

# The Medical Letter<sup>®</sup>

## on Drugs and Therapeutics

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► **Inhibitors and Inducers of CYP Enzymes, P-Glycoprotein, and Other Transporters (online only)**

| Table 1. Inhibitors and Inducers of CYP Enzymes |                                                          |                                                                                                                                                                                                                       |                                                                                                                                                                                                              |                                                                                                                                                                                                                      |
|-------------------------------------------------|----------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                 | Strong Inhibitors                                        | Moderate Inhibitors                                                                                                                                                                                                   |                                                                                                                                                                                                              | Inducers                                                                                                                                                                                                             |
| 1A2                                             | ciprofloxacin<br>fluvoxamine                             | amiodarone<br>capmatinib<br>cimetidine<br>deferasirox<br>estrogens (hormone replacement therapy and oral contraceptives)<br>mexiletine                                                                                | norfloxacin<br>ofloxacin<br>rucaparib<br>tacrine<br>thiabendazole<br>vemurafenib<br>zileuton                                                                                                                 | carbamazepine*<br>rifampin*<br>smoking<br>sodium phenylbutyrate/<br>taurursodiol<br>tetrahydrocannabinol                                                                                                             |
| 2B6                                             |                                                          | clopidogrel<br>crizotinib<br>mifepristone<br>sodium phenylbutyrate/<br>taurursodiol<br>ticlopidine                                                                                                                    |                                                                                                                                                                                                              | artemisinin<br>carbamazepine*<br>efavirenz<br>isavuconazonium<br>lemborexant<br>nevirapine<br>phenobarbital<br>phenytoin derivatives<br>rifampin<br>ritonavir<br>sodium phenylbutyrate/<br>taurursodiol              |
| 2C8                                             | abiraterone<br>clopidogrel<br>gemfibrozil                | deferasirox<br>lapatinib<br>leflunomide<br>letermovir<br>mifepristone                                                                                                                                                 | sodium phenylbutyrate/<br>taurursodiol<br>sorafenib<br>teriflunomide<br>trimethoprim<br>trimethoprim/<br>sulfamethoxazole                                                                                    | dabrafenib<br>mavacamten<br>rifabutin<br>rifampin*<br>rifapentine*                                                                                                                                                   |
| 2C9                                             | fluconazole<br>miconazole                                | abiraterone<br>adagrasib<br>alcohol (intoxicating dose)<br>amiodarone<br>capecitabine<br>ceritinib<br>delavirdine<br>efavirenz<br>etravirine<br>fenofibrate<br>floxuridine<br>fluorouracil<br>fluvastatin<br>imatinib | metronidazole<br>mifepristone<br>oritavancin<br>rucaparib<br>sorafenib<br>sulfadiazine<br>sulfamethoxazole<br>sulfisoxazole<br>trimethoprim/<br>sulfamethoxazole<br>valproate<br>voriconazole<br>zafirlukast | alpelisib<br>aprepitant*<br>bosentan<br>carbamazepine*<br>dabrafenib<br>enzalutamide<br>letermovir<br>mavacamten<br>phenobarbital*<br>phenytoin derivatives*<br>primidone*<br>rifabutin<br>rifampin*<br>rifapentine* |
| 2C19                                            | delavirdine<br>fluconazole<br>fluvoxamine<br>ticlopidine | abiraterone<br>armodafinil<br>bortezomib<br>cannabidiol<br>cimetidine<br>efavirenz<br>eslicarbazepine<br>esomeprazole<br>etravirine                                                                                   | felbamate<br>fluoxetine<br>isoniazid<br>luliconazole<br>modafinil<br>omeprazole<br>oritavancin<br>oxcarbazepine<br>vonoprazan<br>voriconazole                                                                | carbamazepine<br>dabrafenib<br>enzalutamide<br>letermovir<br>mavacamten<br>phenytoin derivatives<br>rifampin*<br>Saint John's wort<br>tipranavir/ritonavir                                                           |

| Table 1. Inhibitors and Inducers of CYP Enzymes (continued) |                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Strong Inhibitors                                           |                                                                                                                                                                                                                                                                                                                                                | Moderate Inhibitors                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                             | Inducers                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 2D6                                                         | bupropion<br>cinacalcet<br>fluoxetine<br>paroxetine<br>quinidine<br>quinine<br>terbinafine<br>tipranavir/ritonavir                                                                                                                                                                                                                             | abiraterone<br>adagrasib<br>amiodarone<br>artemether/lumefantrine<br>celecoxib<br>chloroquine<br>chlorpheniramine<br>chlorpromazine<br>cimetidine<br>clobazam<br>clomipramine<br>cobicistat<br>darifenacin<br>darunavir<br>desvenlafaxine | diphenhydramine<br>dronedarone<br>duloxetine<br>eliglustat<br>haloperidol<br>imatinib<br>lorcaserin<br>mirabegron<br>promethazine<br>propafenone<br>ritonavir<br>rolapitant<br>rucaparib<br>sertraline                                                      | oritavancin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 2E1                                                         | disulfiram                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 3A4                                                         | adagrasib<br>atazanavir<br>boceprevir<br>clarithromycin<br>cobicistat<br>conivaptan<br>idelalisib<br>imatinib<br>indinavir<br>isoniazid<br>itraconazole<br>ketoconazole<br>lopinavir/ritonavir<br>nefazodone<br>nelfinavir<br>nirmatrelvir<br>posaconazole<br>ritonavir<br>telaprevir<br>telithromycin<br>tipranavir/ritonavir<br>voriconazole | abiraterone<br>amiodarone<br>aprepitant<br>ceritinib<br>clotrimazole<br>crizotinib<br>cyclosporine<br>darunavir<br>delavirdine<br>diltiazem<br>dronedarone<br>erythromycin<br>fluconazole<br>fluvoxamine                                  | fosamprenavir<br>fostamatinib<br>grapefruit juice<br>isavuconazonium<br>ivacaftor<br>letermovir<br>lomitapide<br>miconazole<br>netupitant<br>nilotinib<br>propoxyphene<br>quinupristin/dalfopristin<br>ribociclib<br>saquinavir<br>verapamil<br>zafirlukast | apalutamide*<br>armodafinil<br>artemether/lumefantrine<br>bexarotene<br>bosentan<br>carbamazepine*<br>dabrafenib<br>deferasirox<br>dexamethasone<br>efavirenz<br>elagolix<br>enzalutamide*<br>etravirine<br>mavacamten<br>mitotane*<br>mobocertinib<br>modafinil<br>nafcillin<br>nevirapine<br>oritavancin<br>oxcarbazepine<br>phenobarbital*<br>phenytoin derivatives*<br>primidone*<br>rifabutin*<br>rifampin*<br>rifapentine*<br>rufinamide<br>Saint John's wort*<br>sodium phenylbutyrate/<br>taurursodiol<br>sotorasib |
| * = Strong inducer                                          |                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

| Table 2. Inhibitors and Inducers of P-Glycoprotein (P-gp) |                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                     |                                                                                                                                                  |
|-----------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| Inhibitors                                                |                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                            | Inducers                                                                                                                                                                                                                                                                                            |                                                                                                                                                  |
| P-gp                                                      | abiraterone<br>adagrasib<br>amiodarone<br>capmatinib<br>carvedilol<br>clarithromycin<br>cobicistat<br>crizotinib<br>cyclosporine<br>daclatasvir<br>darunavir<br>diltiazem<br>dipyridamole<br>dronedarone<br>eliglustat<br>enasidenib<br>erythromycin<br>etravirine<br>flibanserin | fostamatinib<br>glecaprevir<br>itraconazole<br>ivacaftor<br>ketoconazole<br>lapatinib<br>ledipasvir<br>lomitapide<br>lopinavir/ritonavir<br>maribavir<br>mefloquine<br>nelfinavir<br>neratinib<br>nicardipine<br>osimertinib<br>pibrentasvir<br>progesterone<br>propafenone<br>propranolol | quinidine<br>reserpine<br>ritonavir<br>rolapitant<br>saquinavir<br>sarecycline<br>simeprevir<br>sodium phenylbutyrate/<br>taurursodiol<br>sofosbuvir/velpatasvir<br>sotorasib<br>telaprevir<br>telithromycin<br>tolvaptan<br>velpatasvir<br>vemurafenib<br>verapamil<br>voclosporin<br>voxilaprevir | carbamazepine<br>dexamethasone<br>doxorubicin<br>nefazodone<br>rifampin<br>Saint John's wort<br>tipranavir/ritonavir<br>trazodone<br>vinblastine |

| Table 3. Inhibitors of Organic Anion Transporting Polypeptide (OATP) |                                                                                                                                                                         |                                                                                                                                                                      |                                                                                                                                               |  |
|----------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|--|
| Inhibitors                                                           |                                                                                                                                                                         |                                                                                                                                                                      |                                                                                                                                               |  |
| OATP1B1                                                              | atazanavir<br>bempedoic acid<br>clarithromycin<br>cobicistat<br>cyclosporine<br>daclatasvir<br>darolutamide<br>eltrombopag<br>eluxadoline<br>enasidenib<br>erythromycin | fostemsavir<br>gemfibrozil<br>glecaprevir<br>ledipasvir<br>leflunomide<br>letermovir<br>lopinavir/ritonavir<br>paritaprevir<br>pibrentasvir<br>rifampin<br>ritonavir | rucaparib<br>sacubitril<br>saquinavir<br>simeprevir<br>teriflunomide<br>tipranavir<br>tolvaptan<br>velpatasvir<br>voclosporin<br>voxilaprevir |  |
| OATP1B3                                                              | atazanavir<br>bempedoic acid<br>clarithromycin<br>cobicistat<br>cyclosporine<br>daclatasvir<br>darolutamide<br>enasidenib<br>erythromycin<br>fostemsavir                | glecaprevir<br>ibrexafungerp<br>ledipasvir<br>leflunomide<br>letermovir<br>lopinavir/ritonavir<br>paritaprevir<br>pibrentasvir<br>rifampin                           | ritonavir<br>rucaparib<br>sacubitril<br>saquinavir<br>simeprevir<br>teriflunomide<br>velpatasvir<br>voclosporin<br>voxilaprevir               |  |
| OATP2B1                                                              | tenapanor<br>velpatasvir                                                                                                                                                |                                                                                                                                                                      |                                                                                                                                               |  |

| Table 4. Inhibitors of Breast Cancer Resistance Protein (BCRP/ABCG2) |                                                                                                                                                                                                                                     |                                                                                                                                                                                                         |                                                                                                                                                                                                                 |  |
|----------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Inhibitors                                                           |                                                                                                                                                                                                                                     |                                                                                                                                                                                                         |                                                                                                                                                                                                                 |  |
| BCRP/<br>ABCG2                                                       | atazanavir<br>capmatinib<br>cobicistat<br>cyclosporine<br>dabrafenib<br>daclatasvir<br>darolutamide<br>dasabuvir<br>dipyridamole<br>elbasvir/grazoprevir<br>eltrombopag<br>eluxadoline<br>enasidenib<br>fostamatinib<br>fostemsavir | gefitinib<br>glecaprevir<br>imatinib<br>lapatinib<br>ledipasvir<br>leflunomide<br>lopinavir<br>maribavir<br>osimertinib<br>oteseconazole<br>pantoprazole<br>paritaprevir<br>pibrentasvir<br>regorafenib | ritonavir<br>rolapitant<br>safinamide<br>simeprevir<br>sodium phenylbutyrate/<br>taurursodiol<br>sunitinib<br>tafamidis<br>tedizolid<br>teriflunomide<br>tolvaptan<br>vandetanib<br>velpatasvir<br>voxilaprevir |  |