



Second-Line ART After Treatment Failure or for Regimen Simplification

Table 4: Antiretroviral Medications by Level of Genetic Barrier to Resistance

Table 5: ART Options After First-Line Treatment Failure With Single-Class Drug Resistance

Box 1: Antiretroviral Medication Classes in Order of Position in Interruption of HIV Life Cycle

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Table 4: Antiretroviral Medications by Level of Genetic Barrier to Resistance [a,b]		
Low Resistance (single mutation)	Intermediate Resistance (1 or 2 mutations)	High Resistance (>2 mutations)
<ul style="list-style-type: none"> Lamivudine Emtricitabine Efavirenz Nevirapine Rilpivirine Raltegravir Elvitegravir 	<ul style="list-style-type: none"> Tenofovir disoproxil fumarate Tenofovir alafenamide Zidovudine Abacavir Doravirine Cabotegravir Fostemsavir Enfuvirtide 	<ul style="list-style-type: none"> Etravirine Dolutegravir Bictegravir Darunavir [c] Atazanavir [c] Maraviroc
<p>Notes:</p> <p>a. Derived from [Lataillade, et al. 2018; Oliveira, et al. 2018; Tang and Shafer 2012]</p> <p>b. For group M, subtype B HIV</p> <p>c. Combined with ritonavir or cobicistat</p>		

Table 5: ART Options After First-Line Treatment Failure With Single-Class Drug Resistance [a]	
Failed First-Line Regimen Drug Classes	Classes and Medication Options for Switch
2 NRTIs + 1 NNRTI [a]	<ul style="list-style-type: none"> 2 NRTIs + 1 boosted PI: <ul style="list-style-type: none"> TAF/FTC/DRV/COBI (single tablet) TAF/FTC + DRV/RTV 2 NRTIs + 1 INSTI: <ul style="list-style-type: none"> TAF/FTC/BIC (single tablet) TAF/FTC + DTG
2 NRTIs + 1 PI [a]	<ul style="list-style-type: none"> 2 NRTIs + 1 INSTI: <ul style="list-style-type: none"> TAF/FTC/BIC (single tablet) TAF/FTC + DTG 1 INSTI + 1 NNRTI: RPV/DTG (single tablet) 2 NRTIs + 1 twice-daily boosted PI
2 NRTIs + 1 INSTI [a]	<ul style="list-style-type: none"> 2 NRTIs + 1 boosted PI: <ul style="list-style-type: none"> TAF/FTC/DRV/COBI (single tablet) TAF/FTC + DRV/RTV
Multiclass	<ul style="list-style-type: none"> 2 NRTIs + 1 INSTI + 1 boosted PI +/- 1 NNRTI (based on genotype): <ul style="list-style-type: none"> Consider: MVC [b], FTR, IBA, LEN, ETR, DOR, RPV, TPV
<p>Abbreviations: ART, antiretroviral therapy; BIC, bictegravir; COBI, cobicistat; DOR, doravirine; DRV, darunavir; DTG, dolutegravir; ETR, etravirine; FTC, emtricitabine; FTR, fostemsavir; IBA, ibalizumab; INSTI, integrase strand transfer inhibitor; LEN, lenacapavir; MVC, maraviroc; NNRTI, non-nucleoside reverse transcriptase inhibitor; NRTI, nucleoside/nucleotide reverse transcriptase inhibitor; PI, protease inhibitor; RAM, resistance-associated mutation; RPV, rilpivirine; RTV, ritonavir; TAF, tenofovir alafenamide; TPV, tipranavir.</p> <p>Notes:</p> <p>a. Single-class resistance, with no major NRTI RAMs other than M184V</p> <p>b. If current tropism assay indicates exclusive R5 tropic virus</p>	

Box 1: Antiretroviral Medication Classes in Order of Position in Interruption of HIV Life Cycle

- **Attachment inhibitors:** Fostemsavir (FTR; Rukobia), ibalizumab (IBA; Trogarzo)
- **Coreceptor antagonist:** Maraviroc (MVC; Selzentry)
- **Fusion inhibitor:** Enfuvirtide (T20; Fuzeon)
- **Capsid inhibitor:** Lenacapavir (LEN, Sunlenca)
- **Nucleoside/nucleotide reverse transcriptase inhibitors:** Abacavir (ABC; Ziagen), emtricitabine (FTC; Emtriva), lamivudine (3TC; Epivir), tenofovir (TFV)
- **Non-nucleoside reverse transcriptase inhibitors:** Doravirine (DOR; Pifeltro), efavirenz (EFV; Sustiva), etravirine (ETR; Intelence), rilpivirine (RPV; Edurant)
- **Integrase strand transfer inhibitors:** Bictegravir (BIC; Biktarvy), dolutegravir (DTG; Tivicay), raltegravir (RAL; Isentress), elvitegravir/cobicistat (EVG/COBI; Genvoya or Stribild), cabotegravir (CAB; Cabenuva)
- **Protease inhibitors:** Atazanavir (ATV; Reyataz), darunavir (DRV; Prezista), ritonavir (RTV; Norvir; as a pharmacokinetic booster), tipranavir (TPV; Aptivus)

References

- Lataillade M, Zhou N, Joshi SR, et al. Viral drug resistance through 48 weeks, in a phase 2b, randomized, controlled trial of the HIV-1 attachment inhibitor prodrug, fostemsavir. *J Acquir Immune Defic Syndr* 2018;77(3):299-307. [PMID: 29206721] <https://pubmed.ncbi.nlm.nih.gov/29206721>
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