Interaction between Grapefruit and CYP3A4 [[1](https://pmc.ncbi.nlm.nih.gov/articles/PMC3589309/#:~:text=CYP3A4%20=%20cytochrome%20P450%20enzyme%203A4.%20The,the%20enzyme%2C%20causing%20irreversible%20inactivation%20(mechanism%2Dbased%20inhibition).), [2](https://pubmed.ncbi.nlm.nih.gov/11737987/#:~:text=Of%20all%20the%20chemicals%20studied%2C%20bergapten%20(5%2Dmethoxypsoralen),contribute%20to%20the%20inhibitory%20effect%20on%20CYP3A4.)]

Cytochrome P450 3A4 (CYP3A4) is an enzyme in the liver and intestines that plays a crucial role in metabolizing many drugs. **Grapefruit contains compounds called furanocoumarins, which can inhibit CYP3A4 activity**. [[3](https://www.fda.gov/consumers/consumer-updates/grapefruit-juice-and-some-drugs-dont-mix), [4](https://www.aafp.org/pubs/afp/issues/2006/0815/p605.html), [5](https://pmc.ncbi.nlm.nih.gov/articles/PMC3589309/#:~:text=Because%20these%20chemicals%20are%20innate%20to%20grapefruit%2C,systemic%20drug%20concentration%20and%20subsequent%20adverse%20effects.), [6](https://pmc.ncbi.nlm.nih.gov/articles/PMC1873672/), [7](https://www.sciencedirect.com/science/article/pii/S0278691520300223), [8](https://www.mayoclinicproceedings.org/article/S0025-6196(11)64645-4/fulltext)]

**Mechanism of Interaction [**[**9**](https://www.naturalmedicinejournal.com/journal/grapefruit-juice-drug-interactions-practical-review-clinicians#:~:text=The%20primary%20mechanism%20of%20this%20interaction%20is,reduce%20the%20metabolic%20activation%20of%20certain%20medications.)**,** [**10**](https://www.sciencedirect.com/science/article/pii/S0024320598000137/pdf?md5=3ee7776b4f451ea6ed50ec9c2452664a&pid=1-s2.0-S0024320598000137-main.pdf#:~:text=plasma%20concentrations%20of%20many%20therapeutic%20agents.%20These,that%20inhibition%20has%20not%20been%20fully%20characterized.)**]**

* Furanocoumarins in grapefruit bind to CYP3A4, preventing it from metabolizing drugs effectively. [[11](https://www.sciencedirect.com/science/article/pii/S0278691520300223), [12](https://pubmed.ncbi.nlm.nih.gov/14769198/#:~:text=In%20vitro%20experiments%20confirmed%20that%20furanocoumarins%20from,contribute%20comprehensively%20to%20the%20grapefruit%20juice%2Ddrug%20interaction.), [13](https://www.eatingwell.com/ways-grapefruit-can-affect-your-medication-8583892#:~:text=Specifically%2C%20grapefruit%20and%20grapefruit%20juice%20contain%20compounds,to%20a%20review%20in%20Molecules%20in%202024.)]
* This inhibition leads to increased drug concentrations in the bloodstream, potentially causing adverse effects or altering the effectiveness of medications. [[14](https://en.wikipedia.org/wiki/Grapefruit%E2%80%93drug_interactions), [15](https://pubmed.ncbi.nlm.nih.gov/9351897/#:~:text=We%20found%20that%20grapefruit%20oil%20and%20two,CYP3A4%20catalytic%20activity%20and%20immunoreactive%20CYP3A4%20concentration.), [16](https://en.wikipedia.org/wiki/CYP3A4#:~:text=Some%20substances%2C%20such%20as%20some%20drugs%20and,those%20drugs%20that%20are%20modified%20by%20CYP3A4.)]

Affected Drugs [[17](https://www.bjmp.org/content/drug-interactions-grapefruit-juice#:~:text=Grapefruit%20juice%20inhibits%20the%20CYP3A4%20enzyme%20of,affected%20drugs%20may%20produce%20serious%20adverse%20reactions.), [18](https://www.benzoinfo.com/2017/03/21/psychopharmacology-and-commonly-encountered-enzymatic-drug-drug-interactions-implications-on-psychiatric-treatment-and-psychopharmaceutical-discontinuation-protocols/#:~:text=As%20a%20result%2C%20changing%20the%20activity%20of,wreak%20havoc%20with%20drug%20concentrations%20is%20well%2Ddocumented.)]

**Numerous drugs are metabolized by CYP3A4, including: [**[**19**](https://www.linkedin.com/pulse/grapefruit-juice-potent-inhibitor-cyp3a4-its-drug-weiss-md-cpi-y5p0e)**]**

* Statins (e.g., simvastatin, atorvastatin)
* Calcium channel blockers (e.g., felodipine, nifedipine)
* Immunosuppressants (e.g., cyclosporine, tacrolimus)
* Anti-anxiety medications (e.g., diazepam, lorazepam)
* Antidepressants (e.g., fluoxetine, sertraline) [[20](https://www.spandidos-publications.com/10.3892/mmr.2019.10692#:~:text=Previous%20studies%20have%20demonstrated%20that%20ticagrelor%20and,also%20metabolized%20by%20CYP3A4%20(%2029%E2%80%93%2031).), [21](https://www.researchgate.net/publication/248702917_Drug_Interactions_in_Oncology_-_Review#:~:text=Abstract%20consumption%20of%20grapefruit%20juice%2C%20a%20known,concomitant%20administration%20of%20atorvastatin%20with%20strong%20CYP3A4), [22](https://www.drugs.com/simvastatin.html), [23](https://www.goodrx.com/drugs/safety/grapefruit-juice-interactions#:~:text=Grapefruit%20and%20grapefruit%20juice%20can%20interact%20with,(Procardia)%2C%20and%20estrogen%2Dcontaining%20medications%20like%20estradiol%20(Estrace).), [24](https://pmc.ncbi.nlm.nih.gov/articles/PMC508096/), [25](https://pmc.ncbi.nlm.nih.gov/articles/PMC3839496/), [26](https://www.eurekalert.org/news-releases/830804#:~:text=Many%20medications%20are%20metabolized%20in%20the%20liver,have%20been%20reported%20by%20this%20drug%2Dfood%20interaction.), [27](https://www.webmd.com/drugs/2/drug-11116/valium-oral/details), [28](https://medlineplus.gov/druginfo/meds/a682053.html), [29](https://www.benzoinfo.com/2017/03/21/psychopharmacology-and-commonly-encountered-enzymatic-drug-drug-interactions-implications-on-psychiatric-treatment-and-psychopharmaceutical-discontinuation-protocols/#:~:text=CYP3A4%20is%20a%20very%20common%20metabolizer%20of,nefazodone%2C%20desvenlafaxine%2C%20reboxetine%2C%20and%20tricyclics%20like%20amitriptyline.), [30](https://www.nature.com/articles/1601736#:~:text=Sertralin%20is%20a%20serotonin%20selective%20reuptake%20inhibitor,given%20with%20grapefruit%20juice%20has%20been%20reported.), [31](https://www.sciencedirect.com/science/article/pii/S2590257122000323#:~:text=Citalopram%2C%20fluoxetine%2C%20fluvoxamine%2C%20paroxetine%2C%20sertraline%2C%20and%20venlafaxine,and%203A4%20(%20Luong%20et%20al.%2C%202021).)]

Consequences of Interaction [[32](https://journals.lww.com/jpharmacogenetics/fulltext/2004/10000/regulation_of_cyp3a4_by_the_bile_acid_receptor.1.aspx#:~:text=The%20expression%20of%20CYP3A4%20is%20induced%20by,treatment%20and%20causing%20drug%E2%80%93drug%20interactions%20[%206].)]

Consuming grapefruit juice or eating grapefruit while taking CYP3A4 substrate drugs can: [[17](https://www.bjmp.org/content/drug-interactions-grapefruit-juice#:~:text=Grapefruit%20juice%20inhibits%20the%20CYP3A4%20enzyme%20of,affected%20drugs%20may%20produce%20serious%20adverse%20reactions.), [33](https://japsonline.com/abstract.php?article_id=4218&sts=2#:~:text=Grapefruit%20juice%20(GFJ)%20compounds%2C%20mainly%20naringin%2C%20bergamottin%2C,that%20are%20CYP3A4%20substrates%20when%20administered%20concomitantly.)]

Increase drug levels in the blood, Prolong drug effects, Enhance the risk of side effects, and Reduce the effectiveness of some drugs. [[34](https://www.jwatch.org/jp200007010000010/2000/07/01/how-long-does-grapefruit-juice-inhibit-cyp3a4#:~:text=Comment%20Possibly%20through%20competitive%20inhibition%20or%20down%2Dregulation,someone%20stops%20regular%20ingestion%20of%20grapefruit%20juice.), [35](https://www.semanticscholar.org/paper/GRAPEFRUIT-JUICE-FURANOCOUMARINS-AND-P-450-CYP-3-A/9ead5a4e5371b038741f56d5a0f708f301f7a335#:~:text=It%20(%20GRAPEFRUIT%20JUICE%20FURANOCOUMARINS%20AND%20P,are%20affected%20or%20not%20by%20grapefruit.%20It), [36](https://www.youtube.com/watch?v=FQJ4NO6SDqg), [37](https://www.rxlist.com/statins_and_grapefruit_juice/drug-class.htm#:~:text=When%20the%20action%20of%20these%20enzymes%20is,the%20blood%20levels%20of%20these%20medications%20increase.), [38](https://addictionresource.com/drugs/hydrocodone/and-alcohol/#:~:text=Taking%20grapefruit%20juice%20with%20medications%20can%20increase,the%20drug%20by%20inhibiting%20the%20CYP450%2D3A4%20enzyme.)]

**Recommendations [**[**39**](https://www.fyarrohcp.com/drug-interactions#:~:text=Drug%20Interaction%20Recommendations%20Drug%20interaction%20Recommendation%20Strong,mg/m%202%20per%20dose%20should%20be%20considered)**,** [**40**](https://www.england.nhs.uk/south/wp-content/uploads/sites/6/2018/11/CrizotinibNSCLC.pdf#:~:text=Grapefruit%20and%20grapefruit%20juice:%20avoid%20as%20an,crizotinib%20is%20a%20moderate%20inhibitor%20of%20CYP3A.)**]**

* Avoid consuming grapefruit juice or eating grapefruit when taking CYP3A4 substrate drugs. [[3](https://www.fda.gov/consumers/consumer-updates/grapefruit-juice-and-some-drugs-dont-mix)]
* If you must consume grapefruit, wait at least 24 hours after taking your medication. [[41](https://ascpt.onlinelibrary.wiley.com/doi/full/10.1067/mcp.2000.110216#:~:text=It%20(%20grapefruit%20juice%20)%20appears%20that,ingestion%20of%20grapefruit%20juice%20and%20the%20drug.)]
* Consult with your healthcare provider if you have any concerns about grapefruit-drug interactions.

Note: The interaction between grapefruit and CYP3A4 is complex and can vary depending on factors such as the specific drug, the amount of grapefruit consumed, and individual differences. It is essential to seek professional medical advice for personalized guidance. [[42](https://www.linkedin.com/pulse/grapefruit-juice-potent-inhibitor-cyp3a4-its-drug-weiss-md-cpi-y5p0e#:~:text=While%20grapefruit%20juice%20serves%20as%20a%20well%2Dcharacterized,including%20its%20dependence%20on%20CYP3A4%2C%20is%20paramount.), [43](https://www.naturalmedicinejournal.com/journal/grapefruit-juice-drug-interactions-practical-review-clinicians#:~:text=People%20exhibit%20a%20range%20of%20biochemical%20individuality%2C,to%20juice%20and%20thus%20glass%20to%20glass.), [44](https://www.fda.gov/consumers/consumer-updates/grapefruit-juice-and-some-drugs-dont-mix#:~:text=Grapefruit%20juice%20does%20not%20affect%20all%20the,the%20amount%20of%20grapefruit%20juice%20you%20drink.)]

*Generative AI is experimental.*

[1] [https://pmc.ncbi.nlm.nih.gov/articles/PMC3589309/](https://pmc.ncbi.nlm.nih.gov/articles/PMC3589309/#:~:text=CYP3A4%20=%20cytochrome%20P450%20enzyme%203A4.%20The,the%20enzyme%2C%20causing%20irreversible%20inactivation%20(mechanism%2Dbased%20inhibition).)

[2] [https://pubmed.ncbi.nlm.nih.gov/11737987/](https://pubmed.ncbi.nlm.nih.gov/11737987/#:~:text=Of%20all%20the%20chemicals%20studied%2C%20bergapten%20(5%2Dmethoxypsoralen),contribute%20to%20the%20inhibitory%20effect%20on%20CYP3A4.)

[3] <https://www.fda.gov/consumers/consumer-updates/grapefruit-juice-and-some-drugs-dont-mix>

[4] <https://www.aafp.org/pubs/afp/issues/2006/0815/p605.html>

[5] [https://pmc.ncbi.nlm.nih.gov/articles/PMC3589309/](https://pmc.ncbi.nlm.nih.gov/articles/PMC3589309/#:~:text=Because%20these%20chemicals%20are%20innate%20to%20grapefruit%2C,systemic%20drug%20concentration%20and%20subsequent%20adverse%20effects.)

[6] <https://pmc.ncbi.nlm.nih.gov/articles/PMC1873672/>

[7] <https://www.sciencedirect.com/science/article/pii/S0278691520300223>

[8] <https://www.mayoclinicproceedings.org/article/S0025-6196(11)64645-4/fulltext>

[9] [https://www.naturalmedicinejournal.com/journal/grapefruit-juice-drug-interactions-practical-review-clinicians](https://www.naturalmedicinejournal.com/journal/grapefruit-juice-drug-interactions-practical-review-clinicians#:~:text=The%20primary%20mechanism%20of%20this%20interaction%20is,reduce%20the%20metabolic%20activation%20of%20certain%20medications.)

[10] [https://www.sciencedirect.com/science/article/pii/S0024320598000137/pdf?md5=3ee7776b4f451ea6ed50ec9c2452664a&pid=1-s2.0-S0024320598000137-main.pdf](https://www.sciencedirect.com/science/article/pii/S0024320598000137/pdf?md5=3ee7776b4f451ea6ed50ec9c2452664a&pid=1-s2.0-S0024320598000137-main.pdf#:~:text=plasma%20concentrations%20of%20many%20therapeutic%20agents.%20These,that%20inhibition%20has%20not%20been%20fully%20characterized.)

[11] <https://www.sciencedirect.com/science/article/pii/S0278691520300223>

[12] [https://pubmed.ncbi.nlm.nih.gov/14769198/](https://pubmed.ncbi.nlm.nih.gov/14769198/#:~:text=In%20vitro%20experiments%20confirmed%20that%20furanocoumarins%20from,contribute%20comprehensively%20to%20the%20grapefruit%20juice%2Ddrug%20interaction.)

[13] [https://www.eatingwell.com/ways-grapefruit-can-affect-your-medication-8583892](https://www.eatingwell.com/ways-grapefruit-can-affect-your-medication-8583892#:~:text=Specifically%2C%20grapefruit%20and%20grapefruit%20juice%20contain%20compounds,to%20a%20review%20in%20Molecules%20in%202024.)

[14] <https://en.wikipedia.org/wiki/Grapefruit%E2%80%93drug_interactions>

[15] [https://pubmed.ncbi.nlm.nih.gov/9351897/](https://pubmed.ncbi.nlm.nih.gov/9351897/#:~:text=We%20found%20that%20grapefruit%20oil%20and%20two,CYP3A4%20catalytic%20activity%20and%20immunoreactive%20CYP3A4%20concentration.)

[16] [https://en.wikipedia.org/wiki/CYP3A4](https://en.wikipedia.org/wiki/CYP3A4#:~:text=Some%20substances%2C%20such%20as%20some%20drugs%20and,those%20drugs%20that%20are%20modified%20by%20CYP3A4.)

[17] [https://www.bjmp.org/content/drug-interactions-grapefruit-juice](https://www.bjmp.org/content/drug-interactions-grapefruit-juice#:~:text=Grapefruit%20juice%20inhibits%20the%20CYP3A4%20enzyme%20of,affected%20drugs%20may%20produce%20serious%20adverse%20reactions.)

[18] [https://www.benzoinfo.com/2017/03/21/psychopharmacology-and-commonly-encountered-enzymatic-drug-drug-interactions-implications-on-psychiatric-treatment-and-psychopharmaceutical-discontinuation-protocols/](https://www.benzoinfo.com/2017/03/21/psychopharmacology-and-commonly-encountered-enzymatic-drug-drug-interactions-implications-on-psychiatric-treatment-and-psychopharmaceutical-discontinuation-protocols/#:~:text=As%20a%20result%2C%20changing%20the%20activity%20of,wreak%20havoc%20with%20drug%20concentrations%20is%20well%2Ddocumented.)

[19] <https://www.linkedin.com/pulse/grapefruit-juice-potent-inhibitor-cyp3a4-its-drug-weiss-md-cpi-y5p0e>

[20] [https://www.spandidos-publications.com/10.3892/mmr.2019.10692](https://www.spandidos-publications.com/10.3892/mmr.2019.10692#:~:text=Previous%20studies%20have%20demonstrated%20that%20ticagrelor%20and,also%20metabolized%20by%20CYP3A4%20(%2029%E2%80%93%2031).)

[21] [https://www.researchgate.net/publication/248702917\_Drug\_Interactions\_in\_Oncology\_-\_Review](https://www.researchgate.net/publication/248702917_Drug_Interactions_in_Oncology_-_Review#:~:text=Abstract%20consumption%20of%20grapefruit%20juice%2C%20a%20known,concomitant%20administration%20of%20atorvastatin%20with%20strong%20CYP3A4)

[22] <https://www.drugs.com/simvastatin.html>

[23] [https://www.goodrx.com/drugs/safety/grapefruit-juice-interactions](https://www.goodrx.com/drugs/safety/grapefruit-juice-interactions#:~:text=Grapefruit%20and%20grapefruit%20juice%20can%20interact%20with,(Procardia)%2C%20and%20estrogen%2Dcontaining%20medications%20like%20estradiol%20(Estrace).)

[24] <https://pmc.ncbi.nlm.nih.gov/articles/PMC508096/>

[25] <https://pmc.ncbi.nlm.nih.gov/articles/PMC3839496/>

[26] [https://www.eurekalert.org/news-releases/830804](https://www.eurekalert.org/news-releases/830804#:~:text=Many%20medications%20are%20metabolized%20in%20the%20liver,have%20been%20reported%20by%20this%20drug%2Dfood%20interaction.)

[27] <https://www.webmd.com/drugs/2/drug-11116/valium-oral/details>

[28] <https://medlineplus.gov/druginfo/meds/a682053.html>

[29] [https://www.benzoinfo.com/2017/03/21/psychopharmacology-and-commonly-encountered-enzymatic-drug-drug-interactions-implications-on-psychiatric-treatment-and-psychopharmaceutical-discontinuation-protocols/](https://www.benzoinfo.com/2017/03/21/psychopharmacology-and-commonly-encountered-enzymatic-drug-drug-interactions-implications-on-psychiatric-treatment-and-psychopharmaceutical-discontinuation-protocols/#:~:text=CYP3A4%20is%20a%20very%20common%20metabolizer%20of,nefazodone%2C%20desvenlafaxine%2C%20reboxetine%2C%20and%20tricyclics%20like%20amitriptyline.)

[30] [https://www.nature.com/articles/1601736](https://www.nature.com/articles/1601736#:~:text=Sertralin%20is%20a%20serotonin%20selective%20reuptake%20inhibitor,given%20with%20grapefruit%20juice%20has%20been%20reported.)

[31] [https://www.sciencedirect.com/science/article/pii/S2590257122000323](https://www.sciencedirect.com/science/article/pii/S2590257122000323#:~:text=Citalopram%2C%20fluoxetine%2C%20fluvoxamine%2C%20paroxetine%2C%20sertraline%2C%20and%20venlafaxine,and%203A4%20(%20Luong%20et%20al.%2C%202021).)

[32] [https://journals.lww.com/jpharmacogenetics/fulltext/2004/10000/regulation\_of\_cyp3a4\_by\_the\_bile\_acid\_receptor.1.aspx](https://journals.lww.com/jpharmacogenetics/fulltext/2004/10000/regulation_of_cyp3a4_by_the_bile_acid_receptor.1.aspx#:~:text=The%20expression%20of%20CYP3A4%20is%20induced%20by,treatment%20and%20causing%20drug%E2%80%93drug%20interactions%20[%206].)

[33] [https://japsonline.com/abstract.php?article\_id=4218&sts=2](https://japsonline.com/abstract.php?article_id=4218&sts=2#:~:text=Grapefruit%20juice%20(GFJ)%20compounds%2C%20mainly%20naringin%2C%20bergamottin%2C,that%20are%20CYP3A4%20substrates%20when%20administered%20concomitantly.)

[34] [https://www.jwatch.org/jp200007010000010/2000/07/01/how-long-does-grapefruit-juice-inhibit-cyp3a4](https://www.jwatch.org/jp200007010000010/2000/07/01/how-long-does-grapefruit-juice-inhibit-cyp3a4#:~:text=Comment%20Possibly%20through%20competitive%20inhibition%20or%20down%2Dregulation,someone%20stops%20regular%20ingestion%20of%20grapefruit%20juice.)

[35] [https://www.semanticscholar.org/paper/GRAPEFRUIT-JUICE-FURANOCOUMARINS-AND-P-450-CYP-3-A/9ead5a4e5371b038741f56d5a0f708f301f7a335](https://www.semanticscholar.org/paper/GRAPEFRUIT-JUICE-FURANOCOUMARINS-AND-P-450-CYP-3-A/9ead5a4e5371b038741f56d5a0f708f301f7a335#:~:text=It%20(%20GRAPEFRUIT%20JUICE%20FURANOCOUMARINS%20AND%20P,are%20affected%20or%20not%20by%20grapefruit.%20It)

[36] <https://www.youtube.com/watch?v=FQJ4NO6SDqg>

[37] [https://www.rxlist.com/statins\_and\_grapefruit\_juice/drug-class.htm](https://www.rxlist.com/statins_and_grapefruit_juice/drug-class.htm#:~:text=When%20the%20action%20of%20these%20enzymes%20is,the%20blood%20levels%20of%20these%20medications%20increase.)

[38] [https://addictionresource.com/drugs/hydrocodone/and-alcohol/](https://addictionresource.com/drugs/hydrocodone/and-alcohol/#:~:text=Taking%20grapefruit%20juice%20with%20medications%20can%20increase,the%20drug%20by%20inhibiting%20the%20CYP450%2D3A4%20enzyme.)

[39] [https://www.fyarrohcp.com/drug-interactions](https://www.fyarrohcp.com/drug-interactions#:~:text=Drug%20Interaction%20Recommendations%20Drug%20interaction%20Recommendation%20Strong,mg/m%202%20per%20dose%20should%20be%20considered)

[40] [https://www.england.nhs.uk/south/wp-content/uploads/sites/6/2018/11/CrizotinibNSCLC.pdf](https://www.england.nhs.uk/south/wp-content/uploads/sites/6/2018/11/CrizotinibNSCLC.pdf#:~:text=Grapefruit%20and%20grapefruit%20juice:%20avoid%20as%20an,crizotinib%20is%20a%20moderate%20inhibitor%20of%20CYP3A.)

[41] [https://ascpt.onlinelibrary.wiley.com/doi/full/10.1067/mcp.2000.110216](https://ascpt.onlinelibrary.wiley.com/doi/full/10.1067/mcp.2000.110216#:~:text=It%20(%20grapefruit%20juice%20)%20appears%20that,ingestion%20of%20grapefruit%20juice%20and%20the%20drug.)

[42] [https://www.linkedin.com/pulse/grapefruit-juice-potent-inhibitor-cyp3a4-its-drug-weiss-md-cpi-y5p0e](https://www.linkedin.com/pulse/grapefruit-juice-potent-inhibitor-cyp3a4-its-drug-weiss-md-cpi-y5p0e#:~:text=While%20grapefruit%20juice%20serves%20as%20a%20well%2Dcharacterized,including%20its%20dependence%20on%20CYP3A4%2C%20is%20paramount.)

[43] [https://www.naturalmedicinejournal.com/journal/grapefruit-juice-drug-interactions-practical-review-clinicians](https://www.naturalmedicinejournal.com/journal/grapefruit-juice-drug-interactions-practical-review-clinicians#:~:text=People%20exhibit%20a%20range%20of%20biochemical%20individuality%2C,to%20juice%20and%20thus%20glass%20to%20glass.)

[44] [https://www.fda.gov/consumers/consumer-updates/grapefruit-juice-and-some-drugs-dont-mix](https://www.fda.gov/consumers/consumer-updates/grapefruit-juice-and-some-drugs-dont-mix#:~:text=Grapefruit%20juice%20does%20not%20affect%20all%20the,the%20amount%20of%20grapefruit%20juice%20you%20drink.)