## Drug resistance interpretation: PR

HIVDB 9.5.1 (2023-11-05)

| | |
|---|---|
| PI Major Mutations: | None |
| PI Accessory Mutations: | None |
| PR Other Mutations: | V11H • T12V • I13S • K14* • G16S • G17R • Q18T • L19A • E35N • M36I • N37D • R41K • R57K • D60E • Q61E • C67Y • 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 |

## 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 • S68G • L74I • M184V |
| NNRTI Mutations: | K103S • V106I • V179T • Y181C • G190A |
| RT Other Mutations: | K20R • V35T • T39N • E40D • V60I • K122E • I135T • Q161* • T165I • P170L • K173S • Q174K • P176L • D177E • E194K • T200A • I202V • Q207A • R211S • P217S • K219T • E224D • P226S • E233D • L234S • H235S • P236D • D237S • K238D • W239S • T240Q • V241L • Q242Y • P243S • I244C • V245* • L246T • P247D • E248S • K249* • D250L • W252* |

| Nucleoside Reverse Transcriptase Inhibitors | |
|---|---|
| **abacavir (ABC)** | High-Level Resistance |
| **zidovudine (AZT)** | Susceptible |
| **stavudine (D4T)** | Intermediate Resistance |
| **didanosine (DDI)** | High-Level Resistance |
| **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)** | High-Level 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**

- **K103S** is a non-polymorphic mutation that causes high-level reductions in NVP susceptibility but intermediate reductions in EFV susceptibility. Because **K103S** is a 2-bp change from the wildtype K and a 1-bp change from K103N, persons with **K103S** may be likely to have once had K103N.
- **V106I** occurs in 1% to 2% of viruses from untreated persons. It contributes to reduced NNRTI susceptibility only in combination with other NNRTI-resistance mutations. It is commonly selected in persons receiving DOR in combination with mutations at position 227.
- **V179T** is a rare non-polymorphic mutation occasionally selected in persons receiving NNRTIs. It is associated with minimal, if any, reduction in ETR and RPV susceptibility.
- **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.
- **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.

**Other**

- K219E/Q/N/R are accessory TAMS that usually occur in combination with multiple other TAMs. K219W is an uncommon NRTI-selected mutation. **K219T** 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. **P236D** is a highly unusual mutation at this position.
- 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. **K238D** is a highly unusual mutation at this position.

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 |
|---|---|---|---|---|---|---|---|
| K65R | 45 | -10 | 60 | 60 | 30 | 30 | 50 |
| L74I | 15 | 0 | 0 | 60 | 0 | 0 | 5 |
| M184V | 15 | -10 | -10 | 10 | 60 | 60 | -10 |
| K65R + S68G | 0 | 0 | 0 | 0 | 0 | 0 | 5 |
| Total | 75 | -20 | 50 | 130 | 90 | 90 | 50 |

*Drug resistance mutation scores of NNRTI:* Download CSV

| Rule | DOR | EFV | ETR | NVP | RPV |
|---|---|---|---|---|---|
| V106I | 10 | 0 | 10 | 10 | 10 |
| V106I + Y181C | 5 | 0 | 0 | 0 | 10 |
| Y181C | 10 | 30 | 30 | 60 | 45 |
| Y181C + G190A | 10 | 0 | 10 | 0 | 10 |
| K103S | 0 | 45 | 0 | 60 | 0 |
| G190A | 0 | 45 | 10 | 60 | 15 |
| V179T + Y181C | 0 | 0 | 10 | 0 | 10 |
| Total | 35 | 120 | 70 | 190 | 100 |