



# Ledipasvir/Sofosbuvir (Harvoni®) Drug Interactions

## A Quick Guide for Clinicians – April 2017

John J Faragon, PharmD, BCPS, AAHIVP, Kristen Marks, MD, Marshall Glesby, MD, PhD, Douglas Fish, MD

### Mechanism of Action and Route of Metabolism for Ledipasvir/Sofosbuvir (Harvoni®)

Medication	HCV Mechanism of Action	Route of Metabolism and Drug Interaction Potential
Ledipasvir/Sofosbuvir (Harvoni®)	NS5a inhibitor and NS5b polymerase inhibitor	<ul style="list-style-type: none"> <li>Ledipasvir is an inhibitor of P-glycoprotein (P-gp) and breast cancer resistance protein (BCRP). Unknown metabolism via slow oxidative metabolism has been observed.</li> <li>Sofosbuvir is a substrate for P-glycoprotein (P-gp) and breast cancer resistance protein (BCRP). The intracellular metabolism of sofosbuvir is mediated by hydrolase and nucleotide phosphorylation pathways.</li> </ul>

### Ledipasvir/Sofosbuvir (Harvoni®) Drug Interactions with HIV Medications

Concurrent Medication	Recommendation and Clinical Comments
<b>HIV Protease Inhibitors</b>	
Atazanavir (Reyataz®) + ritonavir (Norvir®) Darunavir (Prezista®) + ritonavir (Norvir®) Lopinavir/ritonavir (Kaletra®) <u>In addition, likely to occur with:</u> Fosamprenavir (Lexiva®) + ritonavir (Norvir®) Saquinavir (Invirase®) + ritonavir (Norvir®)	<ul style="list-style-type: none"> <li>Increases in tenofovir plasma levels can occur with tenofovir disoproxil fumarate formulation and ledipasvir with a ritonavir boosted HIV protease inhibitor. However, interaction is NOT expected with tenofovir alafenamide, since plasma levels of tenofovir are significantly lower with this formulation.</li> <li>When using ritonavir boosted HIV protease inhibitor with tenofovir disoproxil fumarate formulation and ledipasvir/sofosbuvir, there may be increased risk of tenofovir renal toxicity. Monitor closely for tenofovir associated renal events if using tenofovir disoproxil fumarate.</li> </ul>
Tipranavir (Aptivus®) + ritonavir (Norvir®)	<ul style="list-style-type: none"> <li>Co-administration of ledipasvir/sofosbuvir with tipranavir + ritonavir is expected to decrease the concentration of ledipasvir and sofosbuvir, leading to reduced efficacy. Co-administration not recommended.</li> </ul>

## Ledipasvir/Sofosbuvir (Harvoni®) Drug Interactions with HIV Medications

Concurrent Medication	Recommendation and Clinical Comment
<b>HIV Non Nucleoside Reverse Transcriptase Inhibitors</b>	
Efavirenz (Sustiva®, also contained in Atripla®)	<ul style="list-style-type: none"> <li>• Increase in tenofovir levels when using disoproxil fumarate formulation expected when used with ledipasvir and efavirenz. However, interaction is NOT expected with tenofovir alafenamide, since plasma levels of tenofovir are significantly lower with this formulation. Ledipasvir levels also reduced 34% when ledipasvir/sofosbuvir was combined with Atripla®</li> <li>• Monitor for tenofovir-associated renal adverse events in patients receiving ledipasvir/sofosbuvir concomitantly with efavirenz and tenofovir disoproxil fumarate.</li> </ul>
Etravirine (Intelence®) Nevirapine (Viramune®)	<ul style="list-style-type: none"> <li>• Use of etravirine or nevirapine in patients receiving ledipasvir/sofosbuvir has not been studied. Based upon data with efavirenz, a decrease in ledipasvir levels may be possible.</li> </ul>
Rilpivirine (Edurant®, also contained in Complera® and Odefsey®)	<ul style="list-style-type: none"> <li>• Concurrent use at standard doses appropriate.</li> </ul>
<b>HIV Integrase Strand Transfer Inhibitors</b>	
Dolutegravir (Tivicay®, also contained in Triumeq®)	<ul style="list-style-type: none"> <li>• Concurrent use at standard doses appropriate.</li> </ul>
Elvitegravir/cobicistat/tenofovir disoproxil fumarate/emtricitabine (Stribild®)	<ul style="list-style-type: none"> <li>• Increased tenofovir levels expected. Safety of concurrent ledipasvir/sofosbuvir with elvitegravir, cobicistat, emtricitabine and tenofovir has not been established. Co-administration not recommended.</li> </ul>
Elvitegravir/cobicistat/tenofovir alafenamide/emtricitabine (Genvoya®)	<ul style="list-style-type: none"> <li>• Concurrent use at standard doses appropriate.</li> </ul>
Raltegravir (Isentress®)	<ul style="list-style-type: none"> <li>• Concurrent use at standard doses appropriate.</li> </ul>
<b>HIV Entry Inhibitors</b>	
Maraviroc (Selzentry®)	<ul style="list-style-type: none"> <li>• Concurrent use at standard doses appropriate.</li> </ul>
<b>HIV Nucleoside/Nucleotide Reverse Transcriptase Inhibitors</b>	
Abacavir (Ziagen®) Emtricitabine (Emtriva®) Lamivudine (Epivir®) Tenofovir Disoproxil Fumarate (Viread®) Tenofovir Alafenamide (Descovy®) Stavudine (Zerit®)	<ul style="list-style-type: none"> <li>• Concurrent use at standard doses appropriate.</li> <li>• If using tenofovir disoproxil fumarate in combination with efavirenz or a ritonavir boosted HIV protease inhibitor or with cobicistat, see above for comments.</li> </ul>

Didanosine (Videx EC®) Zidovudine (Retrovir®)	<ul style="list-style-type: none"> <li>When using ribavirin with ledipasvir/sofosbuvir, the use of didanosine or zidovudine should be avoided due to overlapping toxicity.</li> </ul>
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## Ledipasvir/Sofosbuvir (Harvoni®) Drug Interactions with Common Primary Care Medications

Medication and or Class	Recommendation and Clinical Comment
Antacids	<ul style="list-style-type: none"> <li>Separate aluminum and magnesium containing antacids and ledipasvir/sofosbuvir administration by 4 hours.</li> </ul>
Antiarrhythmic – Amiodarone	<ul style="list-style-type: none"> <li>Significant bradycardia expected with concurrent use, especially in patients on beta-blockers, underlying cardiac abnormalities, or advanced liver disease. Co-administration not recommended. If concurrent use required, cardiac monitoring is recommended, see package insert for additional information.</li> </ul>
H2-receptor antagonists	<ul style="list-style-type: none"> <li>Administer simultaneously with or 12 hours apart from ledipasvir/sofosbuvir. Do not exceed doses comparable to famotidine 40 mg twice daily.</li> </ul>
Proton-pump inhibitors	<ul style="list-style-type: none"> <li>If co-administration required, doses comparable to omeprazole 20 mg or lower can be administered <u>simultaneously</u> with ledipasvir/sofosbuvir under fasted conditions.</li> </ul>
Anticonvulsants – carbamazepine, oxcarbazepine, phenobarbital, phenytoin	<ul style="list-style-type: none"> <li>Significant decrease in ledipasvir/sofosbuvir levels expected. Co-administration not recommended.</li> </ul>
Antimycobacterials – rifampin, rifabutin, rifapentine	<ul style="list-style-type: none"> <li>Significant decrease in ledipasvir/sofosbuvir levels expected. Co-administration not recommended.</li> </ul>
Digoxin	<ul style="list-style-type: none"> <li>Increase in digoxin levels possible. Monitor digoxin levels.</li> </ul>
Herbal products – St. John’s Wort	<ul style="list-style-type: none"> <li>Significant decrease in ledipasvir/sofosbuvir levels expected due to intestinal P-glycoprotein (P-gp) induction associated with St. John’s Wort. Co-administration not recommended.</li> </ul>
Rosuvastatin	<ul style="list-style-type: none"> <li>Significant increase in rosuvastatin levels when used with ledipasvir/sofosbuvir leading to increased risk of myopathy, including rhabdomyolysis. Co-administration not recommended.</li> </ul>
Simeprevir	<ul style="list-style-type: none"> <li>Significant increases in ledipasvir and simeprevir levels expected. Co-administration not recommended.</li> </ul>

Disclaimer: The information contained in this table has been developed from various resources, including FDA product information, abstracts and posters presented at national and international meetings, and from Recommendations for the Testing, Managing and Treating of Hepatitis C from AASLD and IDSA located at [www.hivguidelines.org](http://www.hivguidelines.org). While the tables contained in this guide are complete based upon references reviewed, there may be other medications that may also be contraindicated or should be co-administered with caution. Please consult additional resources as needed.