

PI Major Mutations:None

PI Accessory Mutations:None

PR Other Mutations:V11A • T12Q • I13V • K14S • I15K • **G16*** • Q18E • **L19A** • **K20S** • E35D • M36I • N37D • R57K • L63A • H69K • L89M

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

No drug resistance mutations were found for PI.

NRTI Mutations:**S68G** • **M184V** • **T215F**

NNRTI Mutations:**A98G** • **Y181C** • **G190S** • **H221Y** • **K238N**

RT Other Mutations:I5V • K20R • V35T • T39K • K43E • K49R • V60I • **V111M** • V118I • D121Y • K122E • I135T • T163I • K173S • Q174R • D177E • V179I • G196E • T200A • I202V • Q207A • R211K • F214L • **K219I** • **G231D** • **Y232M** • **Δ233** • **L234S** • **H235S** • P236S • W239R • P243S • V243I • L246V • P247A • D250G • S251Q • **W252A** • **T253G** • **V254T** • **N255V**

Nucleoside Reverse Transcriptase Inhibitors		Non-nucleoside Reverse Transcriptase Inhibitors	
abacavir (ABC)	Low-Level Resistance	doravirine (DOR)	High-Level Resistance
zidovudine (AZT)	Intermediate Resistance	efavirenz (EFV)	High-Level Resistance
stavudine (D4T)	Intermediate Resistance	etravirine (ETR)	High-Level Resistance
didanosine (DDI)	Low-Level Resistance	nevirapine (NVP)	High-Level Resistance
emtricitabine (FTC)	High-Level Resistance	rilpivirine (RPV)	High-Level Resistance
lamivudine (3TC)	High-Level Resistance		
tenofovir (TDF)	Susceptible		

RT comments

NRTI

- S68G** is a polymorphic mutation that is often selected in combination with K65R. It partially restores the replication defect associated with K65R.
- 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.

NNRTI

- A98G** is a non-polymorphic accessory mutation associated with low-level reduced susceptibility to each of the NNRTIs.
- Y181C** is a non-polymorphic mutation selected in persons receiving NVP, ETR and RPV. It confers high-level resistance to NVP, intermediate resistance to ETR and RPV, and low-level resistance to EFV. It does not significantly reduce DOR susceptibility.
- G190S** is a non-polymorphic mutation that confers high-level resistance to NVP and EFV. It may also be associated low-levels reductions in DOR susceptibility. It does not appear to be selected by ETR or RPV or to reduce their in vitro susceptibility.
- H221Y** is a non-polymorphic accessory mutation selected primarily by NVP, RPV, and DOR. It frequently occurs in combination with Y181C.
- 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

- V118I** is a polymorphic accessory NRTI-resistance mutation that often occurs in combination with multiple TAMs.
- 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.
- K219E/Q/N/R are accessory TAMs that usually occur in combination with multiple other TAMs. K219W is an uncommon NRTI-selected mutation. **K219I** is an unusual mutation at this position.
- L234I is a nonpolymorphic mutation selected in persons receiving NVP and EFV. It is also selected in vitro by ETR and DOR. In combination with V106A, it is associated with high-level DOR resistance. Its effect on susceptibility when it occurs alone has not been well characterized. **L234S** is a highly unusual mutation at this position.
- P236L is a rare mutation selected commonly by DLV, which appears to have little if any effect on current NNRTIs. **P236S** is a highly unusual mutation at this position.

Drug resistance mutation scores of NRTI:

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Rule	ABC	AZT	D4T	DDI	FTC	3TC	TDF
M184V	15	-10	-10	10	60	60	-10
T215F	10	60	40	15	0	0	10
Total	25	50	30	25	60	60	0

Drug resistance mutation scores of NNRTI:

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Rule	DOR	EFV	ETR	NVP	RPV
A98G	15	15	10	30	15
A98G + Y181C	5	5	5	5	5
Y181C	10	30	30	60	45
Y181C + G190S	10	0	10	0	10
Y181C + H221Y	10	0	0	0	10
G190S	20	60	10	60	15
H221Y	10	10	10	15	15
K238N	0	10	0	10	0
Total	80	130	75	180	115