Drug resistance interpretation: PR

HIVDB 9.5.1 (2023-11-05)

PI Major Mutations:	None
PI Accessory Mutations:	None
PR Other Mutations:	I13V 99% cov=3,918 • L33V 100% cov=5,204 • P39S 99% cov=4,959 • R41K 99% cov=5,018 • I62V 100% cov=3,937 • L63P 100% cov=3,927 • H69Y 100% cov=3,944 • I72T 99% cov=3,894

Protease Inhibitors	
atazanavir/r (ATV/r)	Susceptible
darunavir/r (DRV/r)	Susceptible
fosamprenavir/r (FPV/r)	Susceptible
indinavir/r (IDV/r)	Susceptible
lopinavir/r (LPV/r)	Susceptible
nelfinavir (NFV)	Susceptible
saquinavir/r (SQV/r)	Susceptible
tipranavir/r (TPV/r)	Susceptible

PR comments

Other

- **L33I/V** are minimally polymorphic mutations that do not appear to be selected by PIs or to reduce their susceptibility.

Mutation scoring: PR

HIVDB 9.5.1 (2023-11-05)

No drug resistance mutations were found for PI.

Drug resistance interpretation: RT

HIVDB 9.5.1 (2023-11-05)

NRTI Mutations:	**K70KR** K: 58%, R: 42% cov=1,696 • **M184V** 97% cov=2,168
NNRTI Mutations:	**G190AV** A: 74%, V: 26% cov=2,305
RT Other Mutations:	V35T 99% cov=2,070 • K43R 100% cov=1,873 • K49R 100% cov=1,870 • V60I 100% cov=1,862 • V118C 98% cov=1,509 • K122E 99% cov=1,441 • D123S 99% cov=1,441 • D177E 100% cov=2,126 • I178M 100% cov=2,126 • V179I 99% cov=2,120 • T200A 99% cov=2,413 • I202V 100% cov=2,472 • E204D 99% cov=2,188 • Q207E 100% cov=2,188 • R211K 100% cov=2,785 • V245T 100% cov=667 • D250E 99% cov=461 • K512R 100% cov=50 • S519N 99% cov=71 • Q524E 100% cov=85 • E529D 100% cov=96 • A534S 99% cov=104 • A554N 100% cov=187 • V559I 100% cov=213

Nucleoside Reverse Transcriptase Inhibitors	
abacavir (ABC)	Low-Level Resistance
zidovudine (AZT)	Low-Level Resistance
stavudine (D4T)	Susceptible
didanosine (DDI)	Low-Level Resistance
emtricitabine (FTC)	High-Level Resistance
lamivudine (3TC)	High-Level Resistance
tenofovir (TDF)	Susceptible

Non-nucleoside Reverse Transcriptase Inhibitors	
doravirine (DOR)	Potential Low-Level Resistance
efavirenz (EFV)	High-Level Resistance
etravirine (ETR)	Potential Low-Level Resistance
nevirapine (NVP)	High-Level Resistance
rilpivirine (RPV)	Low-Level Resistance

RT comments

NRTI

- **K70R** is a TAM that confers intermediate resistance to AZT and contributes to reduced ABC and TDF susceptibility in combination with other TAMs.
- **M184V/I** cause high-level in vitro resistance to 3TC and FTC and low/intermediate resistance to ABC (3-fold reduced susceptibility). **M184V/I** are not contraindications to continued treatment with 3TC or FTC because they increase susceptibility to AZT and TDF and are associated with clinically significant reductions in HIV-1 replication.

NNRTI

- **G190A** is a non-polymorphic mutation that causes high-level resistance to NVP and intermediate resistance to EFV. It does not significantly reduce susceptibility to RPV, ETR, or DOR.
- **G190C/T/V** are rare non-polymorphic mutations that confer high-level resistance to NVP and EFV. Their effects on ETR, RPV, and DOR susceptibility are not known.

Other

- **V179I** is a polymorphic mutation that is frequently selected in persons receiving ETR and RPV. However, it has little, if any, direct effect on NNRTI susceptibility.
- This virus is predicted to have low-level reduced susceptibility to **RPV**. The use of the combination of CAB/**RPV** should be considered to be relatively contraindicated.

Mutation scoring: RT

HIVDB 9.5.1 (2023-11-05)

Drug resistance mutation scores of NRTI: Download CSV

Rule	ABC	AZT	D4T	DDI	FTC	3TC	TDF
K70KR	5	30	15	10	0	0	5
M184V	15	-10	-10	10	60	60	-10
Total	20	20	5	20	60	60	-5

Drug resistance mutation scores of NNRTI: Download CSV

Rule	DOR	EFV	ETR	NVP	RPV
G190AV	10	60	10	60	15

Drug resistance interpretation: IN

HIVDB 9.5.1 (2023-11-05)

INSTI Major Mutations: E138K 99% cov=102 • G140A 100% cov=103 • S147G 100% cov=129 • Q148K 99% cov=129

INSTI Accessory Mutations: None

IN Other Mutations: S17N 100% cov=321 • M50L 100% cov=275 • I72IV V: 83%, I: 17% cov=227 • T112V 100% cov=73 • I113V 100% cov=73 • T124S 100% cov=75 • T125A 100% cov=75 • V201I 100% cov=331 • T218I 99% cov=301 • L234I 99% cov=345 • K240R 100% cov=348 • D256E 100% cov=419 • S283G 100% cov=333

Integrase Strand Transfer Inhibitors	
bictegravir (BIC)	High-Level Resistance
cabotegravir (CAB)	High-Level Resistance
dolutegravir (DTG)	High-Level Resistance
elvitegravir (EVG)	High-Level Resistance
raltegravir (RAL)	High-Level Resistance

IN comments

Major

- **E138K/A/T** are common nonpolymorphic accessory resistance mutations selected in patients receiving RAL, EVG, CAB, and DTG. Alone they do not reduce INSTI susceptibility. However, they contribute to reduced susceptibility in combination with other mutations particularly those at position 148.
- **G140S/A/C** are non-polymorphic mutations that usually occur with Q148 mutations. Alone, they have minimal effects on INSTI susceptibility. However, in combination with Q148 mutations they are associated with high-level resistance to RAL and EVG and intermediate reductions in DTG and BIC susceptibility.
- **S147G** is a nonpolymorphic mutation selected in patients receiving RAL, EVG, and DTG. Alone it reduces EVG susceptibility about 5-fold.
- **Q148H/K/R** are nonpolymorphic mutations reported in persons receiving RAL, EVG, CAB, and DTG. They nearly always occur in combination with G140A/S or E138K. In this setting they are associated with near complete resistance to RAL and EVG, high-levels of reduction in CAB susceptibility, and low-to-intermediate reductions in DTG and BIC susceptibility.

- There is evidence for high-level **DTG** resistance. If **DTG** is used, it should be administered twice daily.

Mutation scoring: IN HIVDB 9.5.1 (2023-11-05)

Drug resistance mutation scores of INSTI: Download CSV

Rule	BIC	CAB	DTG	EVG	RAL
E138K	10	10	10	15	15
E138K + G140A	10	15	10	15	15
E138K + Q148K	10	20	10	0	0
G140A	10	10	10	30	30
G140A + Q148K	10	20	10	0	0
S147G	10	10	10	60	10
S147G + Q148K	15	20	15	0	0
Q148K	30	50	30	60	60
Total	105	155	105	180	130