

TABLE 361-2 PRINCIPAL ALTERATIONS OF HEPATIC MORPHOLOGY PRODUCED BY SOME COMMONLY USED DRUGS AND CHEMICALS^a

Principal Morphologic Change	Class of Agent	Example
Cholestasis	Anabolic steroid	Methyl testosterone, many other body-building supplements
	Antibiotic	Erythromycin estolate, nitrofurantoin, rifampin, amoxicillin-clavulanic acid, oxacillin
	Anticonvulsant	Carbamazepine
	Antidepressant	Duloxetine, mirtazapine, tricyclic antidepressants
	Anti-inflammatory	Sulindac
	Antiplatelet	Clopidogrel
	Antihypertensive	Irbesartan, fosinopril
	Antithyroid	Methimazole
	Calcium channel blocker	Nifedipine, verapamil
	Immunosuppressive	Cyclosporine
	Lipid-lowering	Ezetimibe
	Oncotherapeutic	Anabolic steroids, busulfan, tamoxifen, irinotecan, cytarabine, temozolomide
	Oral contraceptive	Norethynodrel with mestranol
	Oral hypoglycemic	Chlorpropamide
Tranquilizer	Chlorpromazine ^b	
Fatty liver	Antiarrhythmic	Amiodarone
	Antibiotic	Tetracycline (high-dose, IV)
	Anticonvulsant	Valproic acid
	Antiviral	Dideoxynucleosides (e.g., zidovudine), protease inhibitors (e.g., indinavir, ritonavir)
	Oncotherapeutic	Asparaginase, methotrexate, tamoxifen
Hepatitis	Anesthetic	Halothane, fluothane
	Antiandrogen	Flutamide
	Antibiotic	Isoniazid, ^c rifampicin, nitrofurantoin, telithromycin, minocycline, ^d pyrazinamide, trovafloxacin ^e
	Anticonvulsant	Phenytoin, carbamazepine, valproic acid, phenobarbital
	Antidepressant	lproniazid, amitriptyline, trazodone, venlafaxine, fluoxetine, paroxetine, duloxetine, sertraline, nefazodone ^e
	Antifungal	Ketoconazole, fluconazole, itraconazole
	Antihypertensive	Methyldopa, ^c captopril, enalapril, lisinopril, losartan
	Anti-inflammatory	Ibuprofen, indomethacin, diclofenac, sulindac, bromfenac
	Antipsychotic	Risperidone
	Antiviral	Zidovudine, didanosine, stavudine, nevirapine, ritonavir, indinavir, tipranavir, zalcitabine
	Calcium channel blocker	Nifedipine, verapamil, diltiazem
	Cholinesterase inhibitor	Tacrine
	Diuretic	Chlorothiazide
	Laxative	Oxyphenisatin ^{c,e}
	Norepinephrine-reuptake inhibitor	Atomoxetine
	Oral hypoglycemic	Troglitazone, ^e acarbose
Mixed hepatitis/cholestatic	Antibiotic	Amoxicillin-clavulanic acid, trimethoprim-sulfamethoxazole
	Antibacterial	Clindamycin
	Antifungal	Terbinafine
	Antihistamine	Cyproheptadine
	Immunosuppressive	Azathioprine
	Lipid-lowering	Nicotinic acid, lovastatin, ezetimibe
Toxic (necrosis)	Analgesic	Acetaminophen
	Hydrocarbon	Carbon tetrachloride
	Metal	Yellow phosphorus
	Mushroom	<i>Amanita phalloides</i>
	Solvent	Dimethylformamide
Granulomas	Antiarrhythmic	Quinidine, diltiazem
	Antibiotic	Sulfonamides
	Anticonvulsant	Carbamazepine
	Anti-inflammatory	Phenylbutazone
	Xanthine oxidase inhibitor	Allopurinol
Vascular injury	Chemotherapeutic	Oxaliplatin, melphalan

^aSeveral agents cause more than one type of liver lesion and appear under more than one category. ^bRarely associated with primary biliary cirrhosis–like lesion. ^cOccasionally associated with chronic hepatitis or bridging hepatic necrosis or cirrhosis. ^dAssociated with an autoimmune hepatitis–like syndrome. ^eWithdrawn from use because of severe hepatotoxicity.