DeepChek® Assays for Carrying Out Research About HIV Drug Resistance
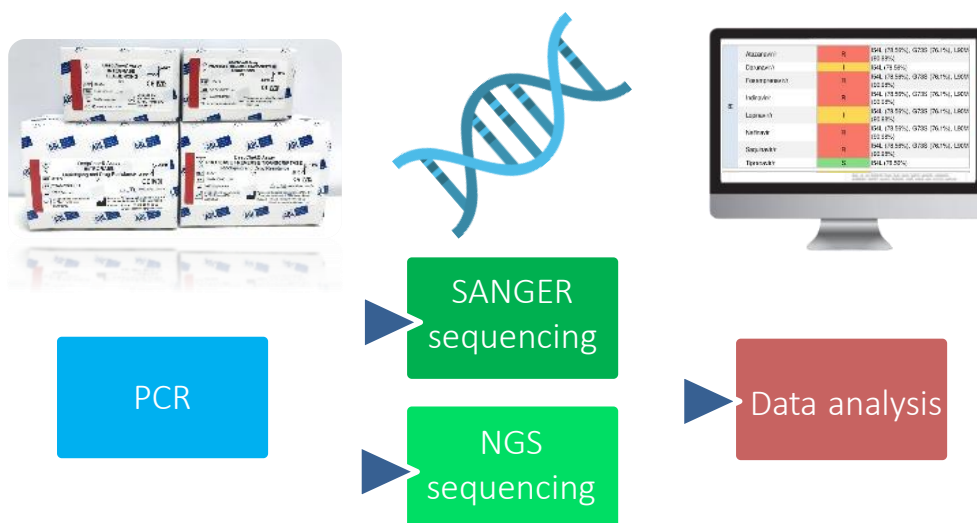
An array of Research Use Only (RUO) assays for use on sequencing platforms, next generation sequencing (NGS) and Sanger

PCR → SANGER sequencing / NGS sequencing → Data analysis

Research support | Laboratory efficiency | Cost effectiveness

ROBUST
Pool different RUO applications in the same NGS run

FLEXIBLE
For low to high throughput
1-384 samples in one run

FAST
~1-2 days (SANGER)
~2-4 days (NGS)

OPEN
Compatible with GLP sequencing reagents and instruments
(Sanger and NGS)

COMPREHENSIVE
Genotyping, Drug Resistance, Tropism, Reporting, Storage…

SECURED DATA ANALYSIS
Healthcare Cloud Access, Local installation

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http://www.abldx.com

DeepChek® HIV-1 Assays
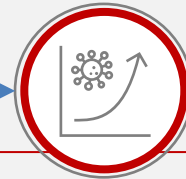# WORKFLOW OVERVIEW

Sample Preparation

- Sample collection
- RNA or proviral DNA extraction
- Lab self-validate

PCR

- Whole genome
- RT/PR
- INT
- V3 Loop
- DeepChek® HIV assays (RUO)

SANGER sequencing

- Purification
- Sequencing
- DeepChek® SANGER Sequencing Reaction (RUO)

NGS sequencing

- Library preparation reagents
- Indexes (24/48/96/384)
- DeepChek® NGS Library Preparation (RUO)

Sequencing (General Laboratory Products)

SANGER data analysis

- Analysis
- Reporting
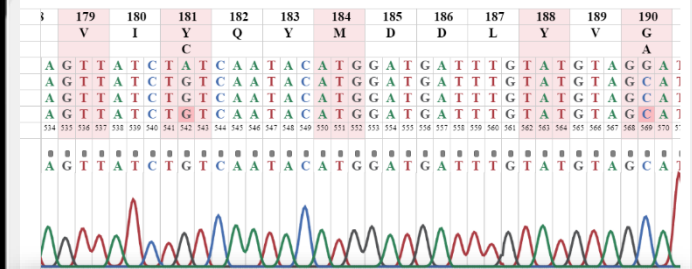- ViroScore® - HIV Software (RUO)

NGS data analysis

- Analysis
- Reporting
- DeepChek® - HIV Software (RUO)

ABL AdvancedDx Biological Laboratories

SANGER

ViroScore®

RUO

NGS

DeepChek®

RUO

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REDUCE SIGNIFICANTLY NGS RELATED COSTS AND TURNAROUND TIME WHEN USING THE DEEPCHEK® TECHNOLOGY

- The DeepChek® assays & software can be used through NGS on a large variety of research applications simultaneously, providing high efficiency
    - Optimize NGS sequencing costs
    - Optimize turnaround time
    - Bring NGS capacity to any lab settings

- Adapt and customize your NGS panel/run to your research plans

Example of a weekly NGS RUO run on 24 samples
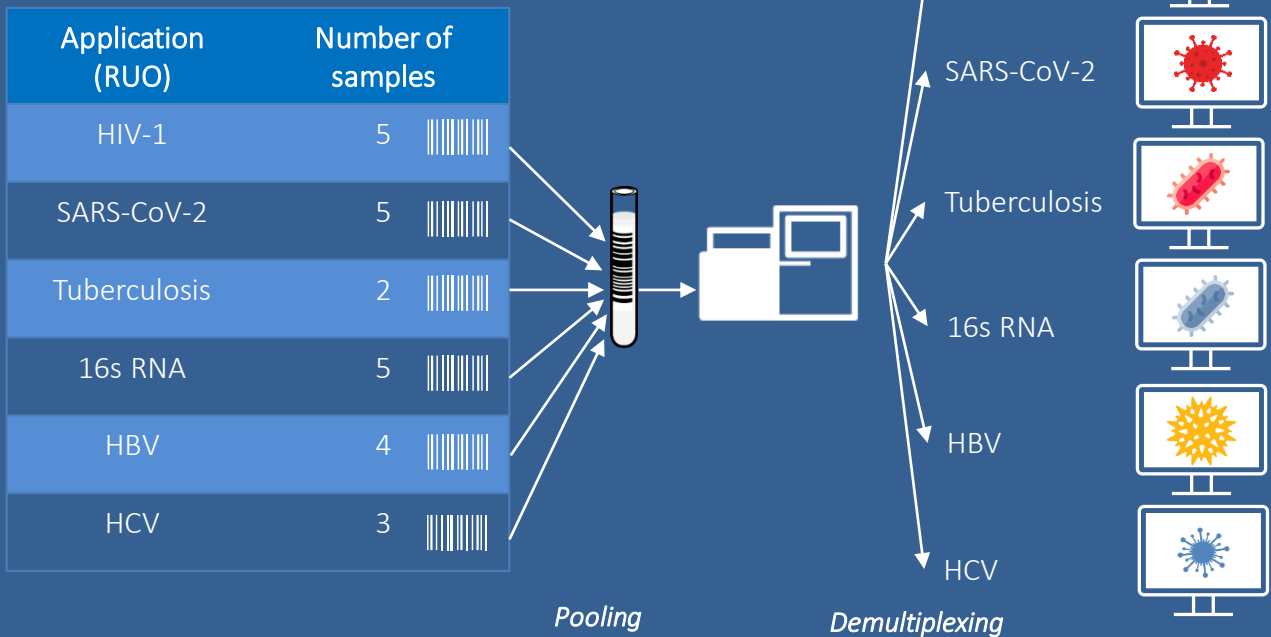
Application (RUO)	Number of samples	
HIV-1	5	
SARS-CoV-2	5	
Tuberculosis	2	
16s RNA	5	
HBV	4	
HCV	3	

Pooling

Demultiplexing

HIV-1
SARS-CoV-2
Tuberculosis
16s RNA
HBV
HCV

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DeepChek® Assay Whole Genome HIV-1 Genotyping (RUO)

- *Access to a comprehensive Next Generation Sequencing (NGS) kit for HIV Whole Genome genotyping.*

- *DeepChek® Assay Whole Genome HIV-1 Genotyping has been developed for use with the leading next generation sequencing (NGS) platforms and includes optimized multiplex PCR master mixes with primers to amplify RNA and proviral DNA inputs with manual or automated library preparations.*

- Ability to screen genomic variations in all HIV-1 genome genes targeted by current and under development HIV-1 inhibitors, including **new entry & capside inhibitors.**

- Number of amplicons: 5x ~700 to 3500 bp obtained from same thermal cycling program in five (5) distinct wells.

- Coverage : ~ 9600 bp.

- Inclusivity: excellent coverage of all representative HIV-1 subtypes from M group strains.

- Cross-reactivity: The assay reacted (i.e., good agarose gel band) for some of the tested microorganisms commonly found in infectious diseases specimens. After NGS and data analysis, no reads mapped with HIV-1.

- Compatible with magnetic-beads RNA/DNA isolation instruments and reagents, and with any PCR thermal cycler with ramp rate of ≥ 1°C/s, and leading NGS instruments and reagents equivalent to Illumina SBS chemistry.

- Shall be compatible with run of 48 / 96 and 384 samples to reach assay cut-off - minimal median total coverage of 1000 reads for the amplicons and a Phred Quality Score Q30>80% (or equivalent)).

- The sequencing outputs can be analyzed with specific downstream sequencing analysis software (e.g. DeepChek® Software) to reduce laboratory staff burden and to alleviate the need for specialized bioinformatics expertise or on the contrary with using generic bioinformatics software and tools for more advanced research teams.
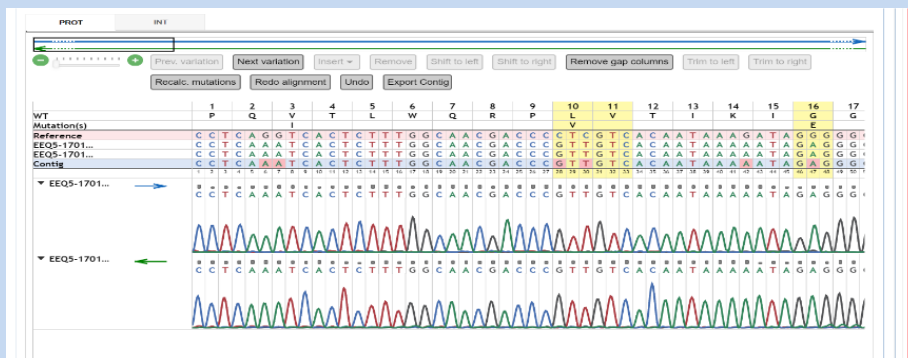

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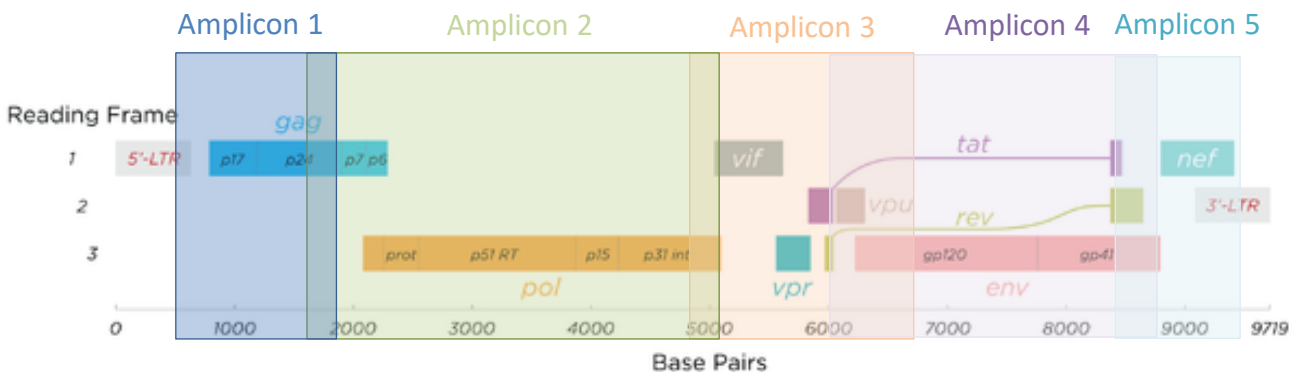
HIV-1 genes associated with antiviral resistance when using the DeepChek® Assay Whole Genome HIV-1 Genotyping (RUO)

Anti-HIV drug class	HIV-1 gene target	Related drugs	Assay fragment #
Capsid inhibitors	*gag*	lenacapavir	1
Nucleoside reverse transcriptase inhibitors (NRTIs)	*reverse transcriptase*	zidovudine, lamivudine, emtricitabine,abacavir, tenofovir disoproxil fumarate, tenofovir alafenamide , islatravir, didanosine and stavudine	2
Non-nucleoside reverse transcriptase inhibitors (NNRTIs)	*reverse transcriptase*	efavirenz, nevirapine, etravirine, rilpivirine and doravirine	2
Protease inhibitors (PIs)	*protease*	lopinavir, atazanavir, darunavir, ritonavir, indinavir, saquinavir, nelfinavir, fosamprenavir and tipranavir	2
Integrase inhibitors (IIs)	*integrase*	raltegravir, elvitegravir, dolutegravir, cabotegravir, bictegravir	2
n.a	*vif, vpr, vpu (accessory proteins)*	enfuvirtide	3
Fusion inhibitors	*gp41*	Fostemsavir	4
Post-attachment inhibitors	*gp120*	n.a	4
n.a	*nef (accessory protein)*	n.a	5

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Advanced IT research tools for new disease discovery

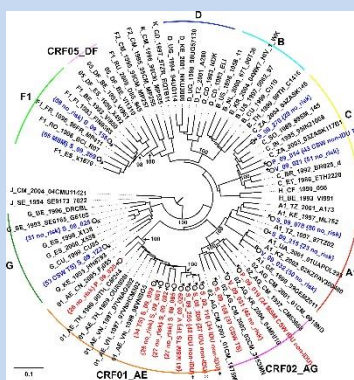**EMBEDDED CHROMATOGRAM EDITOR (RUO)**

SINGLE or CUMULATIVE GENOTYPING (RUO)

SUBTYPING & DRUG RESISTANCE ASSESSMENT (RUO)

Public knowledge databases

- HIVDB/STANFORD 🇺🇸
- ANRS 🇫🇷
- REGA 🇧🇪
- GENO2PHENO 🇩🇪
- HIV-GRADE 🇩🇪
- RIS 🇪🇸
- RENAGENO 🇧🇷

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PCR (RUO)

DeepChek® Assays (RUO)

WHOLE GENOME HIV-1 Genotyping (24 tests)	170B24
PROTEASE / REVERSE TRANSCRIPTASE Genotyping and Drug Resistance (24 or 96 tests)	101B24|96
INTEGRASE Genotyping and Drug Resistance (24 or 96 tests)	102C24|96
V3 LOOP / TROPISM (24 tests)	103A24
GP41/GP120 Genotyping and Drug Resistance (24 tests)	194A24
GAG Genotyping and Drug Resistance (24 tests)	195A24
REVERSE TRANSCRIPTASE SIMPLEX Genotyping and Drug Resistance (24 tests)	197A24
HIV-1 Full PR/RT/INT Drug Resistance (24 tests)	198BA24

NGS SEQUENCING (RUO)

DeepChek® NGS Library Preparation

▪ 24 indexes	116B24+124B24
▪ 48 indexes	116B48+124B48
▪ 96 indexes	116B96+124B96
▪ 384 indexes	116B384+124B384
DeepChek® NGS Clean-up beads	N411-02

SANGER SEQUENCING (RUO)

DeepChek® SANGER Sequencing Reaction (24 rx)	123A24
DeepChek® SANGER Sequencing Reaction (48 rx)	123A48
DeepChek® 96x0.2 mL wells plate	B70501-1
Opti-Seal Optical Sealing Sheet	157300

DATA ANALYSIS (RUO)

DeepChek® - HIV Software (RUO)	S-12-023 (HL | HM)
ViroScore® - HIV Software (RUO)	S-09-014
DeepChek Whole Genome HIV-1 (RUO)	S-22-056 (WHL | WHM)

ABL AdvancedDx Biological Laboratories

Advanced Biological Laboratories (ABL) S.A.
52-54 avenue du X Septembre, Luxembourg,
Luxembourg

AdvancedDx Biological Laboratories USA Inc.

5-7 Perry Way, Unit 15
Newburyport MA 01950
USA

sales@abldx.com
http://www.abldx.com