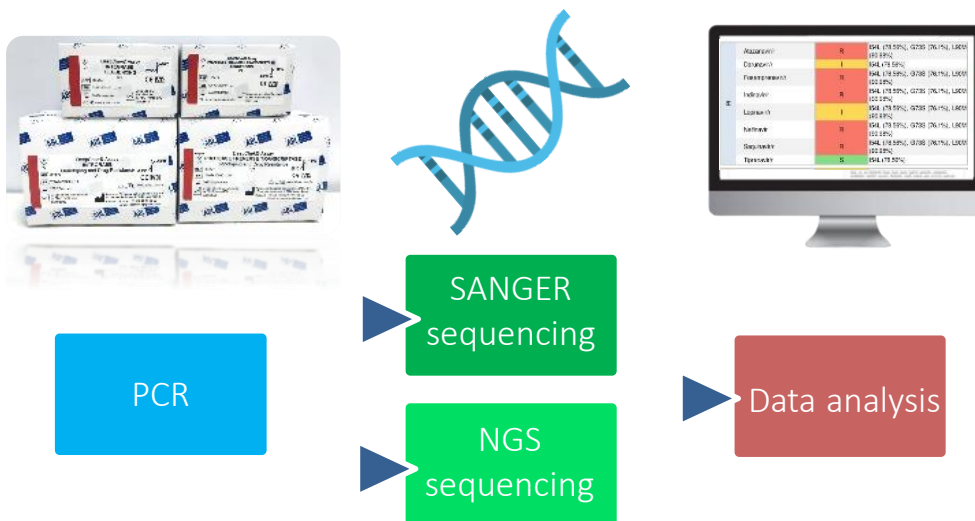




DeepChek[®] HIV

A unique and complete RUO portfolio for HIV genotyping through SANGER & Next Generation (NGS) sequencing



ROBUST
Pool different 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)

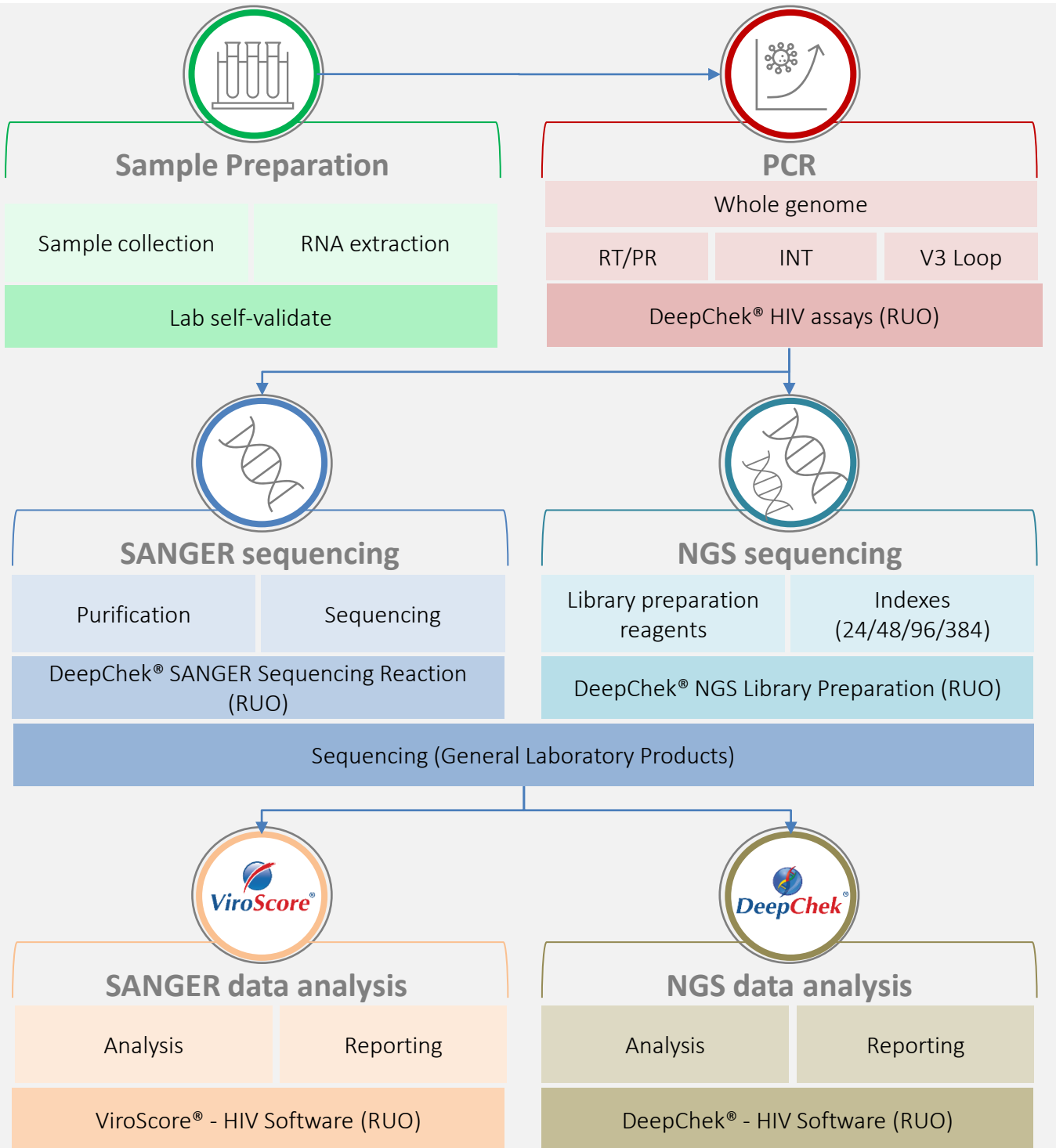
OPEN
Compatible with GLP sequencing reagents and instruments (Sanger and NGS)

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

SECURED
Healthcare Cloud Access, Local installation

Research Use Only – not for use in diagnostic procedures

DeepChek® HIV WORKFLOW OVERVIEW

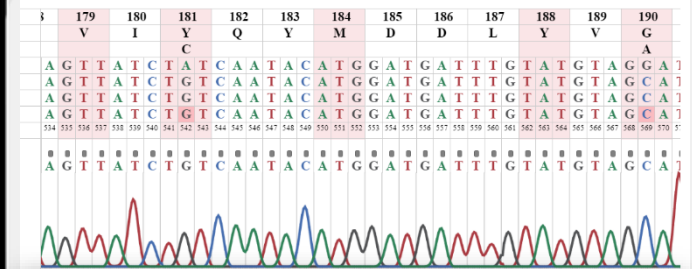


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SANGER



RUO



Subtype:

Reverse transcriptase B (100% similarity) Protease B (97% similarity) Integrase B (100% similarity) GP41 B (100% similarity) GP120/V3 Loop B (check for 46_BF) (45% similarity)

All Mutations Detected (PKB2 reference Sequence) Resistance mutations in bold based on Stanford v7.0.1 (mutation score ≠ 0)

Reverse transcriptase T275, T39A, K43E, K49R, **K101E**, I142V, **I181C**, **G190A**, G196E, **L210W**, L214F, **T215Y**, V245K, P272A, R277K, I293V

Protease V81 L10I, S37N, **I54V**, L63P, H69R, A71V, **G73S**, **I84V**, **L90M**

Integrase K111R, S119G, T122I, G123S, A124T, T125A, R127K, N232D, R284G

GP41 D78N, I729K, P213S, V311E, R324R/K, N301N/K/R/S, T303K/I, R304R/K/Q, K305R/K, del306, R306R/Q/K, del307, Q310H, R311I, V318Y, T319A, I320A/T, G321D/E/G, S213N/K/NM/E/D/N/V, K322I, I323E/V/M/K, N325D/N, M326I, Q328K, H330Y

GP120/V3 Loop

Topism

XI Virus (The I1725 rule would predict this sequence as an XI-Virus.)

Class	Drug	ANRS 25 2015-09	SIZAV 7.0.1 27/02/2014	Z-Score	Interpretation	FPR
NRTI	Zidovudine	R	R	L210W, T215Y	5.137	Resistant
	Didanosine	S	I	L210W, T215Y	1.713	Intermediate
NRTI	Stavudine	R	R	L210W, T215Y	4.383	Resistant
	Lamivudine	S	S	L210W, T215Y	1.467	Sensible (2)
	Emtricitabine	S	S	L210W, T215Y	1.467	Sensible (2)
			I	L210W, T215Y	3.849	Resistant
			I	L210W, T215Y	3.658	Resistant
NRTI		R	R	K305E, Y181C, G190A	5.915	Resistant
		R	R	K305E, Y181C, G190A	4.136	Resistant
		R	R	K305E, Y181C, G190A	Not available	Resistant (3)
		R	R	K305E, Y181C, G190A	Not available	Resistant (3)
NRTI		R	R	I54V, G73S, I84V, L90M	11.065	Resistant
		R	R	I54V, G73S, I84V, L90M	14.423	Resistant

SUBTYPING		COVERED POSITIONS	
PROT	B (94.95%)	RT	B (95.83%)
INT	B (95.53%)	PROT	1-99
		INT	32-289

(DT, PROT, INT) Subtype B **CR05** was used as the reference sequence for the alignment (using BWA v0.7.15 alignment tool). Subtyping determination performed using homology testing of a 20% consensus sequence generated from all the reads mapped to the particular region and compared to an updated set of reference sequences.

DEEPCHEK® HIV (Stanford 8.8)			
Generic name	Assessment	Resistance mutations >20.00%	Resistance mutations between >3% and <20.00%
PI	Alazanavir/r	R	I54L (78.56%), G73S (76.1%), L90M (90.98%)
	Darunavir/r	I	I54L (78.56%)
	Fosamprenavir/r	R	I54L (78.56%), G73S (76.1%), L90M (90.98%)
	Indinavir/r	R	I54L (78.56%), G73S (76.1%), L90M (90.98%)
	Lopinavir/r	I	I54L (78.56%), G73S (76.1%), L90M (90.98%)
	Nelfinavir	R	I54L (78.56%), G73S (76.1%), L90M (90.98%)
	Saquinavir/r	R	I54L (78.56%), G73S (76.1%), L90M (90.98%)
	Tipranavir/r	S	I54L (78.56%)
NRTI	Abacavir	I	D67N (96.96%), M184V (99.35%)
	Didanosine	I	D67N (96.96%), M184V (99.35%)
	Emtricitabine	R	M184V (99.35%)
	Lamivudine	R	M184V (99.35%)
	Stavudine	S	D67N (96.96%), M184V (99.35%)
	Tenofovir	S	D67N (96.96%), M184V (99.35%)
Zidovudine	S	D67N (96.96%), M184V (99.35%)	
NNRTI	Doravirine	S	
	Etavirenz	S	
	Etravirine	S	
	Nevirapine	S	
	Rilpivirine	S	
INI	Bictegravir	I	G140S (99.66%), Q148H (99.33%)
	Dolutegravir	I	G140S (99.66%), Q148H (99.33%)
	Elvitegravir	R	G140S (99.66%), Q148H (99.33%)
	Raltegravir	R	G140S (99.66%), Q148H (99.33%)

S Susceptible (S) Potential low-level resistance (PLLR) I Low-level resistance (LLR) Intermediate resistant (IR) R High-level resistance (HLR)

NGS

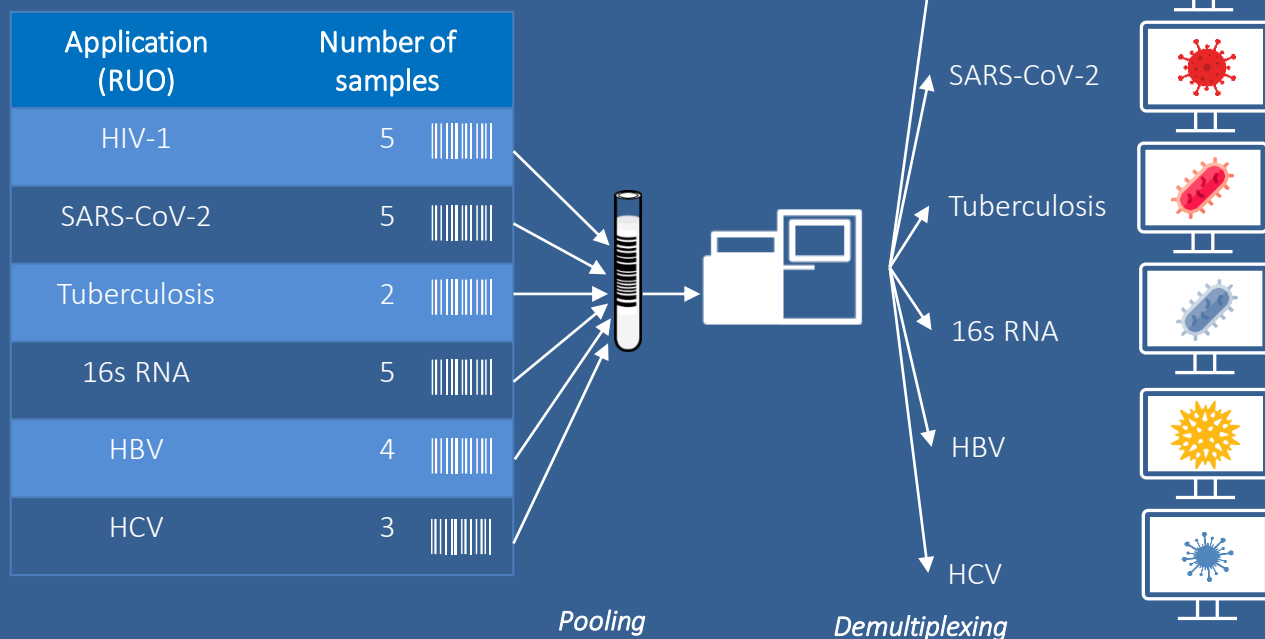
RUO

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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



Research Use Only – not for use in diagnostic procedures

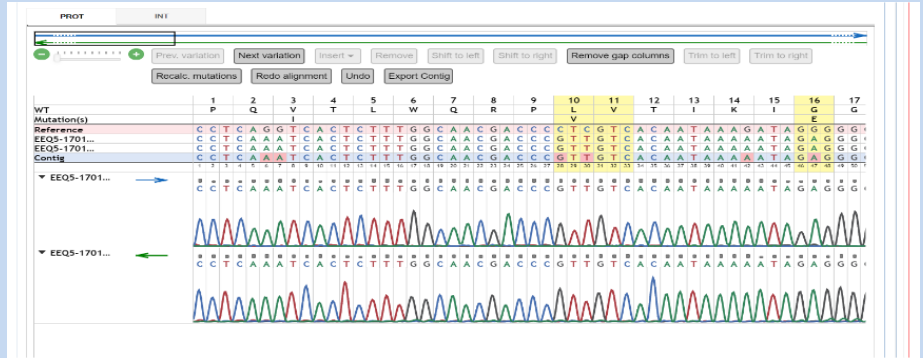
HIV-1 genes associated with antiviral resistance when using the DeepChek® Assay

Whole Genome HIV-1 Genotyping (RUO)

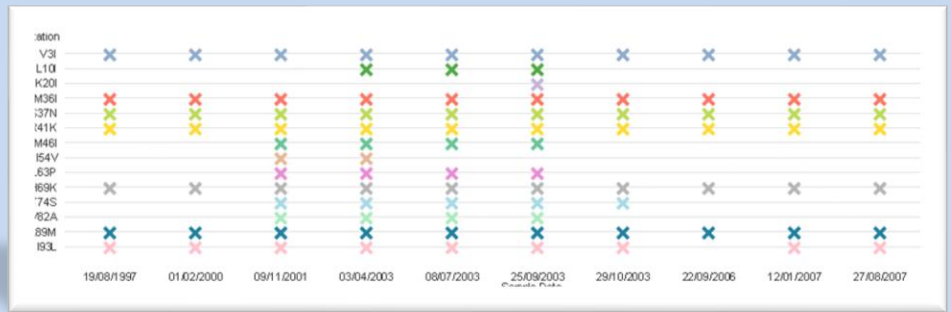
Anti-HIV drug class	HIV-1 gene target	Related drugs	Assay fragment #
Capsid inhibitors	<i>gag</i>	lenacapavir	1
Nucleoside reverse transcriptase inhibitors (NRTIs)	<i>reverse transcriptase</i>	zidovudine, lamivudine, emtricitabine, abacavir, tenofovir disoproxil fumarate, tenofovir alafenamide, islatravir,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

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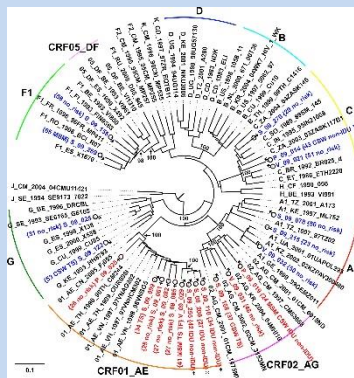
EMBEDDED
CHROMATOGRAM
EDITOR (RUO)



SINGLE or
CUMULATIVE
GENOTYPING (RUO)









SUBTYPING &
DRUG RESISTANCE
ASSESSMENT (RUO)



Drug	ANRS 31 12-2020	STAN 9.0 03-2021
Zidovudine	R	R
Didanosine	Not available	R
Stavudine	Not available	R
Lamivudine	S	S
Emtricitabine	S	S
Abacavir	R	I
Tenofovir	R	I

Algorithm	Sanger based sequencing				
	15.00%	10.00%	5.00%	3.00%	
Abacavir	ANRS	I	I	I	I
	Grade	I	I	I	I
	Rega Institute	S	S	S	S
Didanosine	ANRS	NA	NA	NA	NA
	Grade	I	I	I	I
	Rega Institute	S	S	S	S
Emtricitabine	ANRS	R	R	R	R
	Grade	R	R	R	R
	Rega Institute	R	R	R	R

Public knowledge databases

- HIVDB/STANFORD 
- ANRS 
- REGA 
- GENO2PHENO 
- HIV-GRADE 
- RIS 
- RENAGENO 

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Product References



PCR (RUO)

DeepChek® Assays (RUO)

PROTEASE / REVERSE TRANSCRIPTASE Genotyping and Drug Resistance (24 or 96 tests)	101B24 96
INTEGRASE Genotyping and Drug Resistance (24 or 96 tests)	102C24 96
Whole Genome HIV-1 Genotyping V1.x (24 tests) (RUO)	170A24
V3 LOOP / TROPISM (24 tests)	103A24

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

NGS SEQUENCING (RUO)

DeepChek® NGS Library Preparation	
▪ 24 indexes	116B24+124B24
▪ 48 indexes	116B48+124B48
▪ 96 indexes	116B96+124B96
▪ 384 indexes	116B384+124B384
DeepEqualizer Solution	166A96
DeepChek® NGS Clean-up beads	N411-02
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)



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