Drug resistance interpretation: PR

HIVDB 9.5.1 (2023-11-05)

PI Major Mutations: None
PI Accessory Mutations: None
PR Other Mutations: I13V 98% cov=40,322 • G16E 94% cov=41,153 • K20I 88% cov=41,255 • E35N 90% cov=47,849 • M36I 98% cov=47,843 • R41K 92% cov=48,840 • I64IM I: 77%, M: 21% cov=42,865 • H69K 95% cov=39,984 • V77I 91% cov=31,258 • L89M 97% cov=26,836

Protease Inhibitors	
atazanavir/r (ATV/r)	Susceptible
darunavir/r (DRV/r)	Susceptible
lopinavir/r (LPV/r)	Susceptible

PR comments

Other

- **K20I** is the consensus amino acid in subtype G and CRF02_AG. In subtypes B and C, **K20I** is a PI-selected mutation of uncertain effects on currently used PIs.

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: K65R 93% cov=14,416 • S68SGN S: 55%, G: 30%, N: 10% cov=13,344 • L74LI I: 77%, L: 20% cov=12,448 • M184V 97% cov=15,040
NNRTI Mutations: L100I 92% cov=10,463 • K103N 96% cov=10,580
RT Other Mutations: V35T 92% cov=18,041 • E36D 92% cov=18,051 • T39K 93% cov=18,068 • K49R 93% cov=16,966 • V60I 98% cov=15,527 • K122E 99% cov=11,348 • D123S 91% cov=10,986 • I135T 96% cov=13,482 • Y144F 93% cov=15,014 • K173L 93% cov=14,514 • Q174K 90% cov=14,517 • D177E 95% cov=25,090 • V179I 95% cov=15,049 • G196E 93% cov=25,076 • T200A 96% cov=15,648 • I202IV V: 51%, I: 48% cov=16,083 • Q207A 95% cov=14,536 • V245Q 95% cov=22,890 • T286A 97% cov=29,429 • E291D 95% cov=29,966 • V292I 94% cov=29,999 • I293V 98% cov=30,000 • E297A 92% cov=52,148 • K311R 86% cov=31,527

Nucleoside Reverse Transcriptase Inhibitors	
abacavir (ABC)	High-Level Resistance
zidovudine (AZT)	Susceptible
emtricitabine (FTC)	High-Level Resistance
lamivudine (3TC)	High-Level Resistance
tenofovir (TDF)	Intermediate Resistance

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

RT comments

NRTI

- **K65R** confers intermediate reductions in susceptibility to TDF, ABC, and 3TC/FTC. It increases AZT susceptibility. In NRTI-experienced, INSTI-naive patients with **K65R**, TDF+3TC+DTG is usually highly effective and more effective than AZT/3TC/DTG. However, in patients receiving TDF+3TC+DTG, there is a risk of emergent DTG resistance that does not arise in NRTI-naive patients receiving TDF+3TC+DTG.
- **S68G** is a polymorphic mutation that is often selected in combination with K65R. It partially restores the replication defect associated with K65R.
- L74V causes intermediate ABC resistance. **L74I** causes low-level ABC resistance.
- **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

- **L100I** is a non-polymorphic mutation that usually occurs in combination with K103N. In this setting it confers high-level resistance to NVP, EFV, and RPV and intermediate resistance to ETR and DOR.
- **K103N** is a non-polymorphic mutation that confers high-level reductions in NVP and EFV susceptibility. It is the most commonly transmitted DRM.

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.

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

Drug resistance mutation scores of NRTI: Download CSV

Rule	ABC	AZT	FTC	3TC	TDF
K65R	45	-10	30	30	50
L74LI	15	0	0	0	5
M184V	15	-10	60	60	-10
K65R + S68SGN	0	0	0	0	5
Total	75	-20	90	90	50

Drug resistance mutation scores of NNRTI: Download CSV

Rule	DOR	EFV	ETR	NVP	RPV
L100I	15	60	30	60	60
L100I + K103N	15	0	0	0	0
K103N	0	60	0	60	0
Total	30	120	30	120	60

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=17,700 • K20R 95% cov=19,103 • M36I 98% cov=19,185 • R41K 99% cov=19,339 • H69K 94% cov=15,244 • L89I 95% cov=10,421

Protease Inhibitors	
atazanavir/r (ATV/r)	Susceptible
darunavir/r (DRV/r)	Susceptible
lopinavir/r (LPV/r)	Susceptible

PR comments

Other

- **K20R** is a highly polymorphic PI-selected accessory mutation that increases replication fitness in viruses with PI-resistance mutations.

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: M184V 98% cov=8,860
NNRTI Mutations: K101E 97% cov=7,005 • G190A 97% cov=8,302
RT Other Mutations: P4S 95% cov=9,927 • V35I 96% cov=8,395 • T39TI T:61%, I:36% cov=7,834 • E40D 95% cov=7,589 • V60I 98% cov=6,722 • K122E 98% cov=7,852 • I135R 96% cov=7,919 • S162C 97% cov=9,609 • D177E 99% cov=9,312 • I178M 97% cov=9,308 • T200R 95% cov=7,456 • Q207E 96% cov=5,800 • R211K 96% cov=5,855 • V245E 95% cov=6,058 • D250E 95% cov=6,077 • A272P 97% cov=6,794 • K275R 93% cov=6,696 • K281R 93% cov=6,321 • T286A 96% cov=5,895 • E291D 95% cov=5,679 • V292I 94% cov=5,683 • I293V 92% cov=5,681 • P294T 94% cov=5,683 • K311R 90% cov=5,511

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

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

RT comments

NRTI

- **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

- **K101E** is a non-polymorphic accessory mutation that confers intermediate resistance to NVP and RPV and low-level reductions in susceptibility to EFV, ETR, and DOR when it occurs with other NNRTI-resistance mutations.
- **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.

Mutation scoring: RT

HIVDB 9.5.1 (2023-11-05)

Drug resistance mutation scores of NRTI: Download CSV

Rule	ABC	AZT	FTC	3TC	TDF
M184V	15	-10	60	60	-10

Drug resistance mutation scores of NNRTI: Download CSV

Rule	DOR	EFV	ETR	NVP	RPV
K101E	15	15	15	30	45
K101E + G190A	5	0	5	0	0
G190A	0	45	10	60	15
Total	20	60	30	90	60