illumina NextSeq** | Run Date **14.03.2022** | Machine/ Flow cell ID **NB501457-HL27LAFX3**

Application **OmegaTB v2.0.1** | Application Run By **HAPL** | QC Check **Pass**

Test Ordering Information

Test Code	Test Name	Technique	Specimen Type	Interim Report	TAT	Special Introductory Price
TBWGS	Mycobacterium Tuberculosis Genome Sequencing (MTB-GS)	TB WGS only (TB Culture Positive)	Positive culture	NA	15-21 Days	6500/-
MTBCGS	Mycobacterium Tuberculosis Culture -Reflex Genome Sequencing (MTB-CGS)	TB Culture + Reflex TB WGS	Clinical Specimen/ Positive culture	Yes; Interim report in 14 days		7000/-
MTBXGS	Mycobacterium Tuberculosis Xpert Genome Sequencing (MTB-XGS)	GeneXpert+TB Culture+TB WGS		Yes; Interim report in 36 hrs		8000/-
MTBGSS	Mycobacterium Tuberculosis Genome Sequencing & AFB Smear (MTB-GSS)	AFB Smear+ TB Culture+TB WGS		8200/-		
MTBXGSS	Mycobacterium Tuberculosis Comprehensive panel (MTB-XGSS)	AFB Smear+ GeneXpert+ TB Culture+ TB WGS		8200/-		

Name of Salesperson: Contact: