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=17,380 • E35D 92% cov=20,936 • M36I 98% cov=20,935 • R41K 99% cov=21,188 • K45R 89% cov=21,321 • D60DE E: 50%, D: 49% cov=18,045 • Q61QE Q: 41%, E: 40% cov=17,914 • H69K 95% cov=16,390 • L89M 90% cov=11,755

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

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:	**D67N** 90% cov=6,744 • **K70R** 93% cov=6,685 • **L74LI** I: 53%, L: 45% cov=6,701 • **M184V** 97% cov=12,720 • **T215TI** I: 50%, T: 46% cov=12,269 • **K219E** 95% cov=13,004
NNRTI Mutations:	**A98AG** G: 53%, A: 41% cov=6,677 • **K103N** 96% cov=6,888 • **V108I** 92% cov=6,658 • **P225HS** S: 51%, H: 43% cov=13,442 • **K238T** 93% cov=13,604
RT Other Mutations:	K20R 92% cov=6,779 • V35T 99% cov=8,766 • T39KN N: 52%, K: 43% cov=8,547 • V60VI V: 55%, I: 44% cov=7,735 • T69S 91% cov=6,760 • L109LI L: 60%, I: 35% cov=7,049 • K122E 98% cov=7,703 • D123N 94% cov=7,697 • K173S 99% cov=12,240 • V179I 94% cov=12,441 • T200A 98% cov=12,258 • I202V 95% cov=12,349 • Q207A 98% cov=11,019 • E248D 96% cov=15,580 • R284RK R: 54%, K: 38% cov=10,372 • T286A 98% cov=10,220 • E291D 93% cov=9,061 • V292VI V: 55%, I: 44% cov=9,058 • I293V 97% cov=8,804 • P294T 93% cov=8,611 • E312D 91% cov=7,535 • G335D 95% cov=146 • M357K 93% cov=160 • G359AS S: 63%, A: 32% cov=157 • A360T 94% cov=157 • K366R 95% cov=143 • T369A 99% cov=140 • A371V 96% cov=138 • I375V 93% cov=120 • A376V 92% cov=120 • T377L 92% cov=119

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

Non-nucleoside Reverse Transcriptase Inhibitors	
doravirine (DOR)	Intermediate 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

- **D67N** is a non-polymorphic TAM associated with low-level resistance to AZT.
- **K70R** is a TAM that confers intermediate resistance to AZT and contributes to reduced ABC and TDF susceptibility in combination with other TAMs.
- 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.
- T215Y/F are TAMs that causes intermediate/high-level resistance to AZT and potentially low-level resistance to ABC and TDF. **T215S/C/D/E/I/V/N/A/L** do not reduce NRTI susceptibility but arise from viruses that once contained T215Y/F. The presence of one of these revertant mutations suggests that the patient may have once been infected with a virus containing T215Y/F.
- **K219E/Q/N/R** are accessory TAMS that usually occur in combination with multiple other TAMs.

NNRTI

- **A98G** is a non-polymorphic accessory mutation associated with low-level reduced susceptibility to each of the NNRTIs.
- **K103N** is a non-polymorphic mutation that confers high-level reductions in NVP and EFV susceptibility. It is the most commonly transmitted DRM.
- **V108I** is a relatively non-polymorphic accessory mutation selected in vitro and/or in vivo with each of the NNRTIs. It appears to contribute to reduced susceptibility to most NNRTIs only in combination with other NNRTI-resistance mutations.
- **P225H** is a non-polymorphic EFV-selected mutation that usually occurs in combination with K103N. The combination of **P225H** and K103N synergistically reduces NVP, EFV and DOR susceptibility.
- **K238T/N** are uncommon non-polymorphic mutations selected in persons receiving NVP and EFV usually in combination with K103N. Alone, **K238T/N** appear to have minimal effects on NNRTI susceptibility.

Other

- **T69N/S/A/I/E** are relatively non-polymorphic mutations weakly selected in persons receiving NRTIs. They may minimally contribute reduced AZT susceptibility.
- **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.
- P225H is a non-polymorphic EFV-selected mutation that usually occurs in combination with K103N. The combination of P225H and K103N synergistically reduces NVP, EFV and DOR susceptibility. **P225S** is a highly unusual mutation at this position.

- 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
D67N	5	15	15	5	0	0	5
D67N + K70R + M184V + K219E	10	0	0	0	0	0	0
D67N + K70R + K219E	10	15	10	10	10	10	10
K70R	5	30	15	10	0	0	5
L74LI	15	0	0	60	0	0	5
M184V	15	-10	-10	10	60	60	-10
T215TI	5	20	20	10	0	0	5
K219E	5	10	10	5	0	0	5
Total	70	80	60	110	70	70	25

Drug resistance mutation scores of NNRTI: Download CSV

Rule	DOR	EFV	ETR	NVP	RPV
A98AG	15	15	10	30	15
K103N + P225HS	10	0	0	0	0
V108I	10	10	0	15	0
P225HS	20	45	0	45	0
K103N	0	60	0	60	0
K238T	0	30	0	30	0
Total	55	160	10	180	15