

Additional file 1 to

Revisited: Therapeutic and toxic blood concentrations of more than 1,100 drugs and other xenobiotics

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Therapeutic (“normal”), toxic, and comatose-fatal blood-plasma concentrations (mg/L) in man

Substance	Blood-plasma concentration (mg/L)			t _{1/2} (h)	References
	therapeutic (“normal”)	toxic (from)	comatose-fatal (from)		
Abacavir (ABC)	0.9-3.9 ³⁰⁸			appr. 1.5	[1, 2]
Abiraterone	appr. 0.02-0.2			12	[780]
5-ABP	see 5-(2-Aminopropyl) benzofuran				
Acamprosate	0.25-0.7 ²³¹	¹³¹¹		(3-) 13-20 (-33) ²³²	[3-5]
Acebutolol ¹	0.2-2 (0.5-1.26) ¹		15-20	3-11	[6-8]
Acecaïnide	see (N-Acetyl-)Procainamide				
Acecarbromal(um)	10-20 (sum)	25-30			[8, 9], [13]
Acemetacin	see Indometacin				
Acenocoumarol	0.03-0.1 ¹⁹⁷	0.1-0.15		3-11	[3], [9-11]
Acetaldehyde	0-30	100-125			[10, 11]
Acetaminophen	see Paracetamol				

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Substance	Blood-plasma concentration (mg/L)			t _{1/2} (h)	References
	therapeutic ("normal")	toxic (from)	comatose-fatal (from)		
Acetazolamide	(4-) 10-20 ²⁶⁷	25-30		2-6 (-13)	[3], [11-14]
Acetohexamide	20-70	500		1.3	[15], [779]
Acetone	(2-) 5-20	100-400; 2000 ⁸	550	(6-) 8-31	[11], [16, 17]
Acetonitrile			0.77	32	[11]
Acetyldigoxin ³	see Digoxin				
Acetylfentanyl			0.23-0.27		[945-947]
Acetylmethadol	see Levacetylmethadol				
Acetylsalicylic acid (aspirin, ASS, ASA)	20-200 ²	300-350 ²	(400-) 500 ²	3-20 ^{2, 37}	[28-34]
Acitretin	0.01-0.29 (-0.5) ¹¹²			2-4 days	[35, 36], [948, 949]
ACNU	see Nimustine				
Acrivastine	-0.07			1-2	[8]
Acrylfentanyl			0.01-5 ng/g; 0.5-2.1 ng/mL		[950, 951], [1071]
Acyclovir	0.4-1.5 ²⁰³			2-5 ⁸³	[3], [10], [37-39]
Adalimumab	≥ 4.9 (5-9)			appr. 14 days	[40], [787]
N-(adamantan-1-yl)-1-(5-fluoropentyl)-1H-indole-3-carboxamide	see STS-135				

Substance	Blood-plasma concentration (mg/L)			t _½ (h)	References
	therapeutic ("normal")	toxic (from)	comatose-fatal (from)		
Adipiodone(-meglumine)	850-1200			0.5	[41]
Adrenaline	see Epinephrine				
Adriamycin	See Doxorubicin				
Agomelatine	0.007-0.3 ³¹⁰	0.6 ³¹¹		1-2	[4]
AH-7921			350 (30-9100) ng/mL ⁴⁶⁴		[1011], [1041], [1071]
Ajmaline	(0.1-) 0.53-2.21 (?)		5.5 ⁸	1.3-1.6, 5-6	[3], [42], [952]
Albendazole	0.5-1.5 ⁹²			8-9 ⁹²	[43-46]
Albuterol	see Salbutamol				
Alcuronium	0.3-3 ³⁵³			3.3 ± 1.3	[47]
Aldrin	-0.0015	0.0035		50-167 days (as dieldrin)	[11], [48]
Alendronate (Alendronic acid)	< 0.005 ³²²			1-2; terminal: days ⁵⁹⁴	[49-51], [999]
Alfentanil	0.03-0.6 ⁶		0.1-0.2	0.6-2.3 ⁹⁶	[52-55], [1071]
Alfuzosine	0.003-0.06	0.12		3-9	[8], [780]
Alimemazine (Trimeprazine)	0.05-0.4	0.5	1-3.2	8	[56, 57]
Aliskiren	0.07-0.45 ^{426, 620}			30-70	[47]
Alizapride	0.1-2			2-3	[15]

Substance	Blood-plasma concentration (mg/L)			t _½ (h)	References
	therapeutic ("normal")	toxic (from)	comatose-fatal (from)		
Allobarbital	2-5	10	20	40-48	[8], [11], [13], [58], [779]
Allopurinol ³⁵⁴	2-19			0.5-3	[11], [47]
Almotriptan	0.05-0.07			3-4	[47]
Alogliptin	0.06-0.87			21	[780]
Alphaprodine	0.87-1			1.6-2.6	[11]
Alprazolam	0.005-0.05 (-0.08) ⁶⁵	0.1-0.4	0.3 ²⁵²	(6-) 12-15 (-20)	[4], [56], [59-63], [1231]
Alprenolol ^{48, 427}	0.025-0.14	1-2	40-48	2-7	[7, 8]
Aluminium	0.001 (< 0.005 ²³⁴)	0.02-0.15	4.4 ⁸	160 days	[11], [47], [64-66], [953]
Amantadine	(0.06-) 0.2-0.6 (-1)	1.2 ³¹¹ ; 2.4 ⁸	21-48	9-15	[4], [47, 48]
5F-AMB (5F-AMB-PINACA)			0.3 ng/mL		[1037]
Amfebutamone	see Bupropion				
Amikacin	10-25 ⁷⁶	30		(0.5-) 2-3	[67], [954]
Amiloride	0.017-0.026 ⁶²⁰			(6-) 17-24	[47]
Aminobenzoic acid	300-600	600			[66]
Aminoglutethimide	(0.05-) 7.5-25			10-15	[8], [11]
Aminophenazone	10-20			appr. 2-4	[15]

Substance	Blood-plasma concentration (mg/L)			t _{1/2} (h)	References
	therapeutic ("normal")	toxic (from)	comatose-fatal (from)		
5-(2-Aminopropyl)benzofuran (5-APB)	appr. 0.1		0.1-4.2		[781], [955]
5-(2-Aminopropyl)indole (5-API, 5-IT)		0.015-0.59	0.7-18.6 mg/kg		[956, 957]
4-Aminopyridine (Fampridine)	0.025-0.075	0.14 ⁸ ; 0.2		3-3.5	[10, 11], [68]
5-Aminosalicylic acid (5-AS, 5-ASA)	see Mesalazine				
Amiodarone ²⁶¹	(0.5-) 1-2 (-2.5)	2.5-3		30-120 days	[3], [64], [69-71]
Amisulpride	0.1-0.4	0.64 ³¹¹	9.3 ⁸ ; 41.7 ⁸	12-20	[4], [8], [72], [958]
Amitriptyline ^{7, 48} Amitriptyline + Nortriptyline	0.05-0.3 0.08-0.2	0.5-0.6 0.3 ³¹¹	1.5-2	(10-) 30-50	[4], [56], [73-83], [1084], [1231]
Amlodipine	0.003-0.015	0.088 ^{8, 165}	0.1-0.2 ^{8, 166}	34-50	[84-86], [780], [1064], [1151]
Ammonia	0.5-1.7				[11]
Amobarbital	1-5	(5-6) 10-30	13-96	15-30	[48], [87]
Amodiaquine	-0.05 ²⁷⁰			₂₇₀	[88]
Amoxapine	0.18-0.6 ¹⁵¹	3	5	8	[9]
Amoxicillin	0.5-1 (5-15)			1-2	[15]
Amphetamine	0.02-0.1	0.2	0.5-1	4-8 (7-34) ³⁴⁴	[66], [89]
Amphotericin B	(0.1-) 0.2-3	(3-) 5-10	5.3 ⁸	24-48 ¹¹⁰	[47], [90-93]
Ampicillin	0.02-2 (2-20)			1	[67]

Substance	Blood-plasma concentration (mg/L)			t _{1/2} (h)	References
	therapeutic ("normal")	toxic (from)	comatose-fatal (from)		
Amrinone	1-2 (-4)			3-12	[3], [94, 95]
Amsacrine	(0.1-) 1-5.5			5-7	[96]
Amygdalin (Laetrile)	see Cyanide				[130], [250-256], [788-793]
Anileridine	< 0.5		0.9 ⁸		[11], [48]
Aniline	-0.02 ³²⁸ (urine)	0.13 ^{8, 355}	6	(2-) 3-4 (-7)	[11], [47, 48], [97-99]
Antimony	-0.01 ³²⁹	0.05-0.2			[64], [100], [959]
Antipyrine	see Phenazone				
5-ABP	see 5-(2-Aminopropyl) benzofuran				
5-API	see 5-(2-Aminopropyl)indole				
Apixaban	appr. 0.03-0.3		0.39 ⁸	9-14	[794-797], [960]
Apomorphine	0.002-0.02 ²⁰⁴			appr. 0.75	[3], [10]
Aprindine ⁴⁸	1-2	2-3		13-50	[15], [58]
Aprobarbital	4-20	30-40	50	14-34	[11], [47], [58]
Aripiprazole ⁴³	0.1-0.35	1 ^{311, 345}	1.9 ⁸	60-80	[4], [101, 102], [798]
Aripiprazole + Dehydroaripiprazole	0.15-0.5				
Armodafinil ⁶⁰⁷	0.001-0.01 ⁶⁰⁸			10-20	[47], [780]

Substance	Blood-plasma concentration (mg/L)			t _{1/2} (h)	References
	therapeutic ("normal")	toxic (from)	comatose-fatal (from)		
Arsenic	0.002-0.012 (-0.07) ²⁸³	0.05-0.25	0.6-9.3 (-15)	10-14 ⁶³³	[11], [47], [64], [87], [100], [103], [799], [1230]
Articaine	< 1.5-2 (?)			0.3 (-1)	[104]
Ascorbic acid (Vitamin C)	4-15			days	[3], [105-108], [800]
Asenapine	0.001-0.005	0.01 ³¹¹		13-39	[4]
Aspirin	see Acetylsalicylic acid				
Astemizole	0.002-0.05 ⁴³	14 ⁸		2-4 days ⁴²	[3], [109], [961]
Atazanavir (ATV)	> 0.15 ²⁹³			(4-) 6.5-8.6 (-11)	[2], [47], [110, 111]
Atenolol	0.1-1 (-2) ⁷⁷	2-3	27 ⁸	4-14 ⁹	[7], [42], [64], [112]
Atomoxetine	0.2-1 ³¹⁷	2 ³¹¹	5.4 ⁸	appr. 4 ³⁵⁶	[4], [962]
Atorvastatin ⁵⁴²	0.007-0.01 (-0.25)	0.05		11-24	[47], [780], [1063]
Atovaquone	13.9 ± 6.9 (> 15)			2-3 days	[113]
Atracurium(besylate)	0.1-0.5 (-5)			appr. 0.5	[47], [58]
Atropine	0.002-0.025 ¹⁵⁵	0.03-0.1	0.2	2-6.5, 13-38	[11], [66], [114]
Avanafil	_428			6-20	[47]
Avobenzonone	0.001-0.009 ⁴¹⁹			(29-) 74-112 (-480)	[801], [1122]
Azapropazone (Apazone)	40-90			8-24	[8], [13]

Substance	Blood-plasma concentration (mg/L)			t _{1/2} (h)	References
	therapeutic ("normal")	toxic (from)	comatose-fatal (from)		
Azathioprine ¹⁰	0.05-2			1-2 (-4) ¹¹	[13], [15], [123]
Azelastine	0.002-0.003 (-0.01)			22-25	[15]
Azelnidipine	< 0.03 ?			(9-) 14-20	[802, 803]
Azilsartan medoxomil ⁴²⁹	appr. 4-5 ⁶²⁰			12-20	[47]
Azithromycin	appr. 0.04-1			50-60 (2-4 days)	[115-119]
Aztreonam	1-10 (50-250)			1.5-2	[11]
Baclofen	0.08-0.4 (-0.6)	1.1-3.8	6-9.6	6.8 ± 0.7 (2-8)	[9], [11], [47], [804]
Bambuterol	see Terbutaline				
Barbexaclone	active metabolite = Phenobarbital (see there)				[12]
Barbital	2-20	20-50	50	57-120	[13], [15]
Barium	-0.001		0.37; 16-23 ⁸	10-18	[47]
BDF	See Bromobenzo-difuranylisopropylamine				
Benazepril	0.003-0.007			10.5	[780]
Bendrofluazide	0.05-0.1			appr. 3	[42]
Bendroflumethiazide	0.02-0.09 ^{430, 620}			2.4-3.8	[47], [1152]

Substance	Blood-plasma concentration (mg/L)			t _{1/2} (h)	References
	therapeutic ("normal")	toxic (from)	comatose-fatal (from)		
Benoxaprofen	-50			19-39	[3]
Benperidol	0.001-0.01	0.02 ³¹¹		4-8	[4], [8]
Benzbromarone	2-10			2-4	[927, 928]
Benzene	-0.0002 ²⁷¹		0.95 ⁸	9-24	[47], [58]
Benzhexol	see Trihexyphenidyl				
Benzonatate		2.5	0.8 ⁸ ; 4-35 ⁸	appr. 1-3	[8], [47], [963]
Benzoylcegonine ³⁵⁷	-0.1		1	4-5	[8]
Benzphetamine	0.025-0.5	0.5	14 ⁸		[8], [11], [47]
Benztropine	0.01-0.18	0.05	0.2-0.7	12-24	[8], [11], [47]
Benzydamine	_563			6-23 (oral); 14-35 (topical)	[47]
Benzyl alcohol	_431	18 ⁸ , 194		_195	[3], [47], [120, 121]
Benzylpenicillin	1.2-12			1	[41], [67]
N-Benzylpiperazine	0.01-1.2	0.7-6.3	8.3-20	4-6	[47]
Bepriidil	0.6-2.5			33-42 (30-130)	[8], [122]
Beryllium	-0.0003				[58]
Betacarotene	4-6 ¹⁹⁶				[3], [124]

Substance	Blood-plasma concentration (mg/L)			t _{1/2} (h)	References
	therapeutic ("normal")	toxic (from)	comatose-fatal (from)		
Betaxolol	0.005-0.05		36 ⁸	14-22	[7], [47], [125]
Bethanidine	0.02-0.5			9-10	[3], [58]
Bevantolol	0.2-2			2	[8]
Bezafibrate	-15			2	[3]
Bicalutamide	1.5-17.5 (-25) ¹⁶³			(3-) 7-10 days	[126]
Biperiden	0.001-0.0065 ⁴⁰⁶	0.013 ³¹¹	0.25 ⁸	18-24	[4], [56]
Bismut (Bismuth)	< 0.05 (-0.1)	0.05-0.1		days	[47], [64]
Bisoprolol	0.01-0.1	0.2	0.17 ⁸	10-12	[7], [780], [964], [1064]
Bopindolol	0.001-0.015 ⁵⁴			4-8 ⁵⁴	[7], [965]
Borate	0-7	20	200	12-27	[47], [66]
Boron	0.8-6	20-50	50-150		[58]
Bornaprine	0.0007-0.0072 ³¹³	0.014 ³¹¹		appr. 30	[4]
Bosentan	0.7-1.6 ⁶²⁰			3.5-5.1	[47]
Brallobarbitol (Brallobarbitone)	4-8	8-10	15	20-40	[8], [13]
Bretylium	0.8-2.4			6-11	[3], [58]
Brexiprazole	0.04-0.14	0.28 ³¹¹		91	[4]

Substance	Blood-plasma concentration (mg/L)			t _{1/2} (h)	References
	therapeutic ("normal")	toxic (from)	comatose-fatal (from)		
Brivaracetam	0.5-0.9	1.8 ³¹¹		7-11	[4]
Brodifacoum		0.02	0.03-0.17; acute: 3.9 ⁸	20-60 days	[58], [127]
Bromadiolon		0.02		3-6 days (early), 10-24 days (late phase)	[11], [47], [58]
Bromazepam	(0.05-) 0.08-0.2	0.3-0.4	(1-) 2	8-22 (-35)	[4], [59]
Bromide	75-100 (-300)	500-1500; 3000 ^{8, 242}	2000	9-15 days	[47], [58], [128-130]
Bromisoval	10-20	30-40		appr. 4 ^{28, 105}	[13], [58]
Bromobenzodifuranylisopropylamine (Bromo-DragonFLY, BDF)		0.5-2 ng/mL	4.7 ng/mL ⁸		[967, 968]
Bromocriptine	0.1-0.3 (-4) ng/mL ³¹⁴	8 ng/mL ³¹¹		appr. 38	[4]
25B-NBOMe (2-(4-bromo-2,5-dimethoxyphenyl)-N-[(2-methoxyphenyl)methyl]ethanamine)		0.038	0.06-0.66		[966]
Bromoxynil		20	79 ^{8, 433} ; 137 ^{8, 432}		[58], [969]
Bromperidol	0.012-0.02	0.03 ³¹¹		20-36	[4]
Brompheniramine	0.005-0.015	0.2 ⁸		2-10 (-20)	[15], [47]
Brotizolam	0.001-0.01 (-0.02)	0.02 ³¹¹	0.01-0.03 ⁸ ; 0.21	4-10	[4], [47], [131], [970]
Budesonide	appr. 0.009-0.045			2-3	[780]

Substance	Blood-plasma concentration (mg/L)			t _{1/2} (h)	References
	therapeutic ("normal")	toxic (from)	comatose-fatal (from)		
Budipine	appr. 0.1-0.3			30	[15]
Buflomedil	appr. 0.2-0.5 (-1.0)	15-25	25-50; 275 ⁸	2-4	[11], [42], [58]
Bumetanide	0.001-0.005			0.8-1.5	[780], [1205]
Bunitrolol	0.001-0.015			2-6	[7]
Bupivacaine	(0.25-) 0.5-1.5 (-2)	2-4	3.8 ⁸	0.5-3	[3], [132-134], [971]
Bupranolol ⁴⁴	₄₃₄			2-4	[7], [972]
Buprenorphine ³⁴⁰	0.0005-0.005 (-0.014) ²⁸⁵	0.01 ³¹¹ ; 0.03-0.1 ³³⁹	0.008-0.029	2-5 (i.v.); 18-49 (sublingual); appr. 19 (buccal)	[3, 4], [47], [135-141], [1006]
Bupropion (Amfebutamone)	0.01-0.02; 0.05-0.1 ¹⁵² ; 0.55-1.5 ⁴³⁵	1.2-2 ²⁴⁶ ; 2 ³¹¹	4 ⁸ ; 4.2 ⁸ ; 7.3 ⁸	(4-) 10-20; 17-47 ⁴³⁶	[4], [47], [80], [142-148], [973]
Buspirone ³¹²	0.001-0.004 (-0.01) ⁴³⁷	0.03 ³¹¹	0.2 (0.05-1.1) ⁴⁶⁵	1-5 (4-7) ⁴³⁸	[4], [1012], [1194]
Busulfan	> 0.9 ²⁹¹			2-4	[149-154]
Butabarbital	see Secbutabarbital				
Butalbital	1-5	10-15	15-30	30-40	[13], [15], [58]
1,4-Butanediol ⁴⁶⁶	see 4-Hydroxybutyrate				[1013]
Butanone	-10	500			[58]

Substance	Blood-plasma concentration (mg/L)			t _{1/2} (h)	References
	therapeutic ("normal")	toxic (from)	comatose-fatal (from)		
Butaperazine	0.02-0.3 (-0.7)			12	[15], [779]
Butorphanol	0.0006-0.002			4-9	[8], [779]
Butriptyline	0.07-0.15	0.4-0.5	15	18-22	[15], [47], [779]
Butylone		0.2	0.13-129		[955], [1014, 1015]
Butylscopolamine	-0.7			4-5	[8]
Butyrylfentanyl			99 ng/mL		[974], [1071]
Cabergoline	0.058-0.144 ng/mL ³¹⁵	0.39 ng/mL ³¹¹		63-68	[4]
Cadmium	< 0.0003-0.0065	0.015-0.05		appr. 16 years	[47], [58], [100]
Caffeine (Coffein)	(2-) 4-10	15-20	80-180	2-10	[47], [64], [155-157]
Calcifediol (Calcidiol; see also Vitamin D)	0.01-0.05				[66]
Camazepam	0.1-0.6	2		20-24	[59]
Camostat ⁶³¹	87.1 ± 29.5 ng/mL ⁶³²			100 ± 40 min ⁶³²	[1227, 1228]
Camphor		0.3-0.4	1.7	2-8	[8], [47], [158]
Canagliflozin	0.17-1.3			(8-) 10-12 (-15)	[47], [780]
Candesartan	0.08-0.18 (-0.4)	0.54		5-7, 8-13	[15], [47], [780], [1064]
Canrenone	see Spironolactone				

Substance	Blood-plasma concentration (mg/L)			t _{1/2} (h)	References
	therapeutic ("normal")	toxic (from)	comatose-fatal (from)		
Captopril	0.05-0.5 (-1) ⁶²⁰	5-6	60	1-2 (-6)	[42], [47], [84], [159]
Carazolol ²³	-0.015			9	[7]
Carbachol	appr. 0.01 ?		3.6 ^{8, 287}		[3], [160]
Carbamazepine ¹²	2-8 (4-12)	10	20	12-60 (7-35) ¹⁴⁰	[12], [56], [161-166], [1231]
Carbaryl		5	6-27		[47], [167]
Carbenoxolone	appr. 5-30			8-20	[66]
Carbidopa	0.02-0.2 ³¹⁶	0.4 ^{311, 316}		2	[4]
Carbimazole	0.5-3.4 ⁹⁵			3-6 ⁹⁵	[8], [13]
Carbinoxamine	appr. 0.02-0.04			appr. 10-15	[168]
Carbocromene (Carbochromene)	0.8-2.4 (-3)			0.2-1.5	[8]
Carbon monoxide	₂₀₀	17-30%	50-60%		[10], [47], [58], [975-978]
Carbon tetrachloride	-0.07	0.12 ⁸ ; 7.1 ^{8, 269} ; 11 ⁸ ; 10-50	100-200	appr. 24; 42.6 ⁸	[58], [169-173]
Carboplatin	peak 10-25			2.5-6 ¹⁰⁶	[47]
Carbromal(um) ¹³	2-10	15-20	40	7-15	[13], [58]
Carfentanil			0.12 ⁸ ; 0.145 ⁸ ; 0.221 ⁸ ; 1.3 ⁸ ng/mL		[979, 980], [1071]

Substance	Blood-plasma concentration (mg/L)			t _{1/2} (h)	References
	therapeutic ("normal")	toxic (from)	comatose-fatal (from)		
Cariprazine ⁴³⁹	0.01-0.02	0.04 ³¹¹		48-120	[4], [47]
Carisoprodol ⁴⁴⁰	2.5-10	40; 30-50 ¹⁰⁴	8-65 ^{8, 441} ; 110 ¹⁰⁴	0.9-2.4	[47], [56], [58], [982]
β-Carotene	see Betacarotene				
Carteolol	0.01-0.1			3-7	[7]
Carvedilol	appr. 0.02-0.15 (-0.3)	0.47 ⁸		6-10	[3], [8], [95], [983]
Cathine	0.054-0.087 ³⁷⁰ ; 0.11-0.2 ⁴⁴² ; 0.016-0.31 ⁵⁵³			1.8-8.6	[984, 985]
Cathinone	0.047-0.087 ³⁷⁰ ; 0.009-0.17 ⁵⁵⁴			0.7-2.3	[984, 985]
Cefaclor	13-35 (i.v. -900)			0.5-1 (-2)	[3], [8], [11]
Cefadroxil	-30			1-2	[8]
Cefalexin	-65			1-1.5	[41]
Cefaloridine	20-80			1.5	[41]
Cefalotin	see Cephalotin				
Cefamandole	1-5 (10-40-150)			0.5-1.2	[41], [58]
Cefazolin	-150			1.5-2	[8], [41], [67]
Cefdinir	-4			1.1-2.3	[8], [47]
Cefepime	-160			2	[8]

Substance	Blood-plasma concentration (mg/L)			t _½ (h)	References
	therapeutic ("normal")	toxic (from)	comatose-fatal (from)		
Cefetamet	-7			2-3	[8]
Cefixime	-7			3-4	[8]
Cefmenoxime	-200			1-2	[8]
Cefodizime	-400			2-4	[8]
Cefoperazone	-250			1-2 (-5)	[8], [174]
Cefotaxime	0.5-2 (10-50; i.v. -225)			1-1.5	[67]
Cefotetan	65-90			3.5	[41]
Cefotiam	-150 ⁷¹			0.7-1.5 (-2)	[41], [175]
Cefoxitin	-150			0.7-1	[41]
Cefpodoxime	-7			2-3	[8]
Cefsulodin	20-100			1.6-1.9	[3], [8], [11]
Ceftazidime	20-40 (50-200)			1-4	[3], [8], [11]
Ceftibuten	appr. 3-20			2-4	[8]
Ceftizoxime	40-160			6-9	[41]
Ceftriaxone	15-75			4.5-8.5	[67], [1186]
Cefuroxime	0.5-1 (10-60; i.v. -180) ²⁴³			1.1-1.3	[3], [10], [58], [176, 177]

Substance	Blood-plasma concentration (mg/L)			t _{1/2} (h)	References
	therapeutic ("normal")	toxic (from)	comatose-fatal (from)		
Celecoxib ⁴⁸	0.36-0.8 ³⁷¹			7-16	[47]
Celiprolol	0.05-0.5 (-1)			3-6	[58]
Cephalothin (Cefalotin)	-30			0.5-0.6	[3], [41]
Cerivastatin	0.002-0.04			1.5-3	[8]
Cetirizine	appr. 0.1-0.6	2-5		7-10	[15], [47]
Chinidine	see Quinidine				
Chinine	see Quinine				
Chloralhydrate ¹⁴	1.5-15	40-50	60-100	6-10 (-30)	[47], [58]
Chlorambucil	0.15-0.3			1.5-3	[15]
Chloramphenicol	5-10 (-15) ⁵⁹	25	28-108; 180 ^{8, 552}	2-6	[11], [47], [58], [178], [1069]
Chlordane	-0.001	0.0025	1-7	88 days	[11], [58]
Chlordecone		0.6-32		63-148 days	[47]
Chlordiazepoxide ¹⁵	0.4-3	3.5-10 (-15); 20.5 ⁸	20 ⁸ ; 26 ⁸	6-27	[11], [47], [56], [58], [179], [180]
Chlorhexidine				appr. 12 (dermally in rats)	[47]
Chlormethiazole	see Clomethiazole				

Substance	Blood-plasma concentration (mg/L)			t _{1/2} (h)	References
	therapeutic ("normal")	toxic (from)	comatose-fatal (from)		
Chlormezanone	(3-) 5-9 (-14)	appr. 20	18 ⁸ ; 53 ⁸	20-30 (-60)	[43], [47], [56], [181]
Chlorobutanol		75			[66]
2-(4-chloro-2,5-dimethoxyphenyl)-N-[(2-methoxyphenyl)methyl]ethanamine	see 25C-NBOMe				
Chloroform	20-50 (-100) ⁴⁴³	appr. 70	33 ⁸ ; 64 ⁸ ; 69 ⁸ ; 91 ⁸	1.5	[11], [47], [58], [182]
Chlorophacinone			3.4-28; 26 ⁸	6-23 days	[47]
Chloroquine	0.02-0.5 (-0.7)	0.8-1	3; 8 ⁸ ; 15 ⁸ ; 18 ⁸	dose-dependent (3-14 (-30-60)) days	[30], [47], [56], [183], [806], [1232]
Chlorothiazide	2-18			0.5-2	[3], [11], [58], [780]
Chlorphenamine (Chlorpheniramine)	(0.003-) 0.01-0.02		1.1 ⁸	(12-) 15-25 (-43) ³⁵⁸	[3], [11], [47], [58]
Chlorpromazine ⁶⁶	0.03-0.1 (-0.5)	0.6 ³¹¹ ; 1-2	3-4	10-30	[4], [56], [184], [185]
Chlorpropamide	30-250	200-750		25-60	[58], [66]
Chlorprothixene	0.02-0.3	0.4 ³¹¹	0.4-0.9	8-12	[4], [47], [798]
Chlorpyrifos		0.2	0.5 (0.14-1.2) ²⁷⁶	56-74	[47], [186]
Chlortalidone	0.15-0.3 (-1.4)	appr. 2		44-48 (24-89)	[47], [58]
Chlortetracycline	1-5 (-10)	30		5-6	[9], [13, 14], [58]
Cholecalciferol	see Vitamin D				

Substance	Blood-plasma concentration (mg/L)			t _½ (h)	References
	therapeutic ("normal")	toxic (from)	comatose-fatal (from)		
Chromium	< 0.0005 ³⁸⁸	0.001-0.091 (-0.3) (inhalative exposition); 0.2-4.6 (after oral intake)	1 ⁵⁵⁵ ; 32 ⁸ ; 68 ⁸	3-4 years	[47], [805], [987]
Cibenzoline	0.2-0.4 (-0.9)	(0.5-) 1	3.4-23	(6)- 7-8 (-15) ⁸³	[3], [47], [187]
Cicletanine	appr. 1-2			5-23	[3], [8]
Ciclosporine A (Cyclosporine, CsA)	< 0.1-0.25	0.3-0.4 ¹⁶		10-27 ¹⁶⁹	[188-193]
Cidofovir	appr. 7-43			2.5	[3], [8]
Cilazapril (Cilazaprilat)	0.003-0.09			30-50	[8]
Cilostazol	0.18-0.54			12	[780]
Cimetidine	0.25-3 (0.75-4)	19-50	110 ⁸	1.5-4	[47], [58], [194, 195]
Cinnarizine	0.04-0.33	7.4 ⁸	1.1 ⁸	12-34	[47]
Cinoxacin	appr. 15			1.5-4	[8]
Ciprofloxacin	2.5-4	11.5 ⁸		3-6 (-8)	[47], [196-199], [203]
Cisaprid	0.04-0.08			6-12	[8]
Citalopram	0.05-0.11	0.22 ³¹¹ ; 2.45 ⁸	3.4-10.5 (5-6 ¹⁶⁰)	25-48 ¹⁷⁰	[4], [8], [47], [56], [200-202], [204-207], [807, 808], [1084]
Cladribine	appr. 0.006			0.1-0.2 (6.4-19.7)	[208-210]

Substance	Blood-plasma concentration (mg/L)			t _{1/2} (h)	References
	therapeutic ("normal")	toxic (from)	comatose-fatal (from)		
Clarithromycin	appr. 0.2-2			3-7 ²¹⁷	[8], [115], [118], [211-213]
Clemastine	appr. 0.001-0.002			10-32	[8], [47], [214]
Clenbuterol	0.0003-0.0006	0.003 ⁸	0.001 ^{8, 424}	30-35	[47], [940-942]
Clindamycin	appr. 0.5-2 ⁵⁵⁶			2-3	[8], [47]
Clobazam ¹⁷	0.03-0.3	0.5 ³¹¹	0.7 ^{8, 444} ; 3.9 ⁸	18-42	[4], [47], [59], [215]
Clobutinol	appr. 0.05-0.2			23-34	[3], [8]
Clodronate (Clodronic acid)	0.7-1 ⁴⁶⁰			(2.5-) 7-8; terminal: days ⁵⁹⁴	[49], [996, 997]
Clofibrate	50-250			10-18	[88]
Clomethiazole (Chlormethiazole)	0.1-5 ⁴⁴⁶	(2.8-) 4-15	10-214	(2-) 3-5 (-7)	[4], [9], [13], [47], [216, 217]
Clomipramine ^{48, 85} Clomipramin + N-Desmethylclomipramin	(0.02-) 0.09-0.25 (-0.4) ²²⁶ 0.23-0.45	0.4-0.6 0.45 ³¹¹	1-2	16-60	[4], [76], [80], [218-223], [1084]
Clonazepam	(0.004-) 0.02-0.07 ¹⁵⁰	0.08 ³¹¹ ; 0.1		20-60	[4], [60], [161], [224]
Clonazolam	₄₂₁	₄₂₁			[835]
Clonidine	0.001-0.002 (-0.004)	0.009 ⁸ ; 0.025-0.05	0.023 ⁸ ; 0.23 ⁸ ; 5.2 ⁸	5-20	[47], [225-227]
Cloпамide	appr. 0.06-0.18 ⁶²⁰			6-14	[47]
Cloпenthixol (Cloпentixol)	0.002-0.015	0.1-0.3		15-25	[8], [11]

Substance	Blood-plasma concentration (mg/L)			t _{1/2} (h)	References
	therapeutic ("normal")	toxic (from)	comatose-fatal (from)		
Clopidogrel ⁴⁴⁵	0.001-0.006			1.5-4 (-7)	[47]
Clorazepate ¹⁵	see Nordazepam			1-2	[164]
Clotiapin	0.007-0.15	0.12-0.38	0.3 ⁸ ; 1.3 ⁸	4-10	[47]
Clotiazepam	0.1-0.7			3-15	[8]
Cloxacillin	5-30 (-85)			0.5-1 (0.3-2)	[8], [11], [58]
Clozapine ¹³⁶	(0.1-) 0.35-0.6	0.6-1 (9.5 ⁸)	1.2 ⁸ ; 2 ⁸ ; 5.2 ⁸	(6-) 12-16	[4], [72], [101], [228-240], [809]
25C-NBOMe (2-(4-chloro-2,5-dimethoxyphenyl)-N-[(2-methoxyphenyl)methyl]ethanamine)		0.16 ng/mL ^{8, 447}	0.8 ng/g ^{8, 448}		[47], [988, 989], [995]
Cobalamin	see Vitamin B ₁₂				
Cobalt	0.0001-0.001	0.4-0.5	0.42 ⁸	2 (early); 38 (late phase)	[11], [47], [58]
Cocaine	0.05-0.3	(0.25-) 0.5-1 (-5.2)	0.9-21	0.5-1 ¹⁸	[13, 14], [47], [58], [241, 242], [990], [1083]
Codeine ⁴⁸	0.03-0.25	0.5-1 ³³⁹	0.45-2 (-48)	3-4	[3], [47], [243, 244]
Coffein (Coffeine)	see Caffeine				
Colchicine	0.0003-0.0025	0.005 (0.019 ⁸)	0.009 ⁸ ; 0.024 ⁸ ; 0.066 ⁸	11-32 (-60) ¹⁴³	[10], [47], [245-248]
Colecalciferol	see Vitamin D				

Substance	Blood-plasma concentration (mg/L)			t _{1/2} (h)	References
	therapeutic ("normal")	toxic (from)	comatose-fatal (from)		
Colistin	1-5 ⁸⁶			1.5-2 (-5)	[47]
Copper	0.6-1.5	0.8-2	2.5-5 (-66)	26 days	[66]
Cotrimoxazole	see Sulfamethoxazole and Trimethoprim				
Coumatetralyl		0.009 ⁸ ; 0.12 ⁸		12-13 ⁴⁵²	[47], [249]
Cresol (Methylphenols)	- ⁴⁴⁹	appr. 50	120		[58], [991]
Cromolyn (Cromoglycate)	appr. -0.01			1-1.5	[3]
5F-Cumyl-PEGACLONE			0.09-0.45 ng/mL ^{8, 565}		[1081, 1082]
Cyamenazine	0.0009-0.016		1.8 ⁸ ; 3.6 ⁸ ; 9.8 ⁸	10-12	[47]
Cyanide	- ¹⁷⁷	(0.2-) 0.5; 0.514 ⁸	1-3	0.7-2.1 (whole blood); appr. 19 ¹⁸⁴	[47], [130], [250-256], [788-793]
Cyclizine	0.1-0.25	0.75-1	15; 16 ⁸	7-24	[11], [47], [58], [810]
Cyclobarbital	2-6	10	20; 68 ⁸ ; 70 ⁸	8-17	[811, 812]
Cyclobenzaprine	appr. 0.003-0.04	0.4	0.8; 1 ⁸	18 (9-40) ²⁵³	[11], [58], [257], [992]
Cyclohexane	-0.4 ⁴⁵⁰			1-3	[47]
1-Cyclohexyl-4-(1,2-diphenylethyl)piperazine (MT-45)	-		0.52 ^{8, 559} ; 2.9 ^{8, 451}		[993], [1070]
Cyclophosphamide	10-25			(1.3-) 4-8 (-16)	[3], [8]

Substance	Blood-plasma concentration (mg/L)			t _{1/2} (h)	References
	therapeutic ("normal")	toxic (from)	comatose-fatal (from)		
Cyclopropane	80-180				[11], [58]
Cyclopropylfentanyl ⁴¹¹	-		1.4-43 ⁴¹² ; 51 ⁸ ; 76 ⁸ ng/mL		[813-816], [1015], [1071]
Cyclosporine	see Ciclosporine				
Cyproheptadine	appr. -0.05	0.13 ⁸	0.47 ⁸	8-9; 20-40	[3], [47]
Cyproterone acetate	0.01-0.2			30-40 (-120)	[47], [126]
Cysteamine	appr. > 1.55 ²⁸²			appr. 1	[3], [258]
Cytarabine	0.05-0.5			0.1-0.2 (1.9-2.5)	[9], [209]
2,4-D	see 2,4-Dichloro- phenoxyacetic acid				
Dabigatran	(0.03-) 0.04-0.2 (-0.3)	0.2?; 2.7 ⁸	5.6 ⁸	9-14 ⁸³	[794], [796, 797], [817-820], [960]
Dalfampridine	0.015-0.055			5.8	[780]
Danazol	appr. -0.2			4.5	[3]
Dantrolene	(0.1-) 0.4-1.5 (-3)			4-12	[3], [9], [259]
Dapagliflozin	0.006-0.285			12.9	[780]
Dapsone ⁴⁸	0.5-2	10	18 ⁸	25-31	[260, 261]
Daptomycin	> 3.2 (trough)	24.3 (trough)		(4-) 7-9 (-12)	[821-825], [1186]

Substance	Blood-plasma concentration (mg/L)			t _{1/2} (h)	References
	therapeutic ("normal")	toxic (from)	comatose-fatal (from)		
Darifenacin	0.0015-0.02			16	[780]
Darunavir (DRV)	> 3.3 (1.3-7.4) ³⁰¹			appr. 15	[2], [110], [262]
DEET	see N,N-Diethyl-3-methylbenzamide				
Deferoxamine (Desferrioxamine)	3-15			4-6	[8], [47]
Delorazepam ⁵⁵⁷	0.01-0.07			80-115	[47]
Demoxepam	0.5-0.74	1	2.7		[66], [1194]
Desipramine ^{48,69}	0.01-0.5 (0.1-0.3)	0.3 ³¹¹ ; 0.5-1	3	15-25 ⁷⁰	[4], [74], [78-80], [263, 264]
Desloratadine ³⁷²	0.002-0.006 ³⁷³	0.012 ³¹¹		17-27	[4]
Desmethyldiazepam (N-Desmethyldiazepam)	see Nordazepam (= Nordiazepam)				[59]
Des(methyl)venlafaxine	0.1-0.4	0.8 ³¹¹		10-17	[4]
Detajmium	0.01-0.7		1.8 ⁸	13-14	[8]
Dexamethasone	appr. 0.05-0.27 ²⁴⁷	0.8		2.5-9.5	[3], [265]
Dexfenfluramine ³⁵¹	appr. 0.03-0.06	0.15-0.25		appr. 18	[11], [58], [66]
Dexketoprofen ³⁷⁴	appr. 3.7			0.5-2	[47]
Dexmedetomidine	-appr. 3.5 ng/mL ⁴⁶⁹			3-10	[47], [1017]

Substance	Blood-plasma concentration (mg/L)			t _{1/2} (h)	References
	therapeutic ("normal")	toxic (from)	comatose-fatal (from)		
Dexmethylphenidate ³⁴²	0.013-0.023 ³¹⁸	0.044 ^{311, 318}		appr. 2	[4]
Dextromethorphan ⁴⁸	0.001-0.04 (0.23 ⁴⁵⁸)	0.1-2.8	1.1-3 (-20)	2-4 (23-42 ⁴⁵⁸)	[47], [266-270]
Dextromoramide ³⁵⁰	0.05-0.15	0.2 ³³⁹	0.1-1.5	1.5-4-7	[8], [47], [58], [271, 272]
Dextropropoxyphene ³⁰⁵	0.05-0.3 (-0.5)	0.6-1	1-2	10-30	[30], [48]
Diacetylmorphine or Diamorphine (DAM)	see Heroin (and Morphine)			2-5 minutes	[273-281]
3,4-Diaminopyridin (DAP)	< 0.04 ²¹³	0.1 (?)		0.3-2 ²¹⁴	[282]
Diazepam ¹⁹	0.1-2 (-2.5) ⁴⁵⁹	3 ³¹¹ -5 ⁴⁵⁹		24-48	[4], [13, 14], [59], [224], [241], [283-286]
Diazinon	-	0.05-0.1 (-0.5)	0.7-277		[47], [58]
Diazoxide	10-20 (-50)	50 (-100)		20-36 (-48)	[3], [10], [42], [58], [84]
Dibenzepine	0.025-0.15 (0.1-0.5)	3 ³⁵⁹	18 ³⁵⁹	3.5-5	[11], [58]
Dichloromethane	-		50-280 (-2200)	0.6 (early); 4-8 (late phase)	[47]
2,4-Dichlorophenoxyacetic acid (2,4-D)	-	appr. 100	200; 392 ⁸ ; 720 ⁸	4-140 ¹⁸²	[3], [11], [47], [58]
Dichlorprop	-	52 ⁸	250 ⁸ ; 450 ⁸	70-90	[47]
Dichlorvos (2,2-Dichlorvinyl-dimethylphosphate, DDVP)	-		29	0.16	[47]
Diciclomine	see Dicyclomine				[8]

Substance	Blood-plasma concentration (mg/L)			t _{1/2} (h)	References
	therapeutic ("normal")	toxic (from)	comatose-fatal (from)		
Diclozepam ⁴²¹	_468				[1016]
Diclofenac	0.5-3	50; 60 ⁸		1-3	[47], [287-289]
Dicoumarol	8-30	22-192		1-4 days	[8], [11]
Dicyclomine (Dicycloverin)	-0.1	appr. 0.2	0.2 ⁸ ; 0.5 ⁸	1.8-2 (-5)	[8], [47]
Didanosine (DDI)	appr. 1-30 µmol/L			appr. 1.4	[2, 3], [38], [290, 291]
Dieldrin	-0.0015	0.15-0.3	0.5	2-12 months	[11], [47], [58]
Diethylcarbamazine	> 0.8-1.0			4-15	[292]
Diethylene glycol	-	0.04 ^{8, 453} ; 17 ^{8, 454} ; 200-500	0.2 ⁵⁵⁸ -360 ⁴⁵⁵	3-4	[47]
N,N-Diethyl-3-methylbenzamide (N,N-Diethyl-m-toluamide; DEET)	-	1.6	112 ⁸ ; 240 ⁸	appr. 2.5	[47]
Diethylpentenamide (Valdetamide)	2-10	20	45	6-7	[8], [13]
Diethylpropion	0.003-0.007 (-0.2)	2	5.4 ⁸	4-8 ²³	[3], [8], [58]
Difenacoum	-	0.5		11-42 days	[47]
Diflunisal	40-100 (-200)	300	260 ⁸ ; 370 ⁸ ; 520 ⁸	5-12 ⁸³	[3], [9], [47], [58], [293]
Digitoxin	0.008-0.018	0.03	0.04	140-200 (7-9 days)	[294, 295], [783]
Digoxin	0.0005-0.0009	(0.0012-) 0.002 ³⁸³	0.004-0.005	40-70	[18-27], [782-786]

Substance	Blood-plasma concentration (mg/L)			t _{1/2} (h)	References
	therapeutic ("normal")	toxic (from)	comatose-fatal (from)		
Dihydralazine	see Hydralazine				
Dihydrocodeine	0.03-0.25	0.5-1 (-12) ³³⁹	0.4-166	3-4	[14], [47], [58]
Dihydroergotamine	0.001-0.01			4-15	[3], [8], [47]
Diltiazem	0.03-0.13 (-0.25) ¹⁵⁷	0.8-1	2-6; 7 ⁸ ; 8 ⁸	2-6 (4-9)	[3], [47], [58], [84]
Dimenhydrinate	see Diphenhydramine				
Dimethadione ³⁶⁰	(350-) 700-1000	1000		5-10 days	[3], [8], [11, 12]
Dimethindene	0.01-0.05			appr. 6	[3], [8]
Dimethoate	-		355.5 (160.0-674.0) μmol/L ²⁷⁷	appr. 5	[47], [186]
2,5-Dimethoxy-4-bromoamphetamine (DOB)			0.01 ⁸ ; 0.02 ⁸ ; 0.9 ⁸	17-22	[47]
2,5-Dimethoxy-4-bromophenethylamine (2C-B)		0.34 ⁸		1.1	[47], [994]
3,4-Dimethylmethcathinone (3,4-DMMC)				27 ⁸	[1018]
N,N-Dimethyltryptamine	0.001-0.1			0.5-1.5	[47], [58]
4,6-Dinitro-2-methylphenol (Dinitro-O (ortho)-cresol [DNOC])	1-5	30-60	34 ⁸ ; 75 ⁸	5-6 days	[47], [58]
Dionin	see Ethylmorphine				

Substance	Blood-plasma concentration (mg/L)			t _{1/2} (h)	References
	therapeutic ("normal")	toxic (from)	comatose-fatal (from)		
Diphenhydramine	0.05-0.1 (-1)	(0.1-) 1-2 (-4)	1.1 (in infants); 5-10	3-14, 20-60	[47], [58], [114], [296, 297]
Diphenidine			0.012-1.38 ⁴⁷⁰		[1015]
Diphenoxylate	appr. 0.01-0.08		0.34 ⁸	2-3	[47]
Dipipanone	appr. -0.05	0.43	< 0.1 (oral); 0.5-6.2 (i.v.)	3.2-3.8	[47]
Diprophylline	see Dyphylline				
Dipyridamole	0.1-1.5 (-2)	4	9.2 ⁸ ; 187 ⁸	(6-) 11-13 (-28)	[9], [13, 14], [47]
Dipyron	see Metamizole				
Diquat	-	0.1-0.4	0.4-4.5; 65 ⁸		[11], [47]
Disopyramide	2-7 ⁷⁸	8	27	(3-) 5-8 (-11)	[11], [47], [58], [64], [70], [986]
Disulfiram	0.05-0.4	0.5 ³¹¹ ; 5	8 ⁴⁵⁶ ; 120 ⁴⁵⁶	5-9	[4], [47], [58]
Divalproex	see Valproic acid			(9-) 12.5 (-16)	[780]
Dixyrazine	appr. 0.3 ²⁴⁹		5.5 ⁸ ; 9.4 ⁸		[4], [298]
DOB	see 2,5-Dimethoxy-4-bromoamphetamine				
Dofetilide	0.002-0.0055			(5-) 9-10 (-13.5)	[780]
Domperidone	appr. 0.01-0.1	0.2 ³¹¹		12-16	[3], [299-302]

Substance	Blood-plasma concentration (mg/L)			t _{1/2} (h)	References
	therapeutic ("normal")	toxic (from)	comatose-fatal (from)		
Donepezil ²⁰⁷	appr. 0.03-0.075	0.1 ³¹¹		70-100	[4], [303, 304]
Doripenem	appr. -12			(1-) 2.5-8	[826], [1186]
Dothiepin (Dosulepin) ²⁰	0.045-0.1	0.2 ³¹¹ ; (0.3-) 0.8	0.3-5.8	(8-) 11-20 (-40)	[4], [47], [305, 306]
Doxacurium	0.01-0.3			1-2 ⁸³	[8]
Doxapram	(1.5-) 2-5	9 ²⁶⁸		2.4-9.9	[3], [11], [58], [307]
Doxazosin	0.01-0.15	0.3 ³¹¹		10-22	[47], [95]
Doxepin ²¹ Doxepin plus N-desmethyldoxepin	0.01-0.2 (0.03-0.1) 0.05-0.15	0.5-1 0.3 ³¹¹	2-4	(8-) 15-20 (-25)	[4], [73], [77], [80], [264], [308-310]
Doxorubicin (Adriamycin)	0.006-0.02			20-48	[3], [8], [58]
Doxycycline	1-5 (-10)	30		15-28	[8], [58]
Doxylamine ²⁸⁹	0.05-0.2 ⁴⁵⁷	0.32 ³¹¹ ; 1-2	5	(7-) 9-11 (-13)	[4], [47], [87], [311], [827]
Dronabinol (Delta-9-tetrahydrocannabinol, THC)	0.005-0.01 (-0.05) ¹³⁷			50-100	[241], [312, 313]
Dronedarone	0.084-0.167 ³⁹⁸			24-30	[780], [828]
Droperidol	appr. -0.05			1.5-2.5 ²³⁷	[3], [314]
Drotrecogin alfa	mean 0.072			1.6	[315]
Duloxetine	0.03-0.12	0.24 ³¹¹		9-19	[4], [223]

Substance	Blood-plasma concentration (mg/L)			t _½ (h)	References
	therapeutic ("normal")	toxic (from)	comatose-fatal (from)		
Dutasteride	0.025-0.055			4-5 weeks	[780]
Dyphylline	6.5-14 (-20)	40		2	[11], [58]
Ecamsule (Mexoryl SX)	0.0005-0.012 ⁴¹⁹				[801]
Ecdysterone	appr. -0.008				[829], [1066]
Edoxaban	0.02-0.1	0.15 (-0.2) ⁴⁰²		(6-) 10-14	[47], [794], [797], [830], [960]
Edrophonium	0.15-0.2	appr. 0.15		1.3-2.4	[3], [58], [316]
Efavirenz (EFV)	> 1.0 appr. -3 ²⁹⁷	6 ³¹¹		40-55	[2], [110, 111], [780]
Eletriptan	0.06-0.23			3-7	[47]
Embutramide			2-90	9.6	[47]
Emetine	(0-) ⁴⁷² 0.005-0.075	0.008-0.5	2.4 ⁸	10-18; 24-48	[8], [47]
Empagliflozin	0.03-0.36			9-10	[780]
Emtricitabine				appr. 10	[780]
Enalapril ⁵²	0.01-0.05 (-0.1)	0.3	2.8 ⁸	(6-) 8-11 (-55)	[47], [84], [159]
Encainide ⁴⁸	_175			1.5-3.5 ¹⁷⁶	[3]
Endrin	-0.003	0.01-0.03	0.62 ⁸		[47], [58]
Enflurane	44-144 ⁴⁷³		130 ⁸ ; 710 ^{8, 474}	36 ⁵⁶⁰	[47]

Substance	Blood-plasma concentration (mg/L)			t _{1/2} (h)	References
	therapeutic ("normal")	toxic (from)	comatose-fatal (from)		
Enfuvirtide	2.6-3.4			3-4	[47], [1001]
Enoxacin	1-4 ⁴⁷⁵			3-6	[47], [197], [1019]
Enoximone	≥ 0.2 (3-4 ?)			4-7	[3], [8], [95]
Enprofylline	1-5	10		appr. 2	[8]
Entacapone	0.4-1.0 (-7.0)	2 ³¹¹		(0.5-) 1.5-3.5	[3, 4], [8]
Enzalutamide ⁵⁶⁸	appr. 19-25 (-30) ³⁹¹			appr. 6 (3-10) days	[831, 832], [1086]
Eperisone	appr. 0.0007-0.008 ⁴⁷⁶	0.16-4.1	15.3 ⁸	1-4	[47]
Ephedrine	0.02-0.2	0.15 ⁸ ; 1; 15 ⁸ ; 22 ⁸ ; 23 ⁸	2.7 ⁸ ; 5 ⁸ ; 3.5-21 ⁴⁷¹	3-11	[8], [47], [57, 58], [87], [269]
Epinephrine (Adrenaline)	appr. 6.8 ng/L ⁴⁷⁸		60 ng/L ^{8, 561}	0.7 ⁴⁷⁷	[47], [1073]
Epirubicin	appr. (0.05-) 0.2-3			10-45	[47], [1000]
Eplerenone	appr. 1-1.7 ^{479, 620}			3-6	[47]
Eprosartan	0.4-1.0 (-1.85)			5-9	[3], [8]
Eptastigmine	0.0002-0.006			appr. 1	[8]
Eptinezumab				26-28 days	[1102]
Erenumab	appr. 10-25 ?			21-28 days	[1102], [1105, 1106]
Ergotamine	0.36-0.42 ng/mL ³⁷⁵	0.82 ng/mL ³⁷⁶		1.5-2.5	[47]

Substance	Blood-plasma concentration (mg/L)			t _{1/2} (h)	References
	therapeutic ("normal")	toxic (from)	comatose-fatal (from)		
Ertapenem	appr. -100 (total ⁴¹⁰)			3.5-7 ⁴⁰⁹	[825], [833, 834], [1186]
Erythromycin	0.5-6 (peak 4-12)	12-15		1-3	[11], [58]
Escitalopram ³⁴³	0.015-0.08	0.16 ³¹¹		26.3 ± 10.8 (27-32)	[4], [223]
Eslicarbazepine acetate ⁴⁸⁰	10-35	70 ³¹¹		20-40	[4]
Esmolol	0.15-2			4-16 minutes	[7]
Esomeprazol	appr. 0.6-6.6			0.6-1.4	[47]
Estazolam	0.055-0.2		0.48 ⁸ ; 1.25 ⁸	10-24	[3], [47], [58]
Eszopiclone ³⁴¹	appr. 0.01-0.09	0.15		4-9	[47], [780], [935]
Ethacrynic acid (Ethacrynic acid)	0.05-0.1			1-4	[3], [8, 9]
Etamsylate (Ethamsylate)	15-20			2.5-4	[13, 14], [58]
Ethadione	500-1000	1000			[8]
Ethambutol	(0.5-) 3-5 (-6.5)	6-10	84 ⁸	2.5-3.5; 6-15	[47], [58], [317]
Ethanol		1000-2000	3500-4000	_139	[13]
Ethchlorvynol	0.5-8	20	50	10-25 (-35)	[3], [58]
Ethinamate	1.5-10	50-100	200 ⁸	appr. 2	[8], [13]
Ethosuximide	30-100 (40-60)	120 ³¹¹ ; 150-200	250	30-60	[4], [12], [64], [161], [164]

Substance	Blood-plasma concentration (mg/L)			t _{1/2} (h)	References
	therapeutic ("normal")	toxic (from)	comatose-fatal (from)		
Ethyl chloride	-		36 ⁸ ; 200/650 ⁴⁸¹		[47]
Ethylene glycol		200-500	2000 (500-7750)	3-4 (rats); 2-3 ⁴⁸² ; 14.2-19.7 ⁴⁸³ (31 ⁸ , 27 ⁸)	[47], [66], [318-326], [1020, 1021]
Ethylmorphine ⁴⁸ (Dionin)	0.3-0.6 ^{339, 377}		0.05 ⁸ ; 0.3-2.9 ³³⁹	2-3	[47]
Ethylone (3,4-Methylenedioxy-N-ethylcathinone, = MDED, bk-MDEA)				1.7 ⁸ ; 0.038-2.57 ⁴⁸⁴	[1022]
Ethylphenidate				0.026-2.18 ⁴⁸⁵	[1023]
Etidocaine	0.5-1.5	1.6-2		2-3	[327]
Etilefrine	appr. 0.06			2-3.5	[1002], [1053-1054]
Etizolam ⁴⁸	0.008-0.018 ^{421, 486}	0.03 ⁸	0.26 ⁸	2-3	[47], [1024-1028]
Etodolac	10-20 (> 14 ²²⁹)	40		6-8	[3], [8], [328]
Etomidate	0.1-0.5 (-1)			3.9 ± 1.1 (2-11)	[3], [9]
Etoposide	2-6 (peak 8-14)			4-11	[3], [11]
Etoricoxib	appr. 1.3-3.6			20-36	[47]
Etravirine (ETR)	0.275 (0.081-2.98) ³⁰²			appr. 41	[2], [47], [110]
Everolimus	0.003-0.008 (-0.014) ^{275, 487}			28 ± 7	[329-332], [1029]
Ezetimibe	0.005-0.045	0.09 ³¹¹		appr. 30	[333, 334], [780]

Substance	Blood-plasma concentration (mg/L)			t _{1/2} (h)	References
	therapeutic ("normal")	toxic (from)	comatose-fatal (from)		
Famciclovir	see Penciclovir				[47]
Famotidine	0.02-0.2	0.42 ⁸		2-4.5	[3], [335, 336]
Fampridine	see 4-Aminopyridine				
Favipiravir				4.6 ± 1.2	[1229]
Febuxostat	0.035-1.45			6-7	[780]
Felbamate	(30-) 50-110 ¹⁶⁴	100 ³¹¹ ; 150-200		15-23	[4], [12], [337-339]
Felbinac	appr. 0.4-1 ³²⁶			10-17	[3], [340]
Felodipine	0.001-0.012	0.01		22-27 ⁸⁸	[8], [84], [341]
Fenbufen	appr. -60			10-12	[3], [58]
Fendiline	0.02-0.15			appr. 20	[58]
Fenetylline (Fenethyllyne) ⁴⁹⁰				appr. 1.3	[47]
Fenfluramine	0.04-0.3	0.5 – 0.7	6	18-25	[8], [58]
Fenitrothion			1.1-17 ⁴⁹¹	33-64	[47]
Fenofibrate ⁴⁸⁹	5-30 ²⁴¹	60 ³¹¹		20-22	[3], [342], [780]
Fenoldopam	0.003-0.06			0.1	[8], [58]
Fenoprofen	(25-) 30-60	120 ³¹¹		2-3	[343], [780]

Substance	Blood-plasma concentration (mg/L)			t _{1/2} (h)	References
	therapeutic ("normal")	toxic (from)	comatose-fatal (from)		
Fenoterol	(0.001-) 0.01-0.04			appr. 7	[929, 930]
Fentanyl	0.0003 ⁴ -0.3 ³³⁹	₃₃₉	0.003-0.02 ^{8,103}	1-3.5 (transdermal patch: appr. 17)	[47], [52], [54], [335], [344-351], [1071], [1078-1080]
Fenthion			1.4 (0.2-4.6) ²⁷⁹	12	[47], [186]
Fesoterodine ⁴⁹²	0.005 ⁴⁹³			5-9 ⁴⁹⁴	[47], [1030]
Fexofenadine	appr. 0.1-0.9 ¹⁹¹	2.7		14-18	[8], [352], [780]
Finasteride	0.008-0.01			5-7	[353]
Fingolimod	appr. 0.001-0.018 ⁴⁹⁵			6-9 days	[47]
Flecainide ⁴⁸	(0.2-) 0.4-0.8	1 ³¹¹ ; 1-2	2.6 ⁸ ; 13 ⁸ ; 15 ⁸	10-20	[70], [354], [780]
Flephedrone (4-Fluoromethcathinone, 4-FMC)			0.6 ⁸ ; 4.4 ⁸		[955]
Fleroxacin	appr. 5			(8-) 10-12 (-13)	[1031]
Flibanserin	appr. 0.4 ⁴⁹⁶			6-14	[1032]
Flocoumafen			0.005-0.273 ⁴⁹⁷	6-7 days ⁴⁹⁸	[47]
Flubromazepam	₄₂₁	0.05-0.08; 0.412 ⁸	0.83 ^{8, 401}	appr. 100	[835], [837-839]
Flubromazolam	appr. 0.008 ^{421, 499}		0.059 ^{8, 500}	10-20 ⁵⁰¹	[836], [1031], [1033]
Flucloxacillin	3-30			1-2	[11], [58]

Substance	Blood-plasma concentration (mg/L)			t _{1/2} (h)	References
	therapeutic ("normal")	toxic (from)	comatose-fatal (from)		
Fluconazole	appr. 2-6 (-15)	20; 95 ⁸		22-34 ⁸³	[11], [91], [355-358], [1186]
Flucytosine	(20-) 25-50 (-70)	100		3-5	[8], [58]
Flumazenil ²²	(0.01-) 0.02-0.1	0.5		1-2	[931-934]
Flunarizine	0.025-0.2	0.3		days	[42]
Flunitrazepam ²³	0.005-0.015	0.05	0.3 (0.11-0.74) ⁵⁰²	10-20 (-30)	[56], [59], [359], [1012], [1034]
Fluoride	0.095-0.190 (-0.285) ³⁹	0.5-2	3	2-9	[10], [47], [58], [130], [360-362]
5-Fluoro ADB (Methyl 2-[1-(5-fluoropentyl)-1H-indazole-3-carboxamide]-3,3-dimethylbutanoate = 5-Fluoro MDMB-PINACA)	-		0.11-1.92 ng/mL		[1035, 1036]
5F-AMB (5F-AMB-PINACA)	see AMB				
4-Fluoroamphetamine	-	0.06-0.43 ⁵⁰³	0.32 ^{8, 504}		[47]
Fluorofentanyl	-		2.4 ng/mL ⁸ ; 30 ng/mL		[1038], [1071, 1072]
2-Fluoromethamphetamine (2-FMA)	-		6.9 ng/mL ^{8, 506}		[1041]
4-Fluoromethlyphenidate	-	0.032 ^{8, 417}			[840]
5-Fluorouracil	0.05-0.3	0.4-0.6		< 0.5	[3], [11], [58]
Fluoxetine	0.12-0.5 ¹³⁰	¹³¹¹	2.2; 3.8 ⁵⁰⁷ ; 6 ⁸	2-6 days ¹³⁰	[4], [47], [75], [202], [263, 264], [363, 364], [1084]]

Substance	Blood-plasma concentration (mg/L)			t _½ (h)	References
	therapeutic ("normal")	toxic (from)	comatose-fatal (from)		
Flupentixol (Flupenthixol)	0.0005-0.005	0.015 ³¹¹		20-40	[4]
Fluphenazine	0.001-0.01	0.015 ³¹¹		10-18 ⁴⁵	[4]
Flupirtine	0.5-1.5	appr. 3-4	11 ⁸	7-11	[365], [1042]
Flurazepam ²⁴	0.075-0.165 ⁵⁰⁸	0.33 ³¹¹ ; 0.2-0.5	0.5-2.8 ⁵⁰⁹ ; 24 ⁸	appr. 2-3 ²⁴	[4], [47]
Flurbiprofen	5-15			3-4	[366]
Fluspirilen	0.0001-0.0022	0.0044 ³¹¹		7-14 days	[4]
Flutamide ⁶⁰	0.4-1.5 ⁶⁰			7-20 ⁶⁰	[43], [367]
Fluvastatin	0.05-0.44		2.4 ⁸	1-3	[47], [1063]
Fluvoxamine	0.06-0.23	0.5 ³¹¹ -0.65; 1.97 ⁸	2.8 ⁸ ; 5.4 ⁸	(8-) 15-22 (-28)	[4], [47], [202], [368, 369], [1084]
Folic acid	appr. 0.004-0.03 ³⁸⁹			1.5-2	[800], [944]
Fomepizole	8-35 ⁵¹⁰			10-40 (dose-dependent)	[47], [1055-1058]
Formoterol	appr. 20-80 ng/L			5-13	[47]
Fosamprenavir (FPV) ⁵¹³	> 0.4 ²⁹²			4-11; 7.7 ³¹⁹	[2], [47], [110, 111]
Fosinopril	appr. 0.13-0.25 ⁵¹¹ ; appr. 0.71-1.2 ⁵¹⁴			6-17 ⁵¹²	[47]
Fosphenytoin ³³⁶	see also Phenytoin	30		0.13-0.25	[12]

Substance	Blood-plasma concentration (mg/L)			t _{1/2} (h)	References
	therapeutic ("normal")	toxic (from)	comatose-fatal (from)		
5F-Cumyl-PEGACLONE	see Cumyl				
5F-PB-22	-		0.37-1.5 ng/mL ⁵⁰⁵		[1039, 1040], [1225]
Fospropofol ⁵¹⁵				0.7-0.9	[47]
Fremanezumab				30-32 days	[1102], [1104]
Frovatriptan	appr. 0.004-0.008			20-30	[47]
Furanyl fentanyl	-		2.7 (0.4-42.9) ng/mL ⁵¹⁶		[1011], [1071]
Furosemide (Frusemide)	2-5 (-10)	25-30		0.7-1.5 (-3)	[3], [47], [58]
Fusidic acid	30-200			4-6 (9-13)	[8], [1003]
Gabapentin	appr. 0.5-6 (-20-30) ¹⁸⁵	25 ³¹¹ ; 45 ⁸ ; 85 ⁸ ; 105 ⁸ ; 127 ⁸	37 ⁸	5-7 (-9)	[4], [12], [47, 48], [370-382], [804], [841, 842]
Galantamine (Galanthamine)	(0.01-) 0.03-0.06	0.09 ³¹¹		6-10	[4], [383, 384]
Galcanezumab	appr. 10-30 ?			27 days	[1102, 1103]
Gallopamil	0.02-0.1		8 ⁸	3-8	[84], [385]
Gamma-butyrolactone ⁵¹⁷	see 4-Hydroxybutyrate				[1043]
Gamma-hydroxybutyric acid (gamma-hydroxybutyrate, GHB, liquid ecstasy)	see 4-Hydroxybutyrate				[386, 387], [843-847], [1043]
Ganciclovir	(0.29-0.51) 0.5-5 ¹⁰⁷	3-5		2-4 ⁸³	[38, 39], [388]

Substance	Blood-plasma concentration (mg/L)			t _½ (h)	References
	therapeutic ("normal")	toxic (from)	comatose-fatal (from)		
Gemcitabine	3.9-5.3 ¹⁴⁶	₁₉₂		0.05 (0.18-0.43)	[209]
Gemfibrozil	appr. -25			1.5	[3]
Gentamicin	(2-) 4-10 ²³³	12		1.5-6	[20], [67], [389-394]
GHB (gamma-hydroxybutyric acid)	see 4-Hydroxybutyrate				
Glibenclamide (Glyburide)	0.05-0.2	0.6		10	[47], [780]
Gliclazide	1-3.7			6-14	[47]
Glimepiride	0.09-0.5	¹³¹¹		4-15	[47], [780]
Glipizide	0.1-1 (-1.5)	2		3-7	[66], [780]
Glutethimide	0.2-5	(5-) 10-30	15-50 (10-97 ⁵¹⁸)	5-20	[30], [47]
Glyburide	see Glibenclamide				
Glycerol	appr. 8 (2.9-17) ⁵²²		3643 ⁸	0.6-1.1 (low concentrations); 2.5-10 ⁵²³	[47], [1044], [1074]
Glyceryl trinitrate (GTN)	see Nitroglycerin				
Glyphosate			3.7-1980 ⁵²⁴ ; 118-7480 ⁵²⁵	2-4	[47], [1059, 1060]
Gold	3-8 ⁵¹⁹	(5-) 10-15	0.4 ⁸	21-31 days (oral)	[47, 48], [58], [1045]
Granisetron	appr. 0.005-0.017			3-21 ⁵²⁰	[3], [8], [47]

Substance	Blood-plasma concentration (mg/L)			t _{1/2} (h)	References
	therapeutic ("normal")	toxic (from)	comatose-fatal (from)		
Griseofulvin	0.3-1.7			22 (9-33)	[8], [47]
Guaifenesin	0.3-1.4		25 ⁸	appr. 1	[3], [8], [47]
Guanethidine	0.01			5-10 days	[3], [58]
Guanfacine	appr. 0.001-0.01			13.5 (10-30)	[780]
Halazepam ¹⁵	see Nordazepam			30-40	[13, 14]
Haloperidol	(0.001-) 0.005-0.017	0.006/0.023 ⁵²¹ ; 0.015 ³¹¹ ; 0.05	0.18 ^{8, 74} ; 0.5	10-35 ¹⁵³	[4], [43], [47], [185], [193], [240], [395-398]
Halothan	22-260		33-720 ⁵²⁶ ; 3.4/8.3 ^{8, 527}	43	[48], [87]
Hematin	50-100				[13, 14]
Hemin	see Hematin				
Heptabarb (Heptabarbital)	0.5-4	8-15	20	6-11	[13, 14]
Heptaminol	appr. 0.2-1 (-1.5)			2-3	[13, 14]
Heroin (Diacetylmorphine, Diamorphine) ³³⁷	_338, 528	_339		2-5 minutes	[273-281], [1046]
Hexachlorobenzene (HCB)	-0.0001 ³³²			appr. 2 years	[100]
β-Hexachlorocyclohexane (β-HCH, β-Lindane)	-0.0001 ³³²			appr. 7 years	[100]
Hexachlorophene	0.003-0.65 (-1)		35	6-44	[11], [58]

Substance	Blood-plasma concentration (mg/L)			t _{1/2} (h)	References
	therapeutic ("normal")	toxic (from)	comatose-fatal (from)		
n-Hexane	< 0.09 ng/mL ⁴⁶³			1.5-2	[47]
Hexapropymate	2-5	10-20			[8], [11]
Hexobarbital	1-5	10-20	50	4-6	[13, 14], [58]
Hirudin-rec	₁₇₁	₁₇₁		(1-) 2.5-3	[3], [43], [399]
Homosalate	0.004-0.023 ⁵⁸³			(18-) 47-78 (-162)	[1122]
Hydralazine ⁵	0.05-0.5 (-1.5)			2-6	[84]
Hydrochlorothiazide	appr. 0.04-0.45 (-2)	4 ³¹¹		(6-) 9-12 (-15)	[3], [42], [779, 780], [1150, 1151]
Hydrocodone	0.01-0.04 (0.05)	0.1 ^{311, 339}	0.13-7	appr. 4	[8], [47], [244], [780]
Hydromorphone	appr. 0.005-0.015 (-0.03)	0.1 ^{311, 339}	0.03 ⁸ ; 0.06 ⁸ ; 0.2	2-3	[8, 9], [270], [400], [780], [1047], [1075]
4-Hydroxybutyrate (gamma-hydroxybutyric acid; GHB) ⁴⁸	appr. 50-120 ³⁹³	80 (abuse); 200 ³¹¹	30-9200 (mean 640; median 280; intoxication)	(0.3-) 0.5-1	[3, 4], [8], [47], [244], [401, 402], [843-847], [1043]
Hydroxychloroquine ³⁸⁴	0.1-0.5 ³⁸⁵	0.5-0.8	4; 48 ⁸ ; 104 ⁸	dose-dependent days ³⁸⁶	[3], [13, 14], [47], [403], [780], [848-852], [1226]
4-Hydroxy-3-methoxymethamphetamine (HMMA)	₃₃₃			11.5-13.5	[404-406]
Hydroxytryptophan (5-HTP)	appr. 0.5-1.5 (-9.4 ⁵²⁹)			2-7 ⁵³⁰	[47]

Substance	Blood-plasma concentration (mg/L)			t _½ (h)	References
	therapeutic ("normal")	toxic (from)	comatose-fatal (from)		
Hydroxyzine	0.05-0.1	0.1	0.7 ⁸ ; 2.5 ⁸ ; 3 ⁸ ; 39 ⁸	7-20	[11], [47], [56], [58]
Hyoscyamine	0.0004-0.006			7.5	[780]
Ibandronat (Ibandronic acid)	< 0.1 ³²¹			10-60; terminal: days	[47], [49], [1004, 1005]
Ibuprofen	15-30 (-50)	200	185 ⁸ ; 260 ⁴²² ; 352 ³⁴⁶ ; 1233 ⁵³¹	0.9-2.5 (-3)	[47], [293], [343], [407, 408], [926]
Idebenone	0.05-0.2 ⁵³²			(8-) 16-22 (-26)	[3], [47], [409], [1048]
Iloperidone	0.005-0.01	0.02 ³¹¹ ; 0.07 ⁵³³		18-33	[4], [1049]
Iloprost	appr. 0.0001			appr. 0.5	[936, 937]
Imatinib	0.72 ²⁵⁸			appr. 18	[410, 411]
Imipenem	0.5-5 (20-75)			1-1.5	[8], [412], [825], [833], [1186]
Imipramine ^{48, 125} plus Desipramine	0.05-0.35 0.175-0.3	0.5-1 0.3 ³¹¹	1.5-2	(6-) 11-25 ^{26, 125}	[4], [74], [76-80], [308, 309], [413], [1084]
Inamrinone	_534		76 ⁸	4-6	[47]
Indapamide	0.13-0.25			14-15	[780]
Indinavir (IDV)	> 0.1 ²⁶⁰	appr. 0.5		1.5-2	[2, 3], [110, 111], [211], [414]
Indometacin (Indomethacin)	0.3-1 (-3)	4-5		5-10 (adults); 10-33 (neonates)	[47], [415], [780]
Indoramin	appr. 0.025-0.1			12 (3.5-15)	[95]

Substance	Blood-plasma concentration (mg/L)			t _{1/2} (h)	References
	therapeutic ("normal")	toxic (from)	comatose-fatal (from)		
Infliximab	3-7 ⁵⁶⁴			6-12 days	[47], [1077]
25I-NBOMe	see NBOMe				
INH (isonicotinic acid hydrazide)	see Isoniazid				
Iproniazid	appr. -5 ?				[58]
Irbesartan	appr. 1.9-3.3 ³⁷¹			11-15	[47]
Iridium	-0.02				
Iron	0.5-2	6	17	3-8	[42], [47], [58], [64]
Isavuconazole	appr. 2.5 ⁵³⁵			50-110	[47]
Isoflurane	appr. 20-150		1.8-48 ⁵³⁷	7 min to 58 h ⁵³⁶	[47]
Isoniazid (INH) ⁵	5-10	20	(30-) 100	(0.6-) 1-3 (-6.7) ⁵	[3], [8], [317]
Isopropanol ³⁶¹		200-400	330 ⁸ ; 730 ⁸ ; 1000	2.5-3	[47], [58]
Isosorbide-dinitrate (ISDN) ⁵³⁸	appr. 0.02-0.2 ⁵³⁹			0.4-0.8	[47]
Isosorbide-5-mononitrate (IS-5-MN)	0.1-1	3.1		2-5 (-8)	[47], [95]
Isotretinoin	appr. 0.001-0.002 (topical) ²²⁴			10-20	[3], [416, 417]
Isoxicam	5-15			20-50	[8], [853]
Isradipine	0.0005-0.002 (-0.01)	0.01	0.26 ^{8, 259}	5-10	[3], [84], [418-420]

Substance	Blood-plasma concentration (mg/L)			t _{1/2} (h)	References
	therapeutic ("normal")	toxic (from)	comatose-fatal (from)		
5-IT	see 5-(2-Aminopropyl)indole				
Itraconazole	appr. 0.4-2 ¹¹¹			24-36	[421-424]
Ivabradine	appr. 0.01-0.06 ⁶²⁰	0.11 ⁸ ; 0.37 ⁸ ; 0.52 ⁸		1.3-2.8	[47]
Ivermectin	appr. 0.05 ⁵¹		0.09 ⁸	16-28	[3], [47], [425]
Kanamycin	trough: 1-4; peak: 10-25	25-30		(0.5-)2-3 (-5)	[8]
Kavain	appr. 0.05	0.18-5	1.4 ⁸	2.8-6.7	[47]
Ketamine	(0.1-) 1-6	0.02 ⁵⁴⁰ ; 0.42 ⁵⁶² ; 7 (abuse)	3.8 ⁸ ; 6.9 ⁸	1-3 (-4)	[47], [56], [58], [426-428]
Ketanserin	0.05-0.5		2.8 ⁸	10-22	[8], [47]
Ketazolam ¹⁵	0.001-0.02			1-3	[59]
Ketobemidone	0.01-0.05		0.2-3.2	1.8-4.2	[3], [47], [426], [428]
Ketoconazole	1-3 (-6)			6-10	[8]
Ketoprofen	1-6 (-20)	12 ³¹¹	1100 ⁸	1,1-2 (-4.2)	[47], [429-433], [780]
Ketorolac	0.5-3	5 ³¹¹		4-10	[3], [8], [780]
Ketotifen ⁵⁴¹	0.0004-0.004	0.02	1.2 ⁸ ?	(4-) 7-21 (-27)	[57], [1061, 1062], [1076]
Kratom	see Mitragynine				

Substance	Blood-plasma concentration (mg/L)			t _{1/2} (h)	References
	therapeutic ("normal")	toxic (from)	comatose-fatal (from)		
Labetalol	0.03-0.2 (-0.65)	1 ⁸ ; 2.9 ⁸	1.7 ⁸	3-10	[3], [7], [47], [95]
Lacidipine	0.001-0.006			12-19	[8], [1087]
Lacosamide	1-10	20 ³¹¹		10-15	[4]
Laetrile (Amygdalin)	see Cyanide				
Lamivudine	. ₂₃₀			5-7	[2, 3], [434]
Lamotrigine	1-15	20	36 ⁸ , 347 ⁸ ; 50 ⁸	(15-) 23-37 ¹⁰⁹	[4], [8], [47], [435-437]
Lansoprazole	0.06-0.4			1-2	[780], [1088]
Lead	-0.09 ³²⁴	0.4-0.6	3	. ₁₈₀	[47], [64], [100], [438, 439]
Leflunomide ²⁵⁵	6-100 ²⁵⁶			4-28 days	[3], [440-442]
Lenalidomide	0.06-1	2613 ng/h/mL ³⁹²		3-4	[854-856], [1989, 1090]
Lercanidipine	appr. 0.1-10 ng/mL ⁶²⁰	0.28 ⁸		6-10	[47], [1064]
Levacetylmethadol ⁵⁰ (= Acetylmethadol)	appr. 0.02-0.06			32-116 ⁵⁰	[8], [47]
Levamisole	appr. 0.1-0.7 (0.7-2.5) ⁵⁶⁹			2-8	[8], [47], [1091, 1092]
Levetiracetam	(3-) 10-40	50 ³¹¹ ; 400 ^{8, 264}		4-10	[4], [8], [443]
Levocabastine	< 0.001-0.01 ¹⁴⁷			30-40	[444], [1093]
Levocetirizine ³⁷⁸	0.3-0.5			6-10	[47]

Substance	Blood-plasma concentration (mg/L)			t _{1/2} (h)	References
	therapeutic ("normal")	toxic (from)	comatose-fatal (from)		
Levodopa (L-Dopa)	0.3-2 ²⁸	5 ³¹¹ ; 20 ⁸	650 ⁸	1-3 ²¹⁵	[4], [445-449]
Levomepromazine ²⁷	0.005-0.025 (-0.2)	0.32 ³¹¹ ; 0.4	0.5	16-78	[4], [270], [1094]
Levomethadone ³⁵²	0.04-0.4 ³³⁹	0.4 ³¹¹ ; 0.5 ³³⁹	0.04 ⁸ ; 0.1-0.2 ³⁶²	24-48 (-55)	[3, 4], [270], [450], [1095]
Levomilnacipran ⁵⁷⁰	0.08-0.12 ⁴⁰⁵	0.2 ³¹¹		6-9 (-12)	[4], [780]
Levorphanol	0.007-0.02	0.1	0.9 ⁸ ; 2.7 ⁸	11-30	[8], [47], [1096]
Levothyroxine	0.045-0.14 ⁴⁷			6-8 (-10) days	[451], [1097]
Lidocaine (Lignocaine) ⁵⁷¹	0.5-5 ¹¹³	6-7	10, 12 ⁸	1-4 ¹¹³	[47], [57], [70], [327], [452-454]
Linagliptin	0.002-0.004			50-90 (single dose); 110-150 (multiple dose)	[47], [780]
Lindane (β-HCH, HCCH)	see Hexachlorocyclohexane				
Linezolid	0.5-4	appr. 7.5		4-6	[8], [823], [1098], [1186]
Lisinopril	(0.005-) 0.02-0.07	0.5 ⁸		4-12	[47], [84]
Lithium	4-8 ⁷⁹	8 ³¹¹ ; 13	16	8-50 ²⁸	[4], [47], [80], [264], [455-457]
Lofepamine ⁵⁷²	0.003-0.01			0.5-5 ⁵⁷²	[47], [57], [458]
Loperamide	0.00024-0.0031 ⁸⁴	0.12 ⁸	0.077 ⁸ ; 0.18 ⁸	7-15	[459], [857-860]
Lopinavir (LPV)	> 1.0 ²⁹⁴			5-6	[2], [110, 111]

Substance	Blood-plasma concentration (mg/L)			t _{1/2} (h)	References
	therapeutic ("normal")	toxic (from)	comatose-fatal (from)		
Loprazolam	0.003-0.01			11-20	[59]
Loratadine ¹³⁸	0.001-0.02			2-15 ¹³⁸	[460, 461]
Lorazepam	(0.02-) 0.03-0.25	0.3-0.5		10-16 (-40)	[4], [59], [224], [462, 463]
Lorcainide ⁵⁷³	0.1-0.4 (-0.9)			5-10	[8], [464-466]
Lormetazepam ⁵⁷⁴	0.002-0.01 (-0.025)	0.1 ³¹¹		8-15	[4], [59]
Lornoxicam	0.1-0.8			2-6	[8]
Losartan	< 0.2 (-0.65) ²²⁷	1.8		1.5-2	[3], [8], [780]
Lovastatin ⁵⁴³	0.003-0.018			2-3	[47], [1063]
Loxapine ^{23, 320}	0.005-0.03 (-0.1)	0.02 ³¹¹ ; 1	7.7	6-8 ³²⁰	[4], [8], [11], [58]
Lurasidone	0.015-0.04	0.12 ³¹¹		20-40	[4], [780]
Lysergide (lysergic acid diethyl amide, LSD)	0.0005-0.005	0.001	0.002-0.005	appr. 2-5	[8], [11], [58], [467]
Macitentan	0.2-0.4 ⁶²⁰			10-18	[47]
Magnesium	55-75 ¹²¹	120-140	150-180	2.1-2.9	[3], [47], [58], [468]
Malathione	-	0.35 ⁸ ; 0.5	1.8 ⁸ ; 175 ⁸ ; 517 ⁸	3-6	[47], [58]
Manganese	0.0005-0.0015		6.7 ^{8, 575}	12-36 days	[47], [58]
Mannitol				0.25-1.2 ⁸³	[3]

Substance	Blood-plasma concentration (mg/L)			t _{1/2} (h)	References
	therapeutic ("normal")	toxic (from)	comatose-fatal (from)		
Maprotiline	0.075-0.13	0.22 ³¹¹ ; 0.5-1	1-5	20-60	[4], [8], [1084]
Maraviroc (MVC)	> 0.05 ³⁰⁰				[110]
MCPA	see 2-Methyl-4-chlorophenoxyacetic acid				
MCPP	see 2-Methyl-4-chlorophenoxypropionic acid				
MDA	see Methylenedioxy-amphetamine				
MDEA	see Methylenedioxyethyl-amphetamine				
MDMA	see Methylenedioxymethyl-amphetamine				
MDMB-PINACA	see 5-Fluoro ADB				
Mebendazole	≥ 0.1 ⁶⁷			3-9	[47], [1099]
Meclizine (Meclozine)	0.001-0.045 (-0.15)			appr. 5-7	[47], [780], [861]
Meclofenamic acid (Meclofenamate)	appr. (1-) 2-7			0.8-5.3	[3], [780], [1214]
Mecoprop	see 2-Methyl-4-chlorophenoxypropionic acid				
Medazepam ³⁰	0.1-0.5 (-1)	0.6		2-5 ³⁰	[8], [47], [59], [61]

Substance	Blood-plasma concentration (mg/L)			t _{1/2} (h)	References
	therapeutic ("normal")	toxic (from)	comatose-fatal (from)		
Mefenamic acid	2-10 (-20)	25		2-4	[9], [47]
Mefloquine	0.4-1 ¹⁰⁸	1.5-2 ⁸		10-30 days	[47], [469, 470]
Melatonin	0.0005-0.1 ³⁷⁹			0.5-1	[47]
Melitracen	0.01-0.1			12-24	[8]
Meloxicam	0.4-2	4 ³¹¹		17-22	[8], [471]
Melperone	0.03-0.1	0.2 ^{219, 311}	17 ⁸	4-8	[4], [8], [472, 473], [780]
Melphalan	-1.5			1.5-2	[8]
Memantine	0.09-0.15	0.3 ³¹¹	12 ⁸	60-100	[4], [47]
Meperidine	see Pethidine				
Mephesisin	3-10		16 ⁸	1-4	[8], [47]
Mepindolol	0.007-0.07			3-6	[7], [1100]
Mepivacaine	appr. 0.4-4 ⁵⁷⁶	5	50	1-3	[15], [58]
Meprobamate	5-10	10	30	6-17	[8], [56]
Meptazinol	0.025-0.25		16 ⁸	1-4	[8], [47], [1101]
Mercaptopurine ³⁶⁴	0.03-0.1	1-2		0.5-1.5	[8], [47]
Mercury	appr. 0.0015-0.002 (< 0.005) ¹⁷⁸	0.05	0.5	> 18-24 days	[47], [64], [66], [100], [474-478]

Substance	Blood-plasma concentration (mg/L)			t _{1/2} (h)	References
	therapeutic ("normal")	toxic (from)	comatose-fatal (from)		
Meropenem	> 2-8 (-12) ³⁸⁷	25		1 (-7)	[862]
Mescaline	1.5-3.8			6	[47]
Mesalazine (Mesalamine)	appr. -1 ¹¹⁹			0.5-2.4 ¹²⁰	[479]
Mesoridazine	0.1-1	3-5	3 ⁸ ; 4 ⁸ ; 16 ⁸	2-9 (-20)	[15], [47], [58]
Mesuximide	see Methsuximide				
Metaclazepam	0.05-0.2			7-23	[8], [59]
Metamizole (Dipyrone) ⁵	10 ³²	20 ³²		5-8	[8]
Metandienone (Methandienone)			0.008 ^{8, 424}		[940]
Metaxalone	0.6-3	11 ⁸	37 ⁸	2-14	[47], [780]
Metformin	0.1-2	5-10 ³⁹⁷	91 ⁸ ; 119 ⁸ ; 166 ⁸	2-9	[8], [58], [480, 481], [863-865], [938, 939]
Methadone	(0.05-) 0.1-0.6 ¹³⁵	0.3 ³³⁹ ; 0.6 ³¹¹	0.4 (0.05-1) ³⁶²	24-48 (-55)	[4], [482-489], [1095]
Methamphetamine (Methylamphetamine)	-0.1	0.2-1	1-18 ⁸ ; 40 ⁸	6-15 ³⁴⁴	[8], [47]
Methanol	appr. -3 ⁵⁷⁷	200	900	10-12 (-24) ³²⁵	[8], [47], [58], [325], [490]
Methapyrilene	appr. 0.1	4	4.4 ^{8, 408} ; 12 ⁸ ; 380 ⁸		[11], [771], [867]
Methaqualone	1-3	3-5	5-10	10-40	[8]
Methemoglobin (Met-Hb)	- ¹⁹⁹	25-30%	50-70%		[3], [10, 11], [467]

Substance	Blood-plasma concentration (mg/L)			t _{1/2} (h)	References
	therapeutic ("normal")	toxic (from)	comatose-fatal (from)		
Methimazole	0.5-2.5			2-28	[8], [467]
Methocarbamol	25-40 (-50)	250		1-2	[3], [11], [58]
Methohexital	0.5-5 (-11) ⁵⁵	2-20		1-6	[8, 9], [1107]
Methomyl	-	0.61 ⁸ ; 1.6 ⁸	1.6 ⁸ ; 26 (8-57)		[47]
Methotrexate (MTX)	0.01 – appr. 0.5 ⁵⁷⁸	0.75-1 ⁵⁷⁹	0.12 ⁸	(3-) 6-8 (low dose); 8-17 (high dose)	[3], [47], [1108]
Methotrimeprazine	see Levomepromazine				
Methoxsalen (8-Methoxypsoralene)	0.025-0.1 (-0.2)	0.6 ⁸ ; 1		0.5-1.5	[3], [10], [47], [58]
Methsuximide (Mesuximide)	10-40 ²²³	45 ³¹¹ ; 40-50		20-40 (-45)	[3, 4], [8], [11], [58], [491]
4'-Methyl-alpha-pyrrolidinohexanophenone (MPHP)	-		0.1 ⁸		[868]
2-Methyl-4-chlorophenoxyacetic acid (MCPA)	-	appr. 100	180 ⁸ ; 456 ⁸	12-72 ¹⁸⁷	[3], [11], [47], [492]
2-Methyl-4-chlorophenoxypropionic acid (MCP, Mecoprop)	-	appr. 100	669 ⁸ ; 715 ^{8,181}	14-39 ¹⁸³	[3], [11], [47]
Methyldopa	1-5	7 ⁸	9 ⁸	1.5-3 (4-14)	[9], [13, 14], [47]
3,4-Methylenedioxyamphetamine (MDA) ⁵⁸⁰	-0.4	1.5	1.6-26 ⁸	(6-) 10.5-12.5 (-30)	[8], [47], [58], [404-406], [467], [493, 494]

Substance	Blood-plasma concentration (mg/L)			t _{1/2} (h)	References
	therapeutic ("normal")	toxic (from)	comatose-fatal (from)		
3,4-Methylenedioxyethylamphetamine (MDEA, MDE)	-0.2		1-4.2 ⁸ ; 12 ⁸	4-8 ³³⁴	[47], [493], [495-497]
3,4-Methylenedioxymethylamphetamine (MDMA, Ecstasy, XTC)	0.1-0.35 ²³⁶	0.35-0.5	0.4-0.8; 2.9 ⁸	(4-) 7-8 (-10)	[8], [58], [404-406], [467], [493, 494], [498, 499]
3-Methyl-fentanyl	-		0.3-1.9 ng /mL		[1071, 1072]
Methylphenidate	0.01-0.06	0.05 ³¹¹ ; 0.1-0.5; 0.107 ^{8, 407}	2	2-7	[4], [8], [270], [866]
Methylphenobarbital (Mephobarbital)	see Phenobarbital				
4-Methylthioamphetamine (4-MTA, p-MTA)		1 ⁸	2 ⁸ ; 4.6 ⁸ ; 7.4 ⁸	7	[47], [500-504]
Methyprylon(e) ⁵⁸¹	1-20	12-25	50; 66 ⁸	3-11	[8, 9], [1109, 1110]
Metiamide	0.01-0.06				[58], [1111]
Metildigoxin (Methyldigoxin) ³	see Digoxin				
Metipranolol ³³	0.02-0.08 (-0.17)			2-3.5	[15], [869]
Metoclopramide	(0.01-) 0.05-0.15	0.2	4.4 ⁸	3-6	[15], [66]
Metocurine	appr. 0.4-1			5-7	[1112]
Metolazone	0.005-0.05			6-11	[47], [780], [1113]
Metoprolol ⁴⁸	(0.02-) 0.035-0.5 (-0.6)	0.65 ⁸ ; 7.8; 12 ⁸	4.7 ⁸ ; 18 ⁸ ; 25 ⁸ ; 63 ⁸ ; 142 ⁸	2.5-7.5	[3], [7], [47], [870]

Substance	Blood-plasma concentration (mg/L)			t _{1/2} (h)	References
	therapeutic ("normal")	toxic (from)	comatose-fatal (from)		
Metrifonate ⁵⁸²	appr. 1.4-3.6			2-5	[8], [47]
Metronidazole	3-10 (-30)			6-14	[8], [1186]
Mexiletine	0.5-2	1.5-2	21-45 ⁸	6-17 (-26)	[47], [70], [505]
Mexoryl SX	see Ecamsule				
Mianserin	0.015-0.07	0.14 ³¹¹ ; 0.25-0.5	1.6 ⁸ ; 8.6 ⁸	14-33	[4], [8], [56], [223], [1084]
Mibefradil	appr. 0.2-0.3			17-25	[8]
Miconazole	< 1			24	[8]
Midazolam	0.04-0.1 (-0.25) ¹³⁴	1-1.5		1-3 ⁴⁶	[8], [61], [224], [506-508]
Mifepristone (RU-486)	0.1-4 ²¹⁶			(20-) 24-48 (-54)	[47], [509], [1114]
Milnacipran	(0.05-) 0.1-0.15	0.3 ³¹¹	22 ⁸	5-8	[4], [1115]
Milrinone	0.15-0.25	0.3		1-3	[3], [8], [42], [95]
Minaprine	appr. 0.1-0.4 (-1)?			appr. 25-34	[1119, 1120]
Minoxidil	appr. 0.02-0.2 ¹⁴⁹	3.1 ⁸		1-4	[3], [84], [1116]
Mirabegron	0.005-0.03 (-0.1)			30-50	[780], [1117]
Mirtazapine	0.03-0.08 (-0.3)	0.16 ³¹¹ ; 1-2	2-3	20-40 ¹⁸⁸	[3, 4], [510], [1084]
Misoprostol	_286			0.5-1	[3], [511, 512], [1118]

Substance	Blood-plasma concentration (mg/L)			t _{1/2} (h)	References
	therapeutic ("normal")	toxic (from)	comatose-fatal (from)		
Mitotane	14-20	20		18-159 days	[513]
Mitragynine (Kratom) ⁴⁶⁷	0.02-0.1 ^{103, 585}	339	413; 0.23 ⁸ ; 0.6 ⁸ ; 1.06 ⁸	23 ± 16	[241], [871-877]
Mizolastine	appr. 0.2-0.8			5-17	[3], [8], [47]
Moclobemide ¹⁴¹	0.3-1.0 (-3)	2 ³¹¹ ; (2.8; 18; 60.9) ⁵⁸⁶	11 ¹⁶² ; 30	1-7	[514-519], [1084, 1085], [1127]
Modafinil	1-1.7 (-4) ²⁵⁷	3.4 ³¹¹	35 ⁸	10-15	[4], [89], [520], [1126]
Moexiprilat ⁵⁸⁷	0.005-0.04			2-10	[8]
Molindone	0.005-0.5	0.15 ⁸	6 ⁸ ; 9.3 ⁸	1.2-2.8	[47]
Molsidomine	0.002-0.03			1-2.5	[95]
Molybdenum	-0.005 ⁵⁸⁸	0.0077 ⁸			[47], [1129]
Montelukast (MK-0476)	0.02-0.3	0.6 ³¹¹		3-6	[3], [521], [1130]
Moricizine ²³	0.12-1.27			(3-) 6-13	[8], [467], [1131, 1132]
Morphine ²⁸⁸	0.01-0.1	0.1 ³³⁹	0.1 ³³⁹	1-4	[87], [522-525]
Moxonidine	0.001-0.002 (-0.004)			2-4	[8], [95]
MT45	see 1-Cyclohexyl-4-(1,2-diphenylethyl)piperazine				
Muromonab-CD3 (OKT 3)	0.1-1.5			appr. 18	[1133, 1134]

Substance	Blood-plasma concentration (mg/L)			t _{1/2} (h)	References
	therapeutic ("normal")	toxic (from)	comatose-fatal (from)		
Mycophenolate mofetil ²¹²	0.3-3.5 ²¹¹	44 ⁸		16-18 ²¹²	[526-529], [1135]
Nabumetone	_206			_206	[47], [530], [780]
Nadolol	0.01-0.25		1.3 ⁸	(14-) 20-24	[7, 8], [47]
Naftidrofuryl (Nafronyl)	< 0.5		7.5 ⁸	1-2	[47], [1136]
Nalbuphine	0.02-0.2			2.5-7	[8]
Nalidixic acid	10-30	40-50		1-2 (-7)	[3], [8, 9]
Nalmefene	0.01-0.05	0.2 ³¹¹		5-11	[3, 4]
Naloxone	0.01-0.03			1-2	[8]
Naltrexone	0.003-0.05 ⁹⁹	0.2 ^{311, 589}		2-5 (-13)	[4]
Naphyrone (Naphthylpyrovalerone)		0.03 ³³⁵		appr. 34	[531]
Naproxen	(20-) 50-100	200; 414 ⁸	840 ⁸ ; 1040 ⁸ ; 1320 ^{8, 599}	9-22	[8], [47], [293], [343], [532, 533], [1155]
Naratriptan	appr. 0.01-0.05			5-6	[3], [8]
Nateglinide	0.09-1.2 (-6)			1-2	[47], [780], [1136]
25I-NBOMe 2-(4-iodo-2, 5-dimethoxyphenyl)-N-(2-methoxybenzyl)ethanamine		0.3-2.8 ng/mL	0.24 ⁸ ; 0.76 ⁸ ; 4.7 ⁸ ; 16 ⁸		[47], [1050-1052]
Nebivolol ⁴⁸	0.001-0.02 (-0.06) ⁶²⁰	0.12 ³¹¹ ; 0.48 ⁸		8-14 (-27)	[3], [8], [47], [534-536], [780]

Substance	Blood-plasma concentration (mg/L)			t _{1/2} (h)	References
	therapeutic ("normal")	toxic (from)	comatose-fatal (from)		
Nedocromil	< 0.02			1.5-3.3	[3], [47]
Nefazodone	0.03-2.5 ²²⁰	5.5 ⁸ , 221		2-6 ²²²	[3], [8], [537-542]
Nefopam	0.01-0.1	0.6 ⁸ ; 4 ⁸	12 ⁸	3-8	[8], [47]
Nelfinavir (NFV)	> 0.8 ²⁹⁵			3.5-5	[2], [87], [110, 111]
Neostigmine	appr. 0.001-0.01 ¹²⁷			0.4-1.3	[316], [543]
Netilmicin	0.5-2; 6-10 ⁵⁹⁰	appr. 15-20		0.5-3 ⁸⁰	[8], [878], [1137]
Nevirapine (NVP)	> 3.0 ²⁹⁸			25-30	[2], [110, 111]
Nicardipine	0.07-0.1		5 ⁸	7-12	[84], [1138]
Nickel	0.0015-0-005 ³³⁰	appr. 3 ⁸	7.5 ⁸ ; 19 ⁸		[47], [58], [100]
Nicotine	0.005-0.03 ¹²³	0.4 ⁸	1-2 ^{461, 462}	1-4 ¹²⁴	[3], [8], [270], [544, 545], [1007-1010]
Nicotinic acid	4-18			0.3-1	[8]
Nifedipine	0.01-0.2		0.15 ⁸ ; 1.2 ⁸ ; 5.4 ⁸	2-5	[47], [84]
Niflumic acid	2-35			2-3	[8]
Nilvadipine	< 0.01			9-13	[84], [1139]
Nimesulide ²³⁵	3-6.5			2-7 (11-20)	[3], [8], [546]
Nimodipine	0.01-0.05			1-2	[8], [84]

Substance	Blood-plasma concentration (mg/L)			t _{1/2} (h)	References
	therapeutic ("normal")	toxic (from)	comatose-fatal (from)		
Nimustine (ACNU)	0.2-0.5 ng/mL				[58]
Nisoldipine	0.001-0.003	1.5 ⁸		7-12 (-15)	[3], [47], [84]
Nitrazepam	0.03-0.1	0.2 ³¹¹	5	18-30	[4], [8], [59]
Nitrendipine	(0.005-) 0.01-0.05			8-12	[8], [84]
p-Nitroaniline (4-Nitroaniline)	-		4.2 ⁸		[547]
Nitrofurantoin	0.5-5			0.7-1.5	[8], [1140]
Nitroglycerin (Glyceryl trinitrate, GTN)	appr. -0.015			20-30 minutes	[548]
Nitroprusside	see Thiocyanate	see also Cyanide			
Nizatidine	0.05-1			0.7-2.1	[8], [47]
Nomifensin(e)	0.01-0.1	8	17 ⁸	2-5	[8], [87]
Norclozapine (N-Desmethylozapine)	see Clozapine			appr.8	[4]
Nordazepam (Desmethyldiazepam) ²³	(0.02 ²⁷³ -) 0.12 -0.8	1.5 ³¹¹		30-90	[4], [8], [284, 285], [467]
Nordiazepam	see Nordazepam				
Norephedrine	see Phenylpropanolamine				
Norfefrine	< 0.002 (-0.4)			(2-) 3-7	[8], [1141]
Norfloxacin	0.5-5			3-4 (-6)	[3], [47], [58]

Substance	Blood-plasma concentration (mg/L)			t _{1/2} (h)	References
	therapeutic ("normal")	toxic (from)	comatose-fatal (from)		
Norfluoxetine (N-Desmethylfluoxetine)	see Fluoxetine			7-9 (4-16) days	[4], [1084]
Normesuximide (N-Desmethylnormesuximide) ³¹	10-40	45 ³¹¹		36-45	[4]
Norsertaline (Desmethylsertaline, DMS)	see Sertraline			appr. 70	[4], [879]
Nortriptyline ⁴⁸ (see also Amitriptyline)	0.07-0.17 (0.05-0.15)	0.3 ³¹¹ ; 0.5	1-3	18-44 (-56) ⁶⁸	[4], [76], [80-82], [223], [1084]
Noscapine	0.02-0.4			1.5-4	[47]
Obidoxime	1-10 (appr. 10-20 µmol/L)			1-12	[58], [549], [1142]
Ocfentanil ³⁹⁵	-		3.6 ⁸ ; 9.1 ^{8, 396} ; 15.3 ⁸ ng/mL		[880-883], [1071]
Octisalate	0.001-0.006 (-0.017) ⁵⁸³			27-77	[1122]
Octinoxate	0.001-0.008 (-0.03) ⁵⁸³			50-157	[1122]
Octocrylene	0.001-0.02 ⁴¹⁹			50-80	[801], [1122]
Ofloxacin	2-3 (-5.5)	39 ⁸		5-8	[3], [550], [1143]
OKT 3	see Muromonab-CD3				
Olanzapine ⁵⁴⁸	(0.001-) 0.02-0.08 ⁵⁴⁸	0.1 ³¹¹ ; 0.12 ⁸	0.25 ⁸ ; 1 ⁸ ; 2.5 ⁸ ; 4.9 ⁸	(20-) 30-60	[4], [72], [101], [551-555]
Olmесartan	0.1-1			6-15	[47], [780]
Omecamtiv mecarbil	0.03-0.5	appr. > 1.2		18-21	[884-888]

Substance	Blood-plasma concentration (mg/L)			t _{1/2} (h)	References
	therapeutic ("normal")	toxic (from)	comatose-fatal (from)		
Omeprazole ⁴⁸	0.05-4 ⁹⁸	8 ³¹¹		0.5-1 (-1.5)	[780]
Ondansetron	0.03-0.3			3-5.5	[8], [66]
Opipramol	0.05-0.5	1 ³¹¹	3 ⁸ -10	6-12 ²⁶²	[4], [8], [43], [556]
Orphenadrine	(0.05-) 0.1-0.2 (-0.8)	1.7	3.6 ⁸ ; 5	13-20	[9], [47], [56], [296], [557]
Oxaprozin	60-200			30-70	[47], [780]
Oxatomide	0.02-0.1	0.25	0.9 ⁸	14-30	[3], [47]
Oxazepam	0.2-1.5	2 ³¹¹	3.5; 4.4 ⁸ ; 5.3 ⁸	4-20	[3, 4], [56], [59], [283], [1231]
Oxazolam	see Nordazepam				[1145]
Oxcarbazepine	10-35 ¹⁷²	35 ⁸ ; 40 ³¹¹ -45		1-5 ¹⁷²	[3, 4], [12], [47], [381], [558-560]
Oxpentifylline	see Pentoxifylline				
Oxprenolol	0.05-0.3 (-1.0)	2-3	10	1-4	[7, 8]
Oxybenzone	0.083-0.532 ⁴¹⁹			appr. 79 ⁵⁸³	[801], [1122]
Oxybutinin (Oxybutynin) ⁵⁹⁰	0.001-0.02			2-5 (-12)	[8], [47], [780]
Oxycodone ^{48, 591}	0.005-0.1 ³³⁹	0.2 ³³⁹	0.6-0.7; 5 ⁸	2-5 ⁵³	[47], [58], [244], [270], [1231]
Oxyfedrine	appr. 0.06			4.2	[95]
Oxymorphone ⁵⁹²	0.5-5 ng/mL ³³⁹	_ ³³⁹		(4-) 7-9 (-12)	[47], [780], [1146]

Substance	Blood-plasma concentration (mg/L)			t _{1/2} (h)	References
	therapeutic ("normal")	toxic (from)	comatose-fatal (from)		
Oxyphenbutazone	25-100	200		48-72	[8], [47]
Oxypurinol ⁶¹	5-15	20		18-30	[8], [11], [58]
Oxytocin	appr. -0.2 ng/mL			3-5 minutes	[3]
Paclitaxel	0.25-7 ¹²²	₅₉₃		(4-) 8-20	[8], [47], [1147]
Paliperidone (9-Hydroxyrisperidone) ⁵⁵⁰	0.02-0.06	0.12 ³¹¹		17-24 (-30)	[4], [47], [1194]
Pamidronate (Pamidronic acid)	< 0.02 ³²³			days ⁵⁹⁴	[49], [561]
Pancuronium	0.025-0.1 (-0.6) ⁶⁰⁶	0.4 ^{8, 198}	0.7 ⁸ ; 1.6 ⁸	1.5-2.5	[8], [47], [562]
Pantoprazole	1.5-14 ⁹⁸	28 ³¹¹		1-2	[3], [8], [47]
Papaverine	0.2-2			1-2 (6-7)	[47], [57], [780]
Paracetamol	(5-) 10-25	100-150 ⁵⁹⁵	200-300	2-4	[243], [563-571], [1148, 1149]
Paraldehyde	10-100	200	500	(3-) 4-10	[48], [87]
Paraoxon ⁵⁹⁶	-	0.005			[11]
Paraquat	-	0.05	0.12 ^{8, 348} ; 1-2 ²⁰¹	8-12 ³⁴⁹	[3], [11], [572-580]
Parathion ⁵⁹⁶	-	0.01-0.05	0.05-0.08		[3], [10], [58]
Paroxetine ⁴⁸	0.002-0.065	0.12 ³¹¹ ; 0.4	1.2 ⁸ ; 3.7 ⁸ ; 4 ^{8, 306}	16-24 ⁹³	[4], [202], [263], [368], [581-583], [1084, 1085]
Pefloxacin	(0.1-) 1-10	25		8-15	[8, 9], [58]

Substance	Blood-plasma concentration (mg/L)			t _{1/2} (h)	References
	therapeutic ("normal")	toxic (from)	comatose-fatal (from)		
Pemoline	1-7			7-13	[8]
Penbutolol	0.01-0.3 (-1.0)			17-26	[7-9]
Penfluridol	0.004-0.025			70	[3], [58]
(D-)Penicillamine	1.7-5.6 (-11)			1-3	[8]
Penicillin G	0.1-2.5 (-10)			0.5-1	[9], [780]
Pentachlorophenol (PCP)	-0.2	30	38 ⁸ ; 45	13-19 days	[11], [47]
Pentamidine	0.3-0.5	appr. 0.8		6-9	[3], [8]
Pentazocine	0.01-0.2	1-2 ³³⁹	3	2-5	[8]
Pentobarbital ⁵⁹⁸	1-5	5	10	20-48	[8, 9], [47], [87]
Pentoxifylline ⁷²	appr. 0.5-2	4 ³¹¹	33 ⁸	0.5-3	[8], [47], [780]
Pentoxyverine	-0.18			2-3 (-6)	[8], [47]
Perampanel	0.18-0.98	1 ³¹¹		48-105	[4]
Perazine	(0.01-) 0.1-0.23	0.46 ³¹¹ ; 6.1 ⁸	9.6 ⁸	8-16 (-35)	[4], [8], [584], [1156]
Perhexiline	0.11-0.6 ³⁰⁹	0.6-1.2		(7-) 12-18 (-23)	[3], [585, 586]
Periciazine (Pericyazine) ⁵⁹⁷	0.005-0.03	0.1		7-9	[9], [1154]
Perindopril ⁶⁰⁰	0.08-0.15			0.8-3 ²⁶⁵	[3], [8]

Substance	Blood-plasma concentration (mg/L)			t _{1/2} (h)	References
	therapeutic ("normal")	toxic (from)	comatose-fatal (from)		
Perphenazine	0.6-2.4 ng/mL ¹⁶¹	5 ng/mL ³¹¹		8-12 (-21)	[4], [587]
Pethidine (Meperidine) ¹¹⁵	0.1-0.8 ¹¹⁵	1-2 ³³⁹	1 (-2)	3-6 (-10)	[588-592]
Phenacetin ⁶²	5-10 (-20)	50		appr. 1	[9], [13], [779]
Phenazepam	0.02-0.04 ⁶⁰¹		1 ⁸ ; 1.6 ⁸	60	[47], [1157]
Phenazone (Antipyrine)	1-25	50		10-12 (-16)	[8, 9]
Phencyclidine (PCP)	0.01-0.2	0.007-0.24 (-0.8)	(0.3-) 1-5	1-12 (-50)	[8], [58], [467], [779]
Phendimetrazine	0.02-0.1		0.3 ⁸ ; 0.7 ⁸	2-4	[8], [47], [1158]
Phenelzine	0.001-0.002 (-0.2)	0.5	1.5 ⁸	6-8	[3], [58]
Pheneturide		5-20		30-90	[12]
Phenformin	0.03-0.1	0.6	3	4-13	[3], [8]
Pheniramine	0.01-0.27		appr. 2	16-19	[3], [8]
Phenmetrazine	0.02-0.25	0.5	4	appr. 8	[8]
Phenobarbital	10-40	40; 50 ³¹¹	50-60	60-130	[4], [8], [12], [161], [164], [415]
Phenol	< 10 (in urine)	50; 21.6 ⁸	50 ⁸ ; 90 ⁸	0.5-1 (-4.5); 14 ⁸	[11], [47], [889]
Phenprocoumon	1-3 (-5) ⁶⁰²	5		100-160 ³⁵	[11], [58]
Phensuximide	4-10 (-20)	80		4-12	[8], [58], [779]

Substance	Blood-plasma concentration (mg/L)			t _{1/2} (h)	References
	therapeutic ("normal")	toxic (from)	comatose-fatal (from)		
Phentermine	0.03-0.1	0.9	1; 7.6 ⁸	appr. 20	[8], [47], [58]
Phenylbutazone ³⁶	50-100	120-200	400	30-175 ³⁷	[9], [13]
Phenylephrine	0.4-3.4 ng/mL			0.5-4	[47], [168], [890-892]
Phenylpropanolamine (Norephedrine)	0.1-0.5	2	4.6 ⁸ ; 48 ⁸	3-7	[9], [47]
Phenytoin	(5-15) 10-20 ⁸¹	20-25 ³¹¹	38 ⁸ ; 43 ⁸	10-60 ³⁷	[4], [161], [164], [593-600]
Pholcodine	0.02-0.08	0.1	1; 2.5 ⁸	35-75	[47], [1159]
Physostigmine	0.04-0.06			0.3-1.5	[303], [316], [601]
Pimozide	(0.003-) 0.015-0.02	0.02 ³¹¹		24-55 (-214)	[4], [47], [1160]
Pinazepam ¹⁵	0.01-0.05			16	[59], [1161]
Pindolol	0.02-0.15	0.7-1.5		2-5	[7]
Pioglitazone	0.4-2			3-11 (-20)	[47], [780], [893], [1194]
Pipamperone	0.1-0.4	0.5 ³¹¹ ; 3.2 ⁸		17-22	[4], [47]
Piperacillin	1-5 (20-70)			1-2 (-4)	[8], [58], [1186]
Piperazine	0.02-0.1	0.5			[42], [58]
Pipotiazine	0.001-0.06	0.1		8-11	[3], [8, 9], [58]
Piracetam	appr. 20-50			4.5-7	[8]

Substance	Blood-plasma concentration (mg/L)			t _{1/2} (h)	References
	therapeutic ("normal")	toxic (from)	comatose-fatal (from)		
Pirenzepine	0.03-0.45			8-20	[8]
Piretanide	appr. 0.1-1 (-4) ⁶²⁰			0.6-1.7 ⁸³	[47], [1203, 1204]
Piritramide	0.0035-0.014 ¹²⁸	_128, 339	0.11 ⁸	4-10	[8], [47], [602]
Pirmenol	1-4			6-18	[3], [8], [11]
Piroxicam	2-6	14 ⁸		30-70	[8]
Pitavastatin	0.031-0.081			5-13	[47], [1063]
Pizotifen (Pizotyline)	0.007-0.009			26	[58]
Posaconazole	> 0.5-0.7 ⁶⁰³			20-66	[47], [603-605], [894, 895], [1162]
Practolol	1.5-5			5-13	[7-9]
Prajmalium (Prajmaline) ⁴⁸	0.06-0.44		3.9 ⁸	5-7	[8], [47]
Pramipexole	appr. 0.0002-0.007	0.015 ³¹¹		8-14	[4], [8], [467]
Pranlukast	appr. 0.2-1.2			appr. 2-9	[3], [8]
Pravastatin	0.0025-0.0063			appr. 3	[780]
Prazepam ^{15, 418}	see Nordazepam			1-3	[8], [47], [59], [896]
Praziquantel	appr. 0.2			1-2.5	[8], [1163]
Prazosin	0.001-0.02	0.9		2-3	[42], [47], [95]

Substance	Blood-plasma concentration (mg/L)			t _{1/2} (h)	References
	therapeutic ("normal")	toxic (from)	comatose-fatal (from)		
Prednisolone	0.5-1	2 ³¹¹		2-6	[8], [780]
Prednisone	see Prednisolone				
Pregabalin	2-8 (-17)	10 ³¹¹ ; 13 ⁸ ; 60 ⁸ ; 67 ⁸	76 ⁸ ; 110 ⁸	appr. 6	[4], [373], [606, 607], [842], [897-899]
Prilocaine	0.5-1.5 (-2) ¹²⁶	5-6	appr. 20	1-2	[8], [327], [608]
Primaquine	appr. 0.1-0.2			4-7	[8]
Primidone ⁶³	5-10 (-15)	25 ³¹¹	65 ⁸	4-12 (-22)	[4], [8], [47], [161], [164]
Probenecid	20-200			3-17 ³⁷	[8], [47]
Procaine	0.2-2.5 (-15)	20		-0.5	[15], [58]
Procainamide ⁵	2.5-14	8-15	20	2-5 (-8)	[8], [70], [609]
Prochlorperazine	(0.001-) 0.01-0.05	0.2-0.3	5 ⁸	7-9 (-18)	[3], [9], [47], [58]
Procyclidine	0.08-1	1-2	7.8 ⁸	7-16	[8], [11]
Proguanil ⁴⁸	appr. 0.04-0.15 ¹¹⁴			13-24 ¹¹⁴	[58], [610]
Promazine	0.01-0.05 (-0.4)	1	5	5-41 (8 ± 7)	[8]
Promethazine	0.01-0.05 (-0.2)	0.1 ³¹¹ ; 1-2	2.4 ⁸ ; 1.8-5.4 ²⁵⁰	5-20	[4], [8], [56], [611, 612]
Propafenone ⁴⁸	(0.04-) 0.3-2	1.1 ⁸ ; 2	1.4 ⁸ ; 7.7 ⁸ ; 9 ⁸	2-10 ⁴⁸ , 10-32 ⁴⁸	[42], [47], [70], [613]
Propallylonal	0.3-10	appr. > 10		appr. 3	[8]

Substance	Blood-plasma concentration (mg/L)			t _½ (h)	References
	therapeutic ("normal")	toxic (from)	comatose-fatal (from)		
2-Propanol	see Isopropanol				
Propantheline	0.002-0.05			1-4	[3], [47]
Propiomazine	0.05-0.2		0.1-5.4 ⁸	2-15	[47], [56], [614]
Propofol	1-8		2.4 ⁸ ; 2.5 ⁸ ; 4.3 ⁸ ; 5.3 ⁸	3-8 ⁹¹	[615, 616], [900-903]
Propoxyphene	see Dextropropoxyphene				
Propoxur	-		0.3 ⁸		[87]
Propranolol	0.02-0.3 ⁴⁰³	1	4-10	2-6	[7], [9], [42], [112], [1153]
Propylene glycol	0.05-0.5 ⁴⁰³	1000; 4700 ⁸		2-5	[47], [58], [617]
Propylhexedrine	0.01	0.5	1.7 ^{8, 414} ; 2-3	1 (nasal inhalation); 4 ± 1.5 (oral)	[58], [871], [904], [1164]
Propyphenazone	1.5-12.5			1-3	[8, 9], [1165, 1166]
Prothipendyl	0.03-0.08	0.05 ³¹¹ ; 0.5 (-1)	60 ⁸	2-3	[4], [8], [1167]
Protriptyline	0.05-0.3	0.5	1; 20.7 ⁸	50-200	[8], [58], [87]
Pseudoephedrine	(0.05-) 0.5-0.8	1.6 ³¹¹	19-20 ²⁸⁰	9-16	[11], [58], [266, 267], [269], [618, 619]
Psilocin ³⁸⁰	appr. 0.008	0.018 ⁸		1.8-4.5	[47], [1168]
Psilocybin	see Psilocin				

Substance	Blood-plasma concentration (mg/L)			t _{1/2} (h)	References
	therapeutic ("normal")	toxic (from)	comatose-fatal (from)		
Pyrazinamide	30-75			(5-) 9-10 (-25)	[3], [9], [620]
Pyridostigmine	< 0.05-0.2			0.5-1.5 (-2.5)	[316], [621, 622]
Pyridoxine (Vitamin B ₆)	0.003-0.018			3-6	[66], [800]
Pyrilamine			11 ⁸ ; 5-27 ⁸		[47], [87]
Pyrimethamine	0.1-2		1-10 ⁸	70-96	[3], [47], [1169]
Pyrithyldione	1-10			11-20	[9], [14]
Quazepam	0.01-0.05 (-0.15) ¹³¹			39 (25-41)	[8], [11], [58, 59]
Quetiapine ⁵⁴⁹	0.1-0.5 ^{239, 600}	1 ³¹¹ ; 1.8	0.95 ⁸ ; 1.4 ⁸ ; 1.9 ⁸ ; 9 ⁸ ; 12.7 ⁸	appr. 5-7 ²⁴⁰	[4], [47], [87], [623-628], [807], [905], [1171], [1187]
Quinapril ⁶¹⁷	0.15-0.5 ^{617, 620}			2-3 ⁶¹⁸	[47]
Quinidine	2-5 (-8)	8-10	10-28 ⁸	4-12	[23], [70], [1170]
Quinine	1-7	10		4-15	[8], [58], [629, 630]
Rabeprazole	0.2-1.8	3.6 ³¹¹		1-2	[8], [780]
Raloxifene	0.67-1.3 ng/mL			15-45	[47], [780]
Raltegravir (RAL)	0.072 (0.029-0.118) ³⁰³			7-12	[47], [110]
Ramipril	appr. 0.001-0.04 ²²⁸	0.08 ³¹¹		1-5	[3], [8], [780]
Ranitidine	0.05-1	3 ³¹¹		2-4	[8], [631], [780]

Substance	Blood-plasma concentration (mg/L)			t _½ (h)	References
	therapeutic ("normal")	toxic (from)	comatose-fatal (from)		
Ranolazine	0.37-1.1			3-15	[47], [780], [1172]
Rapamycin	see Sirolimus				
Reboxetine	0.06-0.35 ²⁸¹	0.7 ³¹¹		(8-) 12-14 (-30)	[3, 4], [632, 633]
Recainam	1.3-5.7			5-7	[634], [1173]
Remacemide	appr. 0.1-1			4	[8]
Remifentanil	-0.02			3-10 minutes	[8], [1071], [1174]
Remoxipride	2.15 ± 0.59 ¹³²		41-150	5-10	[56], [635, 636]
Repaglinide	0.004-0.06 (-0.2)			0.5-2.5	[47], [780], [1175]
Reserpine	-0.0015-0.003			75 (2-12 days)	[47], [780], [1176]
Retigabine	0.45-0.9	1.8 ³¹¹		8-10	[4]
Retinol (Vitamin A)	0.2-0.8 (0.7-2.8 µmol/L)		1.2 ⁸		[66], [637], [800]
Ricin	0.003-0.01 ⁶⁰¹	1.5 ⁸			[47], [638], [1177]
Rifabutin	0.05-0.15 (-1.1)			24-58	[3], [47], [1178]
Rifampicin (Rifampin)	0.1-10 ¹⁰¹	204 ⁸	55 ⁸	1-6 ³⁷	[47], [317], [620], [639]
Rifapentine	4-24			10-15	[47], [620], [1179]
Rilmnidine	0.003-0.006 ⁶²⁰			6-10	[47]

Substance	Blood-plasma concentration (mg/L)			t _{1/2} (h)	References
	therapeutic ("normal")	toxic (from)	comatose-fatal (from)		
Riluzole	0.05-0.5 (-1.5)			(5-) 9-15	[8], [47], [467]
Risedronat (Risedronic acid)	appr. 0.4-5 ng/mL			4-12 days	[47], [49], [998], [1180]
Risperidone ^{48, 550}	0.02-0.06 ²⁷²	0.12 ³¹¹	1.8 ⁸	2-4 ¹⁵⁹	[4], [47], [457], [640, 641], [906, 907]
Ritonavir	appr. 5-11 (-20)			3-5	[2, 3], [642]
Rivaroxaban	(0.001-) 0.01-0.36	0.005-0.35		5-9; elderly 11-13	[794], [796, 797], [819], [908], [960], [1181]
Rivastigmine	0.008-0.02	0.04 ³¹¹		1-2 (oral); appr. 3 (transdermal patch)	[4], [8], [303], [643, 644]
Rizatriptan	0.015-0.1			2-3	[3], [8], [47]
Rocuronium	5-10 (-17) ⁶⁰⁶		1.5 ⁸ ; 4.9 ⁸	appr. 1.5	[8], [47], [1182]
Roflumilast ¹⁵⁸	0.0013-0.0024			10-30	[47], [780], [1183]
Ropinirole	0.4-6 ng/mL	12 ng/mL ³¹¹		2-10	[4], [8], [645]
Ropivacaine	0.4-1.8	(1-) 2 ¹⁷³		2 ¹⁶⁸	[47], [646-648]
Rosiglitazone ¹¹⁶	0.1-0.3 (-0.65)			3-4	[8], [1184]
Rosuvastatin	0.006-0.02			12-32	[47], [780], [1063]
Rotigotine	0.1-0.7 ng/mL	2 ng/mL ³¹¹		5-7	[4]
Roxatidine	0.1-0.8			5-6	[8]

Substance	Blood-plasma concentration (mg/L)			t _½ (h)	References
	therapeutic ("normal")	toxic (from)	comatose-fatal (from)		
Roxithromycin	4-12			6-15	[3], [47], [115]
RU-486	see Mifepristone				
Rufinamide	(2-) 5-30	40 ³¹¹		6-10	[4], [47]
Sacubitril ⁴¹⁵	appr. -3 (appr. -16 for Sacubitrilat)			3.9 ± 3.6 ⁴¹⁶	[909]
Salbutamol (Albuterol)	0.004-0.014 (-0.02)	0.018-0.45	0.16	3-6	[58], [649], [1185]
Salicylamide	5-40			appr. 1	[8]
Salicylic acid ⁶⁰⁹	20-200	300-400	(400-) 500	3-20	[3], [28], [30-33]
Salvinorin A	0.01-0.04 ⁶¹⁰			40-80 minutes	[29], [47]
Saquinavir (SQV)	> 0.1-0.25 ²⁹⁶			(1-) 3-7 (-12)	[2], [47], [110, 111]
Saxagliptin ⁴²⁰	0.008-0.025			2.5	[780], [910-912]
Scopolamine	0.1-0.3 (-1) ng/mL		1.2 ng/mL ⁸	2-6	[8], [11], [47]
Secbutabarbital	5-10 (-15)	20	30	34-42	[8]
Secobarbital	1.5-5	7-10	10-15	15-30	[8], [87]
Selegiline	see Amphetamine and Methamphetamine				
Selenium	0.045-0.13 (-0.19)	0.4-1	2; (2.6 ⁸ ; 2.8 ⁸ ; 18.4 ⁸ ; 38 ⁸)	69-77 days	[3], [47], [87], [650-652]

Substance	Blood-plasma concentration (mg/L)			t _{1/2} (h)	References
	therapeutic ("normal")	toxic (from)	comatose-fatal (from)		
Seratrodast	3-25				[8], [1188]
Sertindole	0.05-0.1	0.2 ³¹¹		55-90	[4], [101]
Sertraline ⁴²³	0.01-0.15 (-0.5)	0.29 ⁸ ; 0.3 ³¹¹	1.1-1.5; 1.6 ⁸ ; 3 ⁸	(22-) 24-28 (36)	[4], [58], [223], [653], [879], [1084, 1085]
Sevoflurane	40-80 (appr. -134) ³⁸¹		8 ⁸ ; 26 ⁸	1.8-3.8	[47]
Sibutramine ³⁶⁶	appr. 0.001-0.01	0.11 ⁸		4-8	[8], [47]
Sildenafil	appr. 0.05-0.5	1 ³¹¹	6.2 ⁸	3-5	[8], [780], [1189]
Silver	-0.005 ³⁶⁷ (-0.02 ⁶¹¹)			48-52 days	[47], [58]
Simvastatin ⁵⁴⁴	0.003-0.006	0.01 ³¹¹		2-4 ²⁹⁰	[48], [780], [1063]
Sirolimus (Rapamycin)	0.005-0.015 ²⁴⁴	0.015 (-0.06)		57-63	[654-657]
Sisomicin	0.5-10			appr. 1	[8], [1191]
Sitagliptin	0.05-0.38	0.72 ³¹¹ ; 3.8 ^{8, 612}		8-14	[47], [780], [911], [1190]
Sodium aurothiomalate	see Gold				
Sodium nitroprusside	see Thiocyanate			0.1	[47]
Sodium oxybate (GHB)	see 4-Hydroxybutyrate				
Sodium valproate	see Valproic acid				
Sotalol ¹⁶⁷	0.5-3 (-4)	7.5-16 ⁸	36 ⁸ ; 40 ⁸ ; 43 ⁸	5-13 (-18)	[7, 8], [70], [658, 659]

Substance	Blood-plasma concentration (mg/L)			t _{1/2} (h)	References
	therapeutic ("normal")	toxic (from)	comatose-fatal (from)		
Sparteine ⁴⁸	0.5-1			2.5	[8]
Spiramycin	0.4-3			5-8	[3], [660]
Spiraprilate	0.006-0.045			33-41	[8]
Spironolactone ⁵⁴⁵	0.05-0.25 (-0.5) ⁷³			13-24 ⁷³	[8], [47], [58], [1064]
Stanozolol			0.056 ^{8, 424} ; 0.257 ^{8, 425}		[940], [943]
Stiripentol	1-10	15 ³¹¹		4-13	[3, 4], [8]
Streptomycin	1-5 (15-40)	40		2-4	[8], [11], [58], [467]
Strontium	-0.075			30-60	[47]
Strychnine		0.075-0.1	(0.2-) 1.6 ⁸ -4.7 ⁸	10-15	[8], [11], [661-667]
STS-135				3 min (in vitro)	[1224, 1225]
Sufentanil	(0.02-) 0.5-10 ng/mL ⁶	-. ³³⁹	1-7 ng/mL ⁸ ; 27 ng/mL ⁸	1.6-6.3 (7-49)	[47], [54], [344], [346], [668-671], [1071]
Sulbactam	8-80			1-2 ⁷⁰	[3], [47], [174]
Sulfamethoxazole	30-60 ⁵⁶	400		9-12	[8], [672]
Sulfasalazine ³⁴	5-30	50	130 ⁸	4-10	[8]
Sulfisoxazole	90-100 (-210)			5-8	[48], [1192]
Sulfinpyrazone	6-17			3-5	[8]

Substance	Blood-plasma concentration (mg/L)			t _{1/2} (h)	References
	therapeutic ("normal")	toxic (from)	comatose-fatal (from)		
Sulindac	1-5 ¹⁰²	10 ³¹¹	130 ⁸	appr. 7	[87], [673], [780]
Sulpiride	0.05-0.4 (-1) ²²⁵	1 ³¹¹ ; 5 ⁸	3.8-39 ⁸	4-14	[4], [43], [47], [58]
Sultiam (Sulthiame)	0.5-12.5 (2-8)	12-15	20-25	3-30	[8], [491], [677]
Sumatriptan	0.018-0.06	0.12 ³¹¹		1-4	[8], [47], [780]
Suramin	> 100 ¹¹⁷	300 ¹¹⁸		44-54	[8], [58], [674]
2,4,5-T	see 2,4,5-Trichloro-phenoxyacetic acid				
Tacrine	appr. 0.01	0.02		2-4	[8], [303]
Tacrolimus	(0.0005-) 0.005-0.015 (-0.02)	(0.015-) 0.02-0.025; 0.123 ⁸		9-16	[11], [191], [675-684]
Tadalafil	0.09-0.48	0.96 ³¹¹		16-19	[47], [780]
Talinolol	0.04-0.15		5 ⁸ , 12 ⁹ ; 20 ⁸	10-14 (-20)	[7, 8], [47], [685, 686]
Talipexole	appr. 0.0001-0.001			5-9	[8]
Tamoxifen	0.05-0.5			5-7 days	[3], [47]
Tamsulosin	0.003-0.022			5-16	[47], [780]
Tapentadol	0.01-0.13 (-0.3) ³³⁹	_ ³³⁹	0.3 ⁸ , 613; 1.1 ⁸ , 614; 2 ⁸ ; 6.6 ⁸	3-7	[47], [680], [684]
Taxol	see Paclitaxel				

Substance	Blood-plasma concentration (mg/L)			t _{1/2} (h)	References
	therapeutic ("normal")	toxic (from)	comatose-fatal (from)		
Teicoplanin	(10-) 15-20 (-40)	200		10-15; 83-168 ⁸³	[8], [58], [688], [913]
Telmisartan	0.006-0.225 (-1.2)			(18-) 21-25 (-30)	[47], [780], [1151]
Temazepam	0.02-0.15 (-0.9)	1	3.8 ⁸ ; 8.2 ⁸ ; 9 ⁸	6-25	[8], [58, 59], [689], [702]
Tenoxicam ¹⁷⁴	1.5-4 (-10)			(50-) 70-90	[8], [47], [690, 691], [1193]
Terazosin	0.02-0.08	0.16 ³¹¹		8-12	[8], [780]
Terbinafine	0.01-0.03 ²⁰⁵			20-36	[3], [10], [47], [58]
Terbutaline	0.001-0.006 (-0.03)		0.04	16-20 ⁸⁹	[8], [58], [1195]
Terfenadine ³⁶⁸	< 0.01	0.04-0.06 ¹⁴⁸	0.4 ⁸	15-22 ⁶⁴	[3], [47], [692]
Tetrachloroethylene	-		4-5; 22 ⁸ ; 44 ⁸ ; 66 ⁸	33-72	[47], [58], [87]
Tetracycline	1-5 (5-10)	30		6-10	[3], [8], [11]
Tetrahydrocannabinol (THC)	see Dronabinol				
Tetrazepam ⁴⁰	0.05-0.6 (-1)			(10-) 16-44	[8], [47], [58, 59]
Thalidomide	0.5-1.5 (-8)			5-9	[3], [8]
Thallium	-0.002 (-0.0006 ³³¹)	(0.003-) 0.1-0.5 ¹⁷⁹ ; 5.6 ⁸	0.5-11	2-4 days	[3], [11], [47], [100], [693, 694]
Theobromine	(4-) 10-15	20		6-10	[11], [58]
Theophylline	(5-) 8-15 (-20) ⁸²	20	50	6-9 ⁴¹	[415], [695-701], [703-705]

Substance	Blood-plasma concentration (mg/L)			t _{1/2} (h)	References
	therapeutic ("normal")	toxic (from)	comatose-fatal (from)		
Thiamphenicol	0.5-3-10 (-15)	20		2-7	[8]
Thiamylal	appr. 5		29 ⁸ , 30 ⁴	0.6-0.8 (initial); 12-34 (terminal)	[47], [87]
Thiazinamium	0.05-0.15	0.3			[8], [11], [467], [1196]
Thiocyanate, from Nitroprusside	5-30 ¹⁴⁴	35-100	200	3-4 days ⁸³	[8], [11], [255], [706], [1197, 1198]
Thiopental ⁵⁷	1-5	7	10-15 ⁵⁸	3-8	[8], [48], [707], [1199]
Thiopropazine	appr. 0.001-0.02	0.1			[8, 9]
Thioridazine	0.1-0.2 (-2) ¹³³	0.4 ³¹¹	2.4 ⁸ ; 3-10	7-13 (-36)	[4], [8], [56]
Thiothixene	see Tiotixene				
Thyroxine	see Levothyroxine				
Tiagabine	0.02-0.2	0.3 ³¹¹ ; 0.5-0.6; 3.1 ^{8, 245}		7-9	[3, 4], [8], [12], [381], [708-712]
Tianeptine	0.03-0.08	0.16 ³¹¹	5.1 ⁸	2.5-3	[4], [1200]
Tiapride	1-2	4		2-6	[8, 9], [47]
Tiaprofenic acid	appr. 15-40 ¹⁹³			1.5-3 (-6)	[3], [713, 714]
Ticlopidine	< 1-2			70-130 ¹⁰⁰	[47], [58]
Tiletamine			0.85 ⁸	1-4 (in animals)	[47], [87]

Substance	Blood-plasma concentration (mg/L)			t _{1/2} (h)	References
	therapeutic ("normal")	toxic (from)	comatose-fatal (from)		
Tilidine ²⁵	0.05-0.3 ³³⁹	_ ³³⁹	1.7 ⁸	1-7	[9], [47], [715, 716]
Tiludronate (Tiludronic acid)	0.2-1.5 (-8)			65-78 (-150)	[49], [58], [717]
Timolol	0.005-0.05 (-0.1)			2-6	[8]
Tin	0.03-0.14				[58]
Tinidazol	10-50 (-60)			11-15 (-20)	[3], [47], [58]
Tiopronin	2-5			12-37	[58], [718], [1201]
Tiotixene (Thiothixene)	0.001-0.02 (0.01-0.1)	0.1		12-36	[47, 48], [58], [185]
Tiotropium	16 ng/L ³⁰⁷			5-6 days	[719]
Tipranavir (TPV)	> 20.5 ²⁹⁹			5.5-6	[2], [110, 111]
Tizanidine	0.005 -0.045	0.09 ³¹¹		2-4	[3], [47], [780]
Tobramycin	< 2- (5-10) ¹⁵⁴	12-15		0.5-3	[3], [67], [198], [878]
Tocainide	4-12 (6-10)	13-15; 20 ⁸	74 ⁸ ; 78 ⁸ ; 140 ⁸	8-25	[3], [8], [47], [58], [720, 721]
Tofenacin(e)	0.025-0.1	0.5-1			[9], [58]
Tolbutamide	45-100	(120-) 400-500	640 ⁸	4-12	[8], [58], [722]
Tolcapone	3-6 ⁶¹⁵	12 ³¹¹		2	[4]
Tolmetin	10-80	160 ³¹¹		2-4	[58], [780]

Substance	Blood-plasma concentration (mg/L)			t _{1/2} (h)	References
	therapeutic ("normal")	toxic (from)	comatose-fatal (from)		
Tolperisone	0.09-0.3	0.7 ⁸ , 382	7-14	1.8-2.9	[47]
Tolterodine ^{48, 492}	0.0008-0.002 (-0.005 ⁴⁹³)			2-3	[47], [780], [804], [1030]
Toluene			10 (-48 ⁸ , 254)	13-68 ²⁵⁴	[47], [58]
Topiramate	2-10 ²¹⁸	16 ³¹¹	49 ⁸	18-30	[4], [8], [381], [712], [1202]
Topotecan	appr. 0.001-0.01 ¹⁹⁰			2-3	[3], [723, 724]
Torasemide (Torsemide)	0.064-0.52 (-2)			2-6	[47], [780], [1206-1208]
Tramadol ^{48, 584}	0.1-1 (> 0.3) ^{87, 339}	1 ³³⁹	2 ^{8, 49} ; 5.2 ⁸ ; 5.3 ^{8, 404} , 9.4 ^{8, 551} ; 13 ⁸ ; 38.3 ^{8, 252}	5-10	[11], [63], [244], [725, 726], [902], [1067, 1068], [1123-1125], [1231]
Trandolapril ⁶¹⁹	0.43-3 ng/mL ^{619, 620}		58 ng/mL ⁸	0.6-0.8 ⁶¹⁹	[47]
Tranexamic acid	10-50			1-3 (-10)	[8], [47]
Tranlycypromine	< 0.05	0.1 ³¹¹ ; 0.5 ^{8, 202}	0.7 ⁸ ; 5 ⁸	1-3.5	[4], [727]
Trapidil	(4-) 6-10			2-6	[8], [95], [728]
Trazodone ¹⁴⁵	0.7-1 (-2)	1.2 ³¹¹ ; 3-4	9; 12-15 ⁸	4-11 (-13)	[4], [43], [58], [64], [263], [729]
Trenbolone			0.163 ^{8, 425}		[943]
Triamterene	0.01-0.1 (-0.2)	0.2 ³¹¹		1.5-4 (-6)	[8], [42], [780]
Triazolam	0.002-0.02	0.04 ³¹¹	0.03 ⁸	(1-) 2-5	[4], [58], [423], [730, 731]

Substance	Blood-plasma concentration (mg/L)			t _{1/2} (h)	References
	therapeutic ("normal")	toxic (from)	comatose-fatal (from)		
2,2,2-Tribromoethanol		50	90		[58]
1,1,1-Trichloroethane			(15 ⁸); 100-1000	20-26 ⁶²²	[47], [58]
2,2,2-Trichloroethanol ³⁶⁹	5-15	40-70	60-100	6-10 ³²⁷	[47], [58]
Trichloroethylene			9.7 ⁸ ; 16 ⁸ ; 21 ⁸	30-38 ⁶²³	[47], [87]
2,4,5-Trichlorophenoxyacetic acid (2,4,5-T)	-	appr. 100	200	11-23 (-33)	[3], [11], [47]
Trifluoperazine	0.001-0.01 (-0.05)	0.1-0.2	0.4 ⁸	7-18	[8], [87]
Triflupromazine	0.03-0.1	0.3-0.5		appr. 6	[8]
Trihexyphenidyl (Trihex)	0.05-0.2 ⁷⁵	0.5	0.12 ⁸	(3-5) 24-41	[9], [47], [114], [1215]
Trimeprazine	see Alimemazine				
Trimethadione ²⁷⁴	20-40			16	[58]
Trimethobenzamide	1-2		184 ⁸	7-9	[11], [47], [58]
Trimethoprim	1.5-2.5 ⁵⁶	20		8-11	[8], [672]
Trimipramine ⁵⁶⁶	(0.01-) 0.15-0.3	0.6 ³¹¹	1.7-8.2 ²⁵¹	10-20 (-40)	[4], [56], [223], [1084, 1085]
Tripelenamine	0.02-0.06		10 ⁸	5-8	[8], [11], [57], [87]
Tripolidine	0.004-0.045			1-5	[47], [57]
Tropisetron ⁴⁸	(0.003-) 0.02-0.05 (-0.08)			7-9 (-30)	[8], [47], [66]

Substance	Blood-plasma concentration (mg/L)			t _{1/2} (h)	References
	therapeutic ("normal")	toxic (from)	comatose-fatal (from)		
Tubocurarine	(0.04-) 0.4-3 (-6)			2-4	[8], [48], [58], [1216]
Tungsten	-0.035		5 ⁸	2-4	[47], [58]
U-47700 ³⁹⁴	-	0.24 ^{8, 399} ; 0.394 ⁸	0.017-0.49; 0.32 ⁸ ; 0.37 ^{8, 400} ; 0.53 ⁸ ; 0.82 ⁸ ; 1.1 ⁸ ; 1.52 ⁸ ; 3.04 ⁸	appr. 6	[837], [914-920], [1071]
Uranium	0.04 ng/mL ³³¹		0.77 ^{8, 624}	450 days	[47], [100]
Urapidil	appr. 0.1-0.2			2-3 (-7)	[3], [58], [95]
Valdetamide	see Diethylpentenamide				
Valnoctamide	5-6 (-25)	40		7-14	[58], [1217]
Valproic acid	(40-) 50-100 (-150)	120 ³¹¹ ; 150-200	556 ⁸ ; 720 ⁸	7-17 (-20)	[4], [47], [64], [161], [164]
Valsartan	appr. 0.8-6	12 ³¹¹		5-12 (-14)	[8], [780], [909]
Vanadium	-0.05	0.0058 ⁸	6.2 ⁸	4-12 days	[47]
Vancomycin	10-20 ¹⁴²	30 (-40)		3.6-11 ⁸³	[47], [67], [390], [732-736], [823], [878]
Vardenafil	0.002-0.004 (-0.04)			2-5	[47], [780]
Varenicline	0.004-0.005	0.01 ³¹¹	0.26 ⁸	23-39	[4], [1218]
Vecuronium ⁶²⁴	appr. 0.2-0.37 (-0.5) ⁶²⁴		1.2 ⁸	1-1.5	[8, 9], [47], [1219]
Vedolizumab	> 14-16			appr. 25-26 days	[921]

Substance	Blood-plasma concentration (mg/L)			t _{1/2} (h)	References
	therapeutic ("normal")	toxic (from)	comatose-fatal (from)		
Venlafaxine ⁵⁶⁷	(0.06-) 0.1-0.4 ¹⁸⁹	0.8 ³¹¹ ; 1-1.5 ²⁶⁶	3.2-24 ⁸	3-7 (-14) ⁶²⁵	[4], [11], [101], [223], [737], [807], [1084, 1085]
Verapamil ⁹⁰	(0.01-) 0.02-0.25 (-0.4)	1	2.5; 0.9 ⁸ ; 3.9 ⁸ ; 85 ⁸	6-14 ⁴²	[8], [42], [56], [64], [84], [721], [738, 739], [870], [922]
Vigabatrin	2-10 (-15) ⁹⁴	20 ³¹¹		5-8	[4], [47], [381]
Vilazodone	0.03-0.07	0.14 ³¹¹		18-32	[4]
Vildagliptin	0.18-0.3 (-1.6)			2-3	[911], [923, 924]
Viloxazine	1-4 (-8?)	47 ⁸ ; 60 ⁸	40 ⁸ ; 45 ⁸	2-5	[8], [43], [47]
Vincamine	< 0.25			1-2	[8], [47]
Vinylbital	1-3	5	8	18-33	[8]
Viquidil	0.15-0.25			6-12	[11]
Vitamin A	see Retinol				
Vitamin B ₆	see Pyridoxine				
Vitamin B ₁₂	(200-) 300-500 (-750) pg/mL ³⁹⁰			21-29	[800], [944]
Vitamin C	see Ascorbic acid				
Vitamin D	(0.02-) 0.03-0.09 ²⁶³	0.2; 0.46 ⁸		appr. 30 days	[740-743], [800], [925]

Substance	Blood-plasma concentration (mg/L)			t _{1/2} (h)	References
	therapeutic ("normal")	toxic (from)	comatose-fatal (from)		
Voriconazole	1-6	3.5 (-6.0) ²⁸⁴		4-10 ³⁷	[47], [603], [744, 745], [895], [1186]
Vortioxetine	0.006-0.04 (-0.07)	0.08 ³¹¹		57-66	[4], [780], [1194]
Warfarin	1-3 (-7) ⁶⁰²	10-12	100	37-50 ⁹⁷	[3], [14], [42], [746]
Wismut	see Bismut				
Xamoterol	appr. 0.02-0.05 (-0.2)			13-30	[58], [1210-1213], [1220]
Xipamide	3-11 (-20)			5-8	[47], [1209]
Xylene	< 0.002 ⁶¹⁶		3-40	20-30	[47], [58]
Yohimbine ⁵⁴⁶	appr. 0.05-0.3		5.2 ⁸ ; 5.4 ⁸ ; 7.4 ⁸ ; 8 ^{8, 547}	1-3	[8], [47], [1065], [1221]
Zafirlukast	0.005-0.03 (0.7)			5-20	[8], [47]
Zalcitabine	appr. 0.1 (0.5 µmol/L)			1-3 ⁸³	[38], [290]
Zaleplon(e)	(0.001-) 0.02-0.04 (-0.1)	0.2 ³¹¹		1-2	[4], [8], [935]
Zanoterone	0.1-0.5				[747]
Zidovudine	0.1-0.3 (-1) ⁵¹	2-3; 24 ⁸		0.5-3	[2], [38], [47], [290], [748-750]
Zinc	0.6-1.3 ⁶²⁶	2	42 ⁸	5-16 months ⁶²⁷	[47], [66], [1222]
Zipeprol	0.1-0.7		2.3-31 ⁸	1.2	[47], [57]
Ziprasidone	(0.02-) 0.05-0.2	0.4 ³¹¹		2-8	[4], [8]

Substance	Blood-plasma concentration (mg/L)			t _{1/2} (h)	References
	therapeutic ("normal")	toxic (from)	comatose-fatal (from)		
Zoledronat (Zoledronic acid)	0.22-2.2 ⁶²⁸			1-189 days	[47], [49], [751-753]
Zolmitriptan	0.003-0.01			1.6-3.8	[8], [47]
Zolpidem	0.08-0.16 ⁶²⁹ (-0.2)	0.32 ³¹¹ ; 0.5	1.5-4	1-5	[4], [8], [11], [310], [754-756], [935], [1231]
Zomepirac	0.1-4		152 ⁸	4-10	[8], [87]
Zonisamide	(10-) 20-30 (-40)	40-70	100 ²⁰⁸	50-70 ²⁰⁹	[8], [47], [381], [712], [757, 758]
Zopiclone	(0.01-) 0.055-0.085 ⁶³⁰ (-0.12)	0.15; 0.3 ³¹¹	0.6-1.8	2-8	[4], [11], [15], [56], [935]
Zotepine	0.01-0.15	0.3 ³¹¹		13-16	[4]
Zuclopenthixol ^{48, 365}	0.004-0.05 (-0.1)	0.1 ³¹¹		15-25	[4], [15], [1223]

Drug concentrations are mentioned as mg/L (= µg/mL), if not otherwise stated.

To convert drug concentrations to or from SI units, use the following formulas (MW = molecular weight):

To determine the conversion factor: $CF = \frac{1000}{MW}$

To convert *to* SI units: mg/L (= µg/mL) x CF = µmol/L

To convert *from* SI units: µmol/L ÷ CF = mg/L (= µg/mL)

Example carbamazepine (MW: 236.27): $CF = \frac{1000}{236.27} = 4.23$

Conversion:

mg/L ($\mu\text{g/mL}$) \rightarrow $\mu\text{mol/L}$: $(8 \text{ mg/L}) \times 4.23 = 33.8 \mu\text{mol/L}$

$\mu\text{mol/L} \rightarrow$ mg/L ($\mu\text{g/mL}$): $(33.8 \mu\text{mol/L}) \div 4.23 = 8 \text{ mg/L} (= 8 \mu\text{g/mL})$

Clinical categories used for grouping analytical data

Therapeutic: blood-plasma/serum concentrations (in general, trough at steady state) observed following therapeutically effective doses; no or only minimal side effects (drugs); “normal”: concentrations associated with no or only minimal toxic effects (other xenobiotics, including ‘recreational’ use).

Toxic: blood-plasma/serum concentrations which produce toxicity/clinically relevant side effects/symptoms.

Comatose-fatal: blood-plasma/serum (comatose) concentrations and whole blood (fatal) concentrations reported to have caused coma and death, respectively. Whether published data for deaths refer to levels measured ante-mortem or post-mortem (femoral or heart blood) is often unknown.

In addition to specific references provided in the table, data were compared and contrasted against database sources, published review articles and textbooks [3, 4, 7-15, 41-43, 47, 48, 56-59, 64, 66, 74, 87, 88, 259, 270, 294, 467, 759-780, 878, among others] but not specifically indicated for every drug/substance, as well as supplemented with our experiences in clinical and forensic toxicology.

Meaning of brackets e.g., therapeutic plasma concentration = (0.02-) 0.08-0.25 or $t_{1/2}$ = (4-) 8-22 (-35): These brackets may have slightly different meanings and depend on the substance. For example for antibiotics such as amoxicillin or ampicillin, they refer to trough and peak concentrations, respectively. In most cases, however, the concentrations in brackets refer either to (published) data mentioning a wider boundary of therapeutic (or toxic) concentration ranges but the majority of sources do not include this range or a concentration resulting from (very) low or (unusual) high doses.

This may also include different doses used in different indications (e.g., diuretics, betablockers, benzodiazepines, oral anticoagulants), acute vs. chronic application, very old or very young patients, patients with very low body weight/mass, or even slow and fast /extensive metabolizers. Sometimes (e.g., opioids), this reflect tolerability developed – that is, chronic opioid users may tolerate very high doses compared to opioid-naïve persons. Hence for opioid-naïve persons, a small dose (leading to a low blood/CNS concentration) might be deleterious.

As an example, for lorazepam [(0.02-) 0.08-0.25], the most cited and used therapeutic range is 0.08-0.25 mg/L. However, there is evidence that even lower concentrations may be measured after therapeutic low doses.

So, if not specifically mentioned or annotated, the data in brackets widen the range but do not cover most of the cases.

Annotations

- 1 active metabolites of acebutolol: N-acetylacebutolol ($t_{1/2}$: 9–14 h): therapeutic concentration 1–2.5 mg/L, comatose-fatal from appr. 90 mg/L, and diacetolol ($t_{1/2}$: 8–13 h): therapeutic 0.65–4.5 mg/L, comatose-fatal from appr. 100 mg/L
- 2 as salicylic acid (for analgesic and antipyretic effects)
- 3 as digoxin
- 4 typical therapeutic serum concentrations of fentanyl are 0.0003–0.0012 mg/L after application of a 25 mg/h transdermal patch; high concentrations during surgery and mechanical ventilation
- 5 slow (poor) and rapid (extensive) acetylators (metabolizers)
- 6 during mechanical ventilation
- 7 active metabolites nortriptyline (see Table) and amitriptyline oxide ($t_{1/2}$: 1.5–3 h)
- 8 case report
- 9 in patients with impaired renal function in some cases up to 100 h
- 10 active metabolite 6-mercaptopurine ($t_{1/2}$: 1–1.5 h)
- 11 appr. 0.2 h for azathioprine
- 12 active metabolite carbamazepine-10,11-epoxide ($t_{1/2}$: 5–16 h; usual plasma concentration range 0.2–2 mg/L) should be considered in case of intoxication
- 13 each sum carbromal(um) + carbromide ($t_{1/2}$: 12–15 days)
- 14 each as trichloroethanol
- 15 active metabolite N-desmethyldiazepam = nordazepam (see Table)
- 16 nephrotoxic
- 17 active metabolite N-desmethyloclobazam (therapeutic reference range: 0.3–3 mg/L; laboratory alert level³¹¹ 5 mg/L)
- 18 duration of pharmacological effects: 0.3–0.4 h; major metabolite: benzoylecgonine ($t_{1/2}$: 5–6 h)
- 19 active metabolites nordazepam and oxazepam (see Table)
- 20 active metabolite nordothiepin ($t_{1/2}$: 20–60 h)

- 21 active metabolite desmethyldoxepin (= nordoxepin, $t_{1/2}$: 33–80 h) should be considered in case of intoxication
- 22 benzodiazepine antagonist
- 23 active metabolites
- 24 active metabolite desalkylflurazepam ($t_{1/2}$: 74 ± 24 h)
- 25 active metabolite nortilidine ($t_{1/2}$: 6 h), comatose-fatal plasma concentration: 4.4 mg/L⁸
- 26 in some cases up to 80 h
- 27 active metabolite levomepromazine sulfoxide ($t_{1/2}$: 5–10 h)
- 28 therapeutic concentration range 3-O-methyldopa 0.7–10.9 mg/L
- 29 active metabolite desipramine (see Table)
- 30 active metabolites diazepam, nordazepam, and temazepam (see Table) with longer $t_{1/2}$
- 31 active metabolite of mesuximide; the metabolite is the active compound in vivo
- 32 sum of active metabolites
- 33 each as desacetylmeprobamate
- 34 active metabolite 5-aminosalicylic acid (mesalazine, see Table); rapid/slow acetylators of the primary metabolite sulfapyridine
- 35 in some cases longer
- 36 active metabolite oxyphenbutazone ($t_{1/2}$: 27–64 h)
- 37 dose dependent and depending on the duration of therapy; the drug stimulates its own metabolism
- 38 active metabolite of procainamide
- 39 for the management of osteoporosis
- 40 active metabolites diazepam (see Table), nordiazepam (see Table), and nortetrazepam ($t_{1/2}$: 25–51 h)
- 41 smokers: $t_{1/2}$: 3–6 h

- 42 for astemizole plus desmethylastemizole during steady state appr. 20 days
- 43 active metabolite dehydroaripiprazole
- 44 blood drug concentrations following therapeutically effective doses below detection limit
- 45 as decanoate ($t_{1/2}$: 5–12 days)
- 46 in intensive care patients in some cases $t_{1/2}$ 8–22 h
- 47 physiologic, total serum (TT4; protein bound and non-protein bound); free T4 (fT4): 8–21 ng/L
- 48 rapid (extensive) and slow (poor) metabolizers (genetic polymorphism)
- 49 6 month-old-child, appr. 15 h after 100 mg tramadol rectally
- 50 active metabolites noracetylmethadol and dinoracetylmethadol
- 51 C_{max} 0.038 ± 0.006 mg/L after a single oral dose of 150 μ g/kg in nine patients with onchocerciasis ($t_{1/2}$: 56 ± 7 h)
- 52 as enalaprilat
- 53 duration of clinical effect: 3–5 h
- 54 product after hydrolysis
- 55 narcotic; analyzed during the distribution phase
- 56 for pneumocystis carinii pneumonia (PcP) treatment: sulfamethoxazole 100–200 mg/L, trimethoprim 5–10 mg/L
- 57 metabolite: pentobarbital (see Table)
- 58 “narcotic”
- 59 higher with meningism (-25 mg/L); decreased protein binding in neonates results in increased unbound drug
- 60 each as 2-hydroxyflutamide (active and major metabolite)
- 61 active metabolite of allopurinol
- 62 active metabolite paracetamol (synonym acetaminophen, see Table)
- 63 active metabolites phenobarbital (see Table) and phenylethylmalonide (7-10 mg/L; $t_{1/2}$: 16–50 h)

- 64 as active carboxylic acid metabolite = fexofenadine
- 65 1 mg oral alprazolam/day equals appr. a plasma concentration of 0.01 mg alprazolam/L during steady state; usually, higher doses/plasma concentrations are recommended for the treatment of phobias when compared to panic disorders/attacks
- 66 highly inter- and intraindividual variable kinetics; for children (therapeutically): 0.04–0.1 mg/L; active metabolite desmethylchlorpromazine
- 67 $\geq 0.25 \mu\text{mol/L}$ desirable for echinococcosis
- 68 mean: 27 h; for geriatric patients (> 65 years) in some cases increased to more than 90 h
- 69 active metabolite 2-hydroxydesipramine ($t_{1/2}$: mean 18 h; in patients with impaired renal function several-fold increased)
- 70 in patients with impaired renal function several-fold increased
- 71 in colon tissue 0.8–1.8 h after 1 x 2 g i.v.: 94.0–7.4 $\mu\text{g/g}$
- 72 active metabolites 1-(5-hydroxyhexyl)-3,7-dimethylxanthine and 1-(3-carboxypropyl)-3,7-dimethylxanthine ($t_{1/2}$: 1–1.6 h), among others, with 5 and 8 times, respectively, higher plasma levels than pentoxifylline
- 73 as canrenone, one of the active metabolites of spironolactone ($t_{1/2}$ spironolactone: 1–4 h)
- 74 appr. 8 h after ingestion of probably 210 mg haloperidol and 1400 mg orphenadrine-HCl with life-threatening arrhythmias
- 75 data on effective plasma concentrations for Parkinson's disease not proven
- 76 once or twice daily regimen: peak: 15–40 mg/L, trough: 1–5 (-7) mg/L; individually very variable
- 77 for hypertension: 0.2–0.45 mg/L; for coronary heart disease or arrhythmias: 0.3–0.8 mg/L
- 78 therapeutic concentration of the unbound fraction: 0.5–2 mg/L; therapeutic concentration of the metabolite desalkyldisopyramide < 5 mg/L (ratio of metabolite to the parent compound disopyramide guide to duration of therapy and possibly to the likelihood of toxicity)
- 79 in mmol/L (mEq/L, mval/L): 0.4–1.2 (0.6–1.4) mmol/L, toxic from 1.5 mmol/L; conversion factor: mmol/L x 6.93 = mg/L (mmol/L x 0.693 = mg/dL)

- 80 terminal elimination $t_{1/2}$: 37 ± 6 h, increased in case of renal dysfunction
- 81 therapeutic concentration of the unbound fraction: 1–2.2 mg/L
- 82 for (sleep) apnea: 5–10 mg/L
- 83 increased in patients with impaired renal function
- 84 C_{max} 3–5 h after 4 mg loperamide hydrochloride orally: 1–3 ng/mL
- 85 active metabolite N-desmethylclomipramine ($t_{1/2}$: (21-) 37–43 (-65) h, mean: 40 h)
- 86 after a first dose in a group of patients given 1.5–2.5 mg/kg colistin methate, peak and trough serum colistin levels averaged 21 and 2.8 mg/L, respectively
- 87 post-operative (on-demand; i.v.): 0.02–1–2 mg/L (median: 0.29–0.92 mg/L) as minimal (analgesic) effective concentration; O-desmethyltramadol: 0.03–0.04 mg/L (median: 0.036 mg/L)
- 88 10–36 h
- 89 11–26 h
- 90 stereoselective metabolism; therapeutic concentration after oral application higher than after intravenous administration
- 91 $t_{1/2}$ for β -phase of the elimination: 0.5–1 h
- 92 as albedazole sulfoxide (active metabolite)
- 93 $t_{1/2}$ in slow (poor) metabolizers appr. 40 h
- 94 trough plasma concentration at steady state during 2 g twice daily orally appr. 9 mg/L; C_{max} (0.8 h after 1 g p.o.): appr. 45 mg/L
- 95 as active metabolite methimazole (thiamazole)
- 96 mean 80 min
- 97 15–85 h
- 98 plasma concentrations do not correspond with pharmacological effects
- 99 naltrexone plus 6- β -naltrexone: 0.025–0.1 mg/L; plasma concentrations of the less potent major metabolite 6- β -naltrexol ($t_{1/2}$: 11–13 h) are usually 1.5–10 times higher
- 100 at steady state; 4–15 h after a single dose

- 101 sum rifampicin plus metabolites
- 102 sum sulindac plus metabolites (sulindac sulfide, $t_{1/2}$: 15–18 h; $t_{1/2}$ sulindac sulfone: 17–20 h)
- 103 abuse
- 104 sum carisoprodol plus meprobamate
- 105 12–15 days for the metabolites
- 106 $t_{1/2}$ for total platinum plasma concentrations: 20–40 h (up to 6–7 days)
- 107 2–20 $\mu\text{mol/L}$
- 108 (non-active) carboxylic acid metabolite ($t_{1/2}$: appr. 20 days): 1.5–5.5 mg/L
- 109 during concomitant therapy with carbamazepine or phenytoin mean 13.5–15 (range 8–33) h, during concomitant therapy with valproic acid 48–59 (range 31–89) h
- 110 in infants and after intoxications in some cases dramatically increased to appr. 6–14 days
- 111 during steady state 3–4 h after oral doses of 100–400 mg; prophylaxis of candidiasis: > 0.2 mg/L and of aspergillosis: > 1.0 mg/L in patients with acute myeloid leukemia
- 112 plasma concentrations of the major metabolite 13-cis-acitretin are usually higher
- 113 higher and increased, respectively, in patients with impaired hepatic function; for tinnitus aurium therapeutic plasma concentration appr. 1–2 mg/L
- 114 biologically active/major metabolite cycloguanil ($t_{1/2}$: 8–17 h): plasma concentration after daily oral doses of 100–200 mg proguanil appr. 0.02–0.06 mg/L
- 115 active metabolite norpethidine ($t_{1/2}$: 14–24 (-48) h) with higher toxicity than pethidine; toxic from appr. 0.5 mg/L
- 116 main metabolite N-desmethylrosiglitazone with appr. 20-fold lower potency
- 117 as cytostatic drug: > 200 mg/L
- 118 neurotoxic

- 119 in terminal renal insufficiency appr. 0.5–2 mg/L, cumulation of the inactive metabolite N-acetyl-5-aminosalicylic acid (Ac-5-ASA) up to 20 mg/L without adverse effects
- 120 $t_{1/2}$ of the inactive major metabolite N-acetyl-5-aminosalicylic acid (Ac-5-ASA) appr. 6–9 h
- 121 tocolytic (4.5–6.25 mval(mEq)/L = 2.25–3.125 mmol/L). Approximate normal range: 18–25 $\mu\text{g Mg}^{2+}/\text{mL}$ (1.8–2.5 mg/dL, 0.74–1.03 mmol/L); conversion factor: mg/dL x 0.4113 = mmol/L
- 122 C_{max} appr. 2–8 $\mu\text{mol/L}$ (i.e. 1.7–6.8 mg/L, after 135–390 mg/m² intravenously for 3 h); much lower after intraperitoneal injection
- 123 as transdermal system (patch); plasma concentrations of the major metabolite cotinine ($t_{1/2}$: mean 16–20 h) appr. 10 times higher
- 124 mean 2 h; after application of the transdermal system possibly longer
- 125 active metabolites desipramine (see Table), 2-hydroxyimipramine ($t_{1/2}$: 6–18 h), and 2-hydroxydesipramine⁶⁹
- 126 3–7 min after retrobulbar blockade: 0.5–1.1 mg/L
- 127 for myasthenia gravis
- 128 half maximal effective concentration (EC_{50}) for analgesia: 0.0088 \pm 0.0053 mg/L; EC_{50} for respiratory depression: 0.035 \pm 0.022 mg/L
- 129 appr. 14 h after oral ingestion of 1.5 g and hemoperfusion
- 130 fluoxetine plus norfluoxetine; $t_{1/2}$ of the active metabolite N-desmethylfluoxetine (= norfluoxetine): 4–16, mean 7–9 days
- 131 active metabolites 2-oxoquazepam ($t_{1/2}$: 39 (28–43) h) and N-desalkyl-2-oxoquazepam (N-desalkylflurazepam, $t_{1/2}$: 74 \pm 24 h)
- 132 peak plasma concentration during steady state
- 133 range of plasma concentrations after therapeutically effective doses of thioridazine for the active metabolites mesoridazine (thioridazine-2 sulfoxide): 0.2–1.6 mg/L ($t_{1/2}$: 10–14 h) and sulforidazine (thioridazine-2 sulfone): up to 0.6 mg/L ($t_{1/2}$: 10–16 h) and for the inactive metabolite thioridazine-5(ring) sulfoxide: 0.06–4 mg/L; probably, the best correlation exists between the plasma concentration of mesoridazine and the clinical response
- 134 usually sleep occurred with ≥ 0.1 mg/L; in infants and children (< 13 years): in some cases during mechanical ventilation up to 3 mg/L; α -

- hydroxymidazolam-glucuronide likely contributes in case of impaired renal function to prolonged sedation
- 135 plasma concentration range of the primary metabolite 1,5-dimethyl-3,3-diphenyl-2-ethylidene-pyrrolidine (EDDP) during steady state: 0.005–0.055 mg/L (daily oral methadone dose: 10–225 mg, mean 60 mg)
 - 136 ratio clozapine/active metabolite N-desmethyloclozapine (= norclozapine, $t_{1/2}$: 19.2 ± 10.2 h) usually 1.0–2.5
 - 137 maximum antiemetic effect at > 0.01 mg/L
 - 138 active metabolite descarboethoxyloratadine (desloratadine, $t_{1/2}$: 17–24 h): appr. 0.005–0.02 mg/L
 - 139 0.15 ± 0.05 ‰ per h
 - 140 during chronic administration appr. 10–20 h (induction of own metabolism)
 - 141 caution is warranted in case of concomitant use or intoxication with serotonin reuptake inhibitors (SSRI) such as citalopram, clomipramine, fluoxetine, or paroxetine: possible serotonin syndrome
 - 142 trough concentrations of 15–20 mg/L for complicated infections/sepsis as a surrogate (when the MIC is 1 mg/L or less) for the target 24-hour area under the concentration-time curve (AUC_{24}) to a minimum inhibitory concentration (MIC) ratio of ≥ 400 ; peak concentration: < 40 mg/L
 - 143 distribution half-life: 0.3–0.5 (-1) h
 - 144 non-smoker: 1–4 mg/L (17–69 $\mu\text{mol/L}$); smoker: 3–12 mg/L (52–206 $\mu\text{mol/L}$)
 - 145 major active metabolite 1-m-chlorophenylpiperazine (mCPP); plasma concentration appr. 1/10 compared to trazodone
 - 146 plasma concentration (15–20 $\mu\text{mol/L}$) for maximal cellular accumulation of the active form gemcitabine-5'-triphosphate
 - 147 after nasal or oral application
 - 148 *Torsade de Pointes*, usually due to cytochrome P450 3A4 inhibition (e.g., ketoconazole, erythromycin) and/or impaired hepatic function
 - 149 after oral administration; after topical application: plasma concentration < 0.03 mg/L and $t_{1/2}$ appr. 22 h
 - 150 for each added 1 mg/day dose of clonazepam, there is appr. an increase of 12 ng/mL in the plasma (patients with panic disorder)

- 151 sum of amoxapine and his major metabolite 8-hydroxyamoxapine ($t_{1/2}$: appr. 30 h; $t_{1/2}$ 7-hydroxyamoxapine: 4–6.5 h)
- 152 sum of bupropion (amfebutamone) and morpholinole metabolite ($t_{1/2}$: 19–22 h)
- 153 after i.m.-application as decanoate appr. 3 weeks
- 154 $C_{\min} < 1\text{--}2$ mg/L at best (especially in patients with renal dysfunction)
- 155 appr. 0.02 mg/L in organophosphorous ester poisoning depending on clinical symptoms
- 156 in case of organophosphorous ester (e.g. parathione) intoxication; 250 mg intravenously as bolus followed by an infusion of 750 mg/24 h
- 157 if used as an antiarrhythmic appr. 0.1–0.4 mg/L
- 158 active metabolite roflumilast N-oxide
- 159 extensive metabolizers; $t_{1/2}$ for poor metabolizers: 15-20 h; $t_{1/2}$ for risperidone plus 9-hydroxyrisperidone: 22–24 h
- 160 6 case reports: post-mortem 5.2–49 μg citalopram/g blood and 0.3–1.4 μg desmethylcitalopram/g blood
- 161 concentration/dose-values for extensive metabolizers: 0.025–0.688 (median 0.098) nmol/L per mg oral perphenazine, and 0.096–0.750 (median 0.195) nmol/L per mg oral perphenazine (mol wt 506.07) for poor metabolizers, respectively
- 162 two cases after ingestion of appr. 4 g moclobemide in combination with clomipramine (plasma concentration: 0.3–0.5 mg/L, i.e. toxic)
- 163 as R-enantiomer, mean: 9 mg/L
- 164 dosage: 50–55 mg/kg per day
- 165 appr. 2.5 h after ingestion of 50–100 mg amlodipine besylate with alcohol (263 mmol ethanol/L)
- 166 0.101 mg/L 4 h after ingestion of 70 mg and 0.185 mg/L at 10.5 h, complicated by oxazepam ingestion
- 167 data for d,l-sotalol
- 168 after i.v.-application; $t_{1/2}$: 4–7 h following epidural administration (appr. 4–5 h following intercostal block and appr. 6–8 h following brachial plexus blockade, respectively)

- 169 mean 19 h; $t_{1/2}$ of oral ciclosporine microemulsion is appr. 8 h
- 170 a longer $t_{1/2}$, up to 3.8 days, has been reported in elderly patients
- 171 target range of activated partial thromboplastin time (aPTT) is prolongation of 50–70 sec; aPTT prolongation of more than 100 seconds has been associated with an increased risk of hemorrhagic events
- 172 as 10-hydroxycarbazepine for seizures (0.4–2 mg/L for oxcarbazepine); in patients with trigeminal neuralgia, therapeutic target range of the active metabolite 10-hydroxycarbazepine ($t_{1/2}$: 7–14 (-20) h): 50–110 $\mu\text{mol/L}$ (appr. 13–28 mg/L)
- 173 mild CNS symptoms (limited data)
- 174 pharmacologically inactive metabolites 5'- and 6'-hydroxytenoxicam
- 175 effective plasma concentrations for the 2 active metabolites: O-desmethylencaïnide (0.05–0.3 mg/L; toxic from 0.3 mg/L, $t_{1/2}$: 11 h) and 3-methoxy-o-desmethylencaïnide (0.06–0.28 mg/L; $t_{1/2}$: > 24 h) during long-term therapy
- 176 in poor metabolizers 9–11 h
- 177 “normal”: 0.001–0.006; smoker: 0.005–0.012 (-0.15) mg/L; $\mu\text{mol/L} \times 0.026 = \text{mg/L}$
- 178 reference value; 0.001 $\mu\text{g/g}$ creatinine or 0.0014 mg/L urine; < 30 $\mu\text{g}/24 \text{ h}$ urine (“normal”); “toxic” from appr. 0.05–0.3 mg/L urine. Reference value for children in Germany: 0.0008 mg/L blood and 0.0004 mg/L urine
- 179 > 0.04 mg/L urine
- 180 up to (appr. 5–25) years in chronically exposed workers
- 181 combination with 2,4-D and chlorpyrifos
- 182 urine pH-dependent; in case of intoxication/overdose: 70–90 h
- 183 overdose
- 184 one case of toxicokinetic estimation in acute potassium cyanide (KCN) poisoning
- 185 dependent on indication; > 2.0 mg/L for partiell seizures; tentative target range according to Neels HM et al. 2004 [12]: 12–20 mg/L; peak concentration at steady state appr. 4.6 mg/L (300 mg three times daily (tid)) and appr. 8.4 mg/L (600 mg tid)
- 186 prolonged in case of impaired renal function to 16–43 h; > 100 h in dialysis dependent patients

- 187 dependent on urine pH, if alkaline appr. 8–10 h
- 188 females showed significantly longer elimination half-lives (35.4 ± 13.7 h) than males (21 ± 5 h); the $t_{1/2}$ of the R(-)-enantiomer is twice that of the S(+)-enantiomer
- 189 venlafaxine plus O-desmethylvenlafaxine. After doses of 25, 75, and 150 mg every 8 h for three days, mean peak serum levels were 0.053, 0.167, and 0.393 mg/L; corresponding levels of the major active metabolite O-desmethylvenlafaxine ($t_{1/2}$: 10–11 h) were 0.148, 0.397, and 0.686 mg/L
- 190 at least 10 nmol of the lactone (mol wt 421.46)/L; decreases in absolute neutrophil counts of 50–90% were observed with steady state plasma concentrations of total topotecan (lactone + hydroxy acid) of 20–60 nmol/L, respectively
- 191 a mean steady state peak plasma concentration of 0.286 mg/L was observed in healthy volunteers after 60 mg (oral solution) every 12 h for 10 doses
- 192 the metabolite 2',2'-difluorodeoxyuridine (dFdU) has minimal antitumor activity but may contribute to the toxicity of gemcitabine
- 193 C_{max} after 200 mg three times daily
- 194 serum concentration of benzoic acid following high dose diazepam i.v.-infusion and severe metabolic acidosis (5-year-old girl; urine concentration: 1,200 mg/L)
- 195 1.5 h in dogs after i.v.-administration
- 196 for erythropoietic protoporphyria (EPP)
- 197 trough; peak: 0.1–0.5 mg/L
- 198 + 0.4 mg of its metabolite 3-deacetylpancuronium/L
- 199 “normal”: ≤ 2 –3% of total hemoglobin (Hb); from 15–20%: cyanosis, headache, dizziness
- 200 carboxyhemoglobin (COHb) averages 1–2% in urban non-smokers and 5–6% in smokers
- 201 2 h after ingestion; concentrations above 2 mg/L at 4 h, 1.6 mg/L at 12 h, 0.6 mg/L at 16 h, and 0.16 mg/L at 24 h are lethal
- 202 3 h after ingestion of 400 mg with no severe symptoms
- 203 mean steady state trough concentration; peak concentration: 5–15 mg/L
- 204 for Parkinson's disease (appr. 15–50 pmol/mL)

- 205 peak: 0.5–3 mg/L
- 206 plasma concentrations below detection limit; plasma concentrations of the active metabolite 6-methoxy-2-naphthylacetic acid (assumed therapeutic range 8.1–21 mg/L; $t_{1/2}$: appr. 23–24 h), which appears to be responsible for the effects, were 10–37 mg/L 3–6 h after single oral doses of 250, 500, and 1000 mg, respectively
- 207 active metabolite 6-O-desmethyldonepezil
- 208 coma in a patient overdosing zonisamide, carbamazepine, and clonazepam
- 209 25–30 h in patients co-medicated with enzyme-inducing anticonvulsants (e.g., phenobarbital)
- 210 2–4 h in patients co-medicated with enzyme-inducing anticonvulsants (e.g., phenobarbital)
- 211 renal-transplant patients treated long-term (2–3 years) with mycophenolate mofetil had significantly lower trough plasma concentrations of the active metabolite mycophenolic acid (1.94 ± 0.24 mg/L) when compared to patients taking mycophenolate mofetil (1 g twice daily) short-term (2–10 months; 3.53 ± 0.45 mg/L); proposed mycophenolic acid pre-dose target concentration: 1–3.5 mg/L
- 212 as mycophenolic acid (active metabolite)
- 213 ten men with multiple sclerosis, 10–20 mg p.o. every 6 h and analyzed 30 min before the next dose; peak levels < 0.1 mg/L 30 min after a dose
- 214 nine patients, maximum tolerated oral dose 50–100 mg
- 215 $t_{1/2}$ of the metabolite 3-O-methyldopa: 15 h
- 216 appr. 2.5 $\mu\text{mol/l}$ (1 mg/L) 24 h after single doses of 100–800 mg and during daily treatment with 200 mg
- 217 active metabolite 14-hydroxyclearithomycin ($t_{1/2}$: 5–7 h)
- 218 C_{max} following oral administration of 200, 400, 800, and 1200 mg, respectively: 3.7, 8, 18, and 29 mg/L; tentative target range according to Neels et al., 2004 [12]: 5–25 mg/L
- 219 at a daily dosage of 60, 120, and 240 mg the mean \pm SD concentration in patients with symptomatic ventricular tachyarrhythmias ($n = 9\text{--}18$) was 75 ± 46 , 144 ± 105 , and 324 ± 180 nmol/L, respectively
- 220 nonlinear kinetics

- 221 appr. 5 h after ingestion of 3 g, not associated with severe toxicity to a 27-year-old woman
- 222 slightly increased (8–12 h) in patients with impaired hepatic function; active metabolites hydroxynefazodone ($t_{1/2}$: 2–5 h), m-chlorophenyl-piperazine ($t_{1/2}$: 4–10 h), and triazoledione ($t_{1/2}$: 10–12 h)
- 223 each as the active metabolite N-desmethylnesuximide; methsuximide ($t_{1/2}$: 1–2 h) steady state concentration: appr. 0.04–0.08 mg/L
- 224 mean steady state trough concentration in 15 young adults receiving a daily dose of 0.47–1.71 mg isotretinoin/kg: 0.05–0.34 mg/L ($t_{1/2}$: 29 ± 40 h), and for the 4-oxo metabolite ($t_{1/2}$: 22 ± 10 h): 0.16–0.68 mg/L
- 225 for depression; higher in case of schizophrenia (0.2–1 mg/L)
- 226 suggested threshold for the sum of clomipramine (0.05–0.06 mg/L) and N-desmethylnclomipramine (0.16–0.18 mg/L): 0.2–0.24 mg/L
- 227 for the active metabolite E-3174 ($t_{1/2}$: 4–9 h); plasma concentration of losartan producing 50% of maximal blood pressure response to exogenous angiotensin-II: 0.032 mg/L
- 228 as ramiprilat ($t_{1/2}$: 13–17 (50–110) h)
- 229 half maximal inhibitory concentration (IC_{50}) for analgesic effect after oral surgery
- 230 the inhibitory concentration to reduce the level of extracellular hepatitis B DNA by 50% varied from 2.3 μ g/L to 1.3 mg/L; C_{max} after 150–300 mg p.o.: 1.2–2.0 mg/L
- 231 C_{max} at steady state (666 mg three times daily p.o.)
- 232 after oral administration of the enteric-coated tablet
- 233 trough < 2 plus peak 6–10 (5–12) mg/L
- 234 reference value; < 0.015 mg/L urine
- 235 active metabolite 4'-hydroxynimesulide ($t_{1/2}$: 3–9 h)
- 236 mean C_{max} 126.5 and 226.3 ng/mL 2 h after 75 and 125 mg p.o. and 162.9 and 291.8 ng/mL after oral administration of 1.0 and 1.6 mg MDMA/kg body weight, respectively, to young adults; mean C_{max} for the metabolites 4-hydroxy-3-methoxymethamphetamine (HMMA) 171.9 and 173.5 ng/mL, 3,4-methylenedioxymethamphetamine (MDA) 8.4 and 13.8 ng/mL, and 4-hydroxy-3-methoxyamphetamine (HMA) 3.5 and 3.9 ng/mL, respectively
- 237 in patients > 60 years prolonged up to 10 h

- 238 adjuvant in methadone maintenance therapy
- 239 means of the 'average' steady state plasma concentration for the relatively high dose of 250 mg every 8 h appr. 0.8–1 mg/L
- 240 combination of distribution and elimination processes; $t_{1/2}$ up to 22 h in cases of overdose
- 241 as active metabolite fenofibric acid
- 242 appr. 37.5 mmol/L (= mval/L, mEq/L)
- 243 steady state concentration 21.6 ± 14.2 mg/L (mean \pm SD) during continuous infusion of 3 g (1.1–2.2 mg/kg h) every 24 h in 44 patients undergoing coronary artery bypass graft surgery
- 244 target – whole blood – trough concentration if ciclosporine is being used at trough concentrations of 0.075–0.15 mg/L; without ciclosporine: appr. 0.03 mg/L (LC/UV assay)
- 245 4 h after ingestion of 30–40 tiagabine hydrochloride 8 mg tablets (coma)
- 246 bupropion plus 10-hydroxybupropion ($t_{1/2}$: 17–47 h)
- 247 calculated steady state concentration in children (4 months to 16 years) receiving 0.3 mg/kg body weight i.v.
- 248 femoral blood concentration of the metabolite desmethylalimemazine after fatal intoxication: 0.2–1.3 μ g/g
- 249 40–50 min after 0.15 mg/kg i.v.
- 250 femoral blood concentration of the metabolite desmethylpromethazine after fatal intoxication (n=3): 0.3–1.8 μ g/g
- 251 femoral blood concentration of the metabolite desmethyltrimipramine after fatal intoxication (n=10): 0.3–2.5 μ g/g
- 252 μ g/g femoral blood; in multiple-substance intoxication median 0.2 (P_{10}/P_{90} : 0.11/1.6) μ g/g e.g., fatal overdose with tramadol, alprazolam (0.21 mg/L), and ethanol (1.29 g/kg) in a 30-year-old woman
- 253 enterohepatic circulation; prolonged in elderly subjects to 33.4 hours (range: 20.0–53.4 h)
- 254 whole blood
- 255 all data refer to the active metabolite teriflunomide (A771726)
- 256 steady state concentrations of 8.8 ± 2.9 mg/L at 5 mg/day, 18 ± 9.6 mg/L at 10 mg/day, and 63 ± 36 mg/L at 25 mg/day, respectively

- 257 steady state trough concentrations after 400 mg/d orally; two major metabolites modafinil acid (appr. 0.5–0.8 mg/L, $t_{1/2}$: 7.3 ± 1.1 h) and modafinil sulfone (appr. 4.5–5.3 mg/L), but neither appears to contribute to the wake-promoting properties of modafinil
- 258 mean plasma trough concentration at steady state obtained from 400 mg imatinib/day in 83 adult patients with chronic phase chronic myeloid leukemia; peak: 2.3 mg/L
- 259 in a 5-year-old girl
- 260 suggested minimum target trough concentration in patients with HIV-1 susceptible to the antiretroviral drug (dose of 800 mg two times daily)
- 261 active metabolite N-desethylamiodarone ($t_{1/2}$: 57–64 days), which achieves plasma concentrations similar to the parent compound
- 262 inactive metabolites deshydroxyethylpipramol ($t_{1/2}$: 97 ± 24 h) and pipramol N-oxide ($t_{1/2}$: 10.7 ± 3.2 h)
- 263 as 25-hydroxyvitamin D [25(OH)D, calcidiol]; vitamin D deficient: < 0.01 mg/L (< 10 ng/mL = 25 nmol/L); vitamin D insufficient: < 0.02 (–0.03) mg/L (50 (–75) nmol/L); > 0.02 mg/L (> 50 nmol/L) considered optimal vitamin D status; conversion factor: mg/L x 2,500 = nmol/L (ng/mL x 2.5 = nmol/L)
- 264 6 h after reportedly ingestion of 30 g in a 38-year-old woman
- 265 metabolite perindoprilat, 3–10 hours, with a prolonged terminal half-life between 25 and 120 h
- 266 sum of venlafaxine and O-desmethylvenlafaxine
- 267 for glaucoma 4–5 mg/L
- 268 doxapram plus keto-doxapram
- 269 24 h after ingestion of appr. 20 mL
- 270 active metabolite desethylamodiaquine ($t_{1/2}$: 1–10 days)
- 271 smokers: –0.6 ng/mL
- 272 risperidone plus 9-hydroxyrisperidone; 0.002–0.02 for risperidone, 0.01–0.06 mg/L for 9-hydroxyrisperidone
- 273 as active metabolite after administration of therapeutic doses of diazepam
- 274 active metabolite dimethadione (see Table)

- 275 HPLC-MS/MS (or FPIA) blood, in combination with ciclosporine microemulsion
- 276 median (interquartile range, IQR) in n=439 patients at hospital admission (1.3 [0.4–3.5] $\mu\text{mol/L}$; in 35 deaths: median (IQR) 4.7 [3.6–5.9] $\mu\text{mol/L}$
- 277 median (interquartile range, IQR) in n=264 patients at hospital admission; in 61 deaths: median (IQR) 846 (657–1183) $\mu\text{mol/L}$
- 278 in the presence of ethanol or during ethanol treatment; $t_{1/2}$ longer in patients with a serum creatinine concentration $\geq 130 \mu\text{mol/L}$
- 279 median (interquartile range, IQR) in n=99 patients at hospital admission (4.9 [0.6–16.6] $\mu\text{mol/L}$; in 16 deaths: median (IQR) 12.3 [0.94–30.3] $\mu\text{mol/L}$)
- 280 3 dead infants aged ≤ 6 months with post-mortem blood levels of pseudoephedrine ranging from 4.7–7.1 mg/L
- 281 daily dose 2–8 mg p.o.
- 282 treatment goal: cystine levels $< 1 \text{ nmol cystine/mg protein}$
- 283 according to other sources: $< 0.005 \text{ mg/L}$; urine: $< 0.012 \text{ mg/L}$; hair: $< 0.5 \mu\text{g/g}$; reference value for children in Germany: 0.015 mg/L urine. Case report: at day one 0.13–0.16 mg/L blood (urine: 67.5 mg/L) in a 43-year-old-male after ingestion of appr. 54 g arsenic trioxide
- 284 potentially increased risk for visual adverse effects ($> 3.5 \text{ mg/L}$) and abnormal liver function, respectively
- 285 trough plasma buprenorphine and norbuprenorphine concentrations in excess of 0.0007 mg/L (0.7 ng/mL) were associated with minimal withdrawal symptoms in 11 heroin-dependent subjects
- 286 serum peak concentration of misoprostol acid (MPA) 574.8 ± 250.7 , 287.6 ± 144.3 , and $125.2 \pm 53.8 \text{ pg/mL}$ after sublingual, oral, and vaginal application, respectively, of 0.4 mg misoprostol to 40 women undergoing termination of pregnancy
- 287 on the first day of hospital admission after unintentional ingestion of appr. 400–500 mg carbachol (corresponding urine concentration: 374 mg/L).
- 288 main (probably inactive) metabolite: morphine-3-glucuronide (M3G); active metabolite: morphine-6-glucuronide (M6G)
- 289 metabolite: nordoxylamine
- 290 active β -hydroxy-metabolite
- 291 targeted range between AUC of 9–12 mg/L/h

- 292 as amprenavir; suggested minimum target trough concentration in patients with HIV-1 susceptible to the antiretroviral drug (dose of 700 mg twice daily)
- 293 suggested minimum target trough concentration in patients with HIV-1 susceptible to the antiretroviral drug (dose of 300 mg once daily)
- 294 suggested minimum target trough concentration in patients with HIV-1 susceptible to the antiretroviral drug (dose of 400 mg twice daily)
- 295 suggested minimum target trough concentration in patients with HIV-1 susceptible to the antiretroviral drug (dose of 1,250 mg twice daily)
- 296 suggested minimum target trough concentration in patients with HIV-1 susceptible to the antiretroviral drug (dose of 1,000 mg twice daily)
- 297 suggested minimum target trough concentration in patients with HIV-1 susceptible to the antiretroviral drug (dose of 600 mg once daily)
- 298 suggested minimum target trough concentration in patients with HIV-1 susceptible to the antiretroviral drug (dose of 200 mg twice daily)
- 299 suggested minimum target trough concentration for antiretroviral therapy-experienced patients who have resistant HIV-1 strains (dose of 500 mg twice daily)
- 300 suggested minimum target trough concentration for antiretroviral therapy-experienced patients who have resistant HIV-1 strains
- 301 median (range) trough concentration from clinical trials (dose 600 mg twice daily); suggested threshold: > 0.55 mg/L
- 302 median (range) trough concentration from clinical trials
- 303 median (range) trough concentration from clinical trials
- 304 post-mortem heart blood level (death by hanging?)
- 305 active enantiomer of propoxyphene; active metabolite norpropoxyphene
- 306 heart blood
- 307 C_{max} at steady state achieved after 2–3 weeks of once-daily inhalation of 18 µg tiotropium; t_{max} after inhalation of 18 µg: 5 min
- 308 steady state peak concentration following a 300 mg twice daily or a 600 mg once-daily regimen
- 309 active metabolite cis-monohydroxyperhexiline ($t_{1/2}$: 10–29 h)
- 310 1–2 h after 50 mg

- 311 “laboratory alert level”; mostly according to AGNP Consensus Guidelines for therapeutic drug monitoring in psychiatry: update 2017 [4] i.e., drug concentrations above the recommended reference range, based on reports on intolerance or intoxications. In most cases, however, arbitrarily defined as plasma concentration that is 2-fold higher than the upper limit of the therapeutic reference range
- 312 active metabolite 6-hydroxybuspirone
- 313 C_{\max} 1–2 h after 4 mg
- 314 at low dose therapy (2.5 mg); at maximum dose (25 mg): 0.001–0.004 mg/L
- 315 C_{\max} 0.5–4 h after drug intake for 4 weeks
- 316 C_{\max} after 2 h
- 317 60–90 min after intake of 1.2 mg/kg per day
- 318 four h after 20 mg
- 319 $t_{1/2}$ with ritonavir 15–23 h
- 320 active metabolite 8-hydroxyloxapine ($t_{1/2}$: 20–60 h)
- 321 C_{\max} after 2h-infusion of 6 mg: 0.328 mg/L, after infusion of 2 mg: 0.246 mg/L
- 322 mean C_{\max} after a single oral standard dose of 70 mg in healthy volunteers 33–41 ng/mL; mean C_{\max} after a 2h-infusion of 10 mg: 265 ng/mL
- 323 mean C_{\max} after a 4h-infusion of 15 mg: appr. 0.25 mg/L
- 324 male; female: –0.07 mg/L, children: –0.06 mg/L [reference value for children in Germany: 0.035 mg/L (whole) blood]
- 325 shorter in case of hemodialysis or continuous venovenous hemodiafiltration; in a, fatal, case with 4,400 mg methanol/L blood and in the presence of adequate ethanol level (1,000 mg/L or 1 ‰) appr. 3.5 h
- 326 after topical (dermal) application
- 327 prolonged in newborns (27.8 ± 21.3 h)
- 328 reference value for Germany: 0.014 mg/L urine
- 329 reference value for children in Germany: 0.0003 mg/L urine
- 330 reference value for children in Germany: 0.0045 mg/L urine

- 331 reference value in urine for children in Germany
- 332 reference value in whole blood in Germany
- 333 metabolite of 3,4 methylenedioxymeth(yl)amphetamine (MDMA)
- 334 $t_{1/2}$ (R)-MDE: 7.9 (6–11) h; $t_{1/2}$ (S)-MDE: 4.0 (3–6) h
- 335 40 h after oral ingestion of appr. 100 mg (0.03 mg/L 60 h after drug intake)
- 336 active metabolite phenytoin
- 337 prodrug; main active metabolites are morphine and morphine-6-glucuronide (M6G); main (probably) inactive metabolite = morphine-3-glucuronide (M3G)
- 338 in maintenance therapy e.g., for heavily dependent opioid addicts. 30 min after i.v. application of 150–300 mg diacetylmorphine (heroin): 0.1–0.24 mg/L morphine ($t_{1/2}$: 1–4 h), 2.6–5.9 mg/L morphine-3-glucuronide (M3G; $t_{1/2}$: (2–) 3–5 h), 0.5–1.0 mg/L morphine-6-glucuronide (M6G; $t_{1/2}$: (1–) 2–3 h), and 0.08–0.29 mg/L 6-monoacetylmorphine (6-MAM; $t_{1/2}$: appr. 2–5 min; n=4); in another study 30 min after i.v. application of 260–300 mg diacetylmorphine: 0.39–0.75 mg/L morphine, 3.2–5.2 mg/L M3G, 0.5–0.7 mg/L M6G, and 0.08–0.19 mg/L 6-MAM (n=4)
- 339 depending on tolerance and state/severity of pain
- 340 metabolites: norbuprenorphine (active; plasma concentration after therapeutic buprenorphine doses appr. 0.5–2 (-20) ng/mL; $t_{1/2}$: 35.6 (1.1–66.8) h after i.v., 73.6 (13.4–143) h after buccal, and 83 (10–243) h after sublingual application), buprenorphine-glucuronide, and norbuprenorphine-glucuronide
- 341 active enantiomer of zopiclone
- 342 active enantiomer of methylphenidate
- 343 active enantiomer of citalopram
- 344 strongly dependent on pH of urine
- 345 symptomatic poisoning in adults is more likely with doses above 90 mg
- 346 on hospital day #2
- 347 19 h post-ingestion of appr. 4 g
- 348 five h post-ingestion; all patients with a plasma paraquat level above 3.44 mg/L died
- 349 prolonged in (paraquat-induced) renal failure to appr. 80–120 (-150) h

- 350 active enantiomer of moramide
- 351 active enantiomer of fenfluramine
- 352 active enantiomer of methadone (see Table); in many cases, analytical discrimination between both enantiomers is not possible
- 353 after a bolus dose of 0.25 mg/kg body weight (n=10): 2.3 mg/L at 3 min, 0.84 mg/L at 30 min, 0.61 mg/L at 1 h, and 0.44 mg/L at 2 h
- 354 active metabolite oxypurinol
- 355 eleven h post-ingestion
- 356 $t_{1/2}$ in poor metabolizers of cytochrome P450 2D6 is appr. 21 h
- 357 metabolite of cocaine
- 358 dependent on pH of urine
- 359 sum of dibenzepine and desmethyldibenzepine
- 360 active metabolite of trimethadione
- 361 metabolite: acetone
- 362 in non-users of opioids
- 363 active metabolite norlorcainide ($t_{1/2}$: 28–32 h), therapeutic plasma concentration: 0.1–1.5 mg/L
- 364 metabolite of azathioprine
- 365 (cis-)isomer of clopenthixol
- 366 active metabolites norsibutramine ($t_{1/2}$: 12–22 h) and dinorsibutramine ($t_{1/2}$: 14–23 h)
- 367 with silver sulphadiazine ointment for burns: 0.06–0.6 mg/L (non-toxic)
- 368 active metabolite fexofenadine
- 369 as metabolite of chloralhydrate
- 370 peak plasma concentrations (C_{max}) in four subjects after 1 h chewing khat leaves that supplied 28.1–45.1 mg cathine and 34.3–64.1 mg cathinone
- 371 higher for poor metabolizers of cytochrome P450 2C9
- 372 enantiomer of loratadine

- 373 0.001–0.0035 mg/L for the active metabolite 3-hydroxydesloratadine ($t_{1/2}$: 17–27 h)
- 374 enantiomer of ketoprofen
- 375 after a single oral dose of 2 mg
- 376 average of 12 victims
- 377 serum morphine (active metabolite) levels were appr. 0.013 in extensive metabolizers and 0.003 in poor metabolizers
- 378 enantiomer of cetirizine
- 379 endogenous: –0.01–0.09 ng/mL
- 380 active metabolite of psilocybin
- 381 during anaesthesia
- 382 measured 14 h post-ingestion
- 383 serum concentrations from 1.2–2.0 ng/mL (0.0012–0.002 mg/L) were associated with a higher risk of death
- 384 main metabolite desethylchloroquine
- 385 plasma concentrations of hydroxychloroquine less than 0.2 mg/L are indicative of poor medication adherence in patients with systemic lupus erythematoses. Mean serum concentration in n=20 patients treated with oral doses of three times 200 mg hydroxychloroquine sulfate daily for COVID-19 was 0.46 ± 0.2 mg/L [1226]
- 386 at least 5 days; terminal $t_{1/2}$ appr. 43 days
- 387 for actual minimal inhibitory concentration (MIC) distributions see e.g., EUCAST database at: www.eucast.org
- 388 urine: < 0.0006 mg/L, < 0.0007 mg total Cr/24 h
- 389 appr. 9.1–68.1 nmol/L
- 390 to convert pg/mL to pmol/L, multiply by 0.7378. In a recent general population study in the Netherlands, plasma concentrations > 455 pg/mL were associated with increased risk of all-cause mortality
- 391 sum enzalutamide and active metabolite N-desmethylenzalutamide; at week 13 in metastatic castration-resistant prostate cancer (mCRPC) patients taking 160 mg enzalutamide/d (n=680), the trough concentration for enzalutamide was 11.4 ± 2.95 mg/L, 13.0 ± 3.8 mg/L for N-desmethylenzalutamide, and 8.4 ± 6.8 mg/L for the carboxylic acid metabolite

- 392 cutoff AUC_{0-24} ; can be a good predictor of grade 3-4 adverse events in elderly (Japanese) patients with newly diagnosed multiple myeloma
- 393 suggested cut-off for endogenous concentrations: blood 4 mg/L, urine 10 mg/L, and hair 3 ng/mg
- 394 N-desmethyl-U-47700 is probably a better blood and (mainly) urine biomarker of U-47700 intake and intoxication. N,N-didesmethyl-U-47700 is another biomarker
- 395 O-desmethylocfentanil is probably a relevant metabolite
- 396 post-mortem in peripheral blood; in heart blood: 0.005, 0.023, and 0.027 mg/L
- 397 to minimize the development of lactic acidosis plasma concentrations above 2.5 mg/L should be avoided
- 398 C_{max} during steady state; $t_{1/2}$ of N-debutyl-dronedarone appr. 20–25 h
- 399 + 1.4 mg/L phenazepam
- 400 + 0.83 mg/L flubromazepam ($t_{1/2}$ appr. 100 h)
- 401 + 0.37 mg/L U-47700
- 402 trough edoxaban concentration related to frequency of major gastrointestinal bleeding (MGIB); probability of MGIB significantly increased at appr. 0.06 (-0.1) mg/L
- 403 after dermal or inhalative occupational exposure
- 404 + 0.2 mg/L propofol; self-administration
- 405 steady state concentrations expected under a therapeutic dose of 100 mg/d
- 406 0.2–2 h after 4 mg
- 407 in a 14-year-old girl 2.5 h after ingestion of 21 long-acting methylphenidate 54 mg tablets (total of 1,134 mg methylphenidate)
- 408 + 900 mg/L ethanol
- 409 $t_{1/2}$ in 3–12 months-old children appr. 2.5 h
- 410 high level of protein binding
- 411 active (?) metabolite cyclopropylnorfentanyl
- 412 in 32 cases, post-mortem serum concentrations of 0.0153 ± 0.0119 mg/L (median 0.0123 mg/L) cyclopropylfentanyl were reported

- 413 post-mortem blood concentrations ranging from 0.02 to 0.18 µg/g in nine cases of accidental intoxications where mitragynine and O-desmethylnaloxone were detected
- 414 fatal case, together with a blood concentration of 0.39 mg/L mitragynine; the cause of death was ruled propylhexedrine toxicity
- 415 on the market as sodium salt complex of anionic forms of sacubitril (an inactive prodrug of the active neprilysin inhibitor, sacubitrilat [$t_{1/2}$: 18.4 ± 6.8 h⁴¹⁶]) and valsartan
- 416 in patients with heart failure with reduced ejection fraction; $t_{1/2}$ is higher when compared to healthy subjects, $t_{1/2}$: sacubitril 1–2 h, sacubitrilat 9–13 h
- 417 as (±)-threo 4-fluoromethylphenidate (4F-MPH); urine concentration 0.83 mg/L
- 418 as (the active metabolite) desmethyldiazepam = nordazepam
- 419 maximum plasma concentration after applying 2 mg of sunscreen (spray, lotion or cream) per 1 cm² to 75% of body surface area (BSA) 4 times per day for 4 days (each n=6 healthy volunteers)
- 420 active metabolite 5-hydroxysaxagliptin ($t_{1/2}$: 3–7 h)
- 421 according to Høiseth et al. [835], the median (range) concentrations in 'drugged drivers' were:
 0.012 mg/L (0.00048-0.10) for flubromazolam (n=25),
 0.055 mg/L (0.0047-1.2) for flubromazepam (n=24),
 0.013 mg/L (0.0021-0.057) for diclazepam (n=15),
 0.050 mg/L (0.019-0.17) for etizolam (n=14),
 0.0053 mg/L (0.0019-0.011) for clonazolam (n=7) and
 0.074 mg/L for pyrazolam (n=1).
- 422 + 560 mg/L valproate
- 423 active metabolite norsertaline (desmethylsertaline, DMS)
- 424 post-mortem femoral blood concentrations of appr. 0.001 mg/L clenbuterol, appr. 0.056 mg/L stanozolol, and appr. 0.008 mg/L metandienone in a 34-year-old male bodybuilder with previous unknown heart disease
- 425 post-mortem blood concentrations of 0.163 mg/L trenbolone and 0.257 mg/L stanozolol in a 36-year-old male bodybuilder
- 426 one hour after the last oral 300 mg dose
- 427 active metabolite 4-hydroxyalprenolol, therapeutic: 0.04–0.06 mg/L

- 428 0.6–0.7 hours after oral ingestion of 50, 100, or 200 mg average plasma concentrations of 0.68, 0.88, or 2.15 mg/L were achieved
- 429 prodrug of azilsartan
- 430 patients receiving a single daily oral 5 mg-dose for two weeks developed steady state peak plasma concentrations averaging 0.05 mg/L at 2.3 h post-administration
- 431 a single dermal scalp application of 5% benzyl alcohol lotion resulted in plasma benzyl alcohol concentrations of 1.6–3.0 mg/L at 0.5–1 hours in four of 19 children ages 6 months to 11 years
- 432 two h post-ingestion
- 433 same case, 20 h post-ingestion (prior to death), in a mixed intoxication with MCPA
- 434 a single oral 300 mg-dose in 4 healthy adults led to an average peak plasma carboxybuprenolol concentration of 4.19 mg/L
- 435 bupropion + hydroxybupropion
- 436 $t_{1/2}$ bupropion: 1–15 h, $t_{1/2}$ hydroxybupropion: 17–47 h
- 437 buspirone + 8-hydroxybuspirone 0.001–0.004 mg/L
- 438 $t_{1/2}$ for metabolites
- 439 active metabolites are N-desmethylocariprazine and N,N-didesmethylocariprazine
- 440 active metabolite meprobamate, therapeutic plasma concentration: 10–30 mg/L, $t_{1/2}$: appr. 8 h
- 441 carisoprodol concentration (without meprobamate); corresponding meprobamate levels were 6.8–62 mg/L
- 442 car drivers with no signs of impairment
- 443 during anaesthesia
- 444 plus 86 mg/L desmethyloclobazam
- 445 the active metabolite of clopidogrel is a thiol derivative which is mainly formed via cytochromes P450 (CYP2C19, among others) in the liver
- 446 at 4–8 h
- 447 'Holland film'; 15 hours post-ingestion
- 448 ante-mortem; post-mortem femoral vein blood 0.6 ng/g, urine 2.93 ng/g

- 449 current German biologic tolerance value (BAT) for exposure to cresol isomers in the workplace is 200 mg/L in an end-of-shift urine specimen
- 450 in exposed workers at air concentrations of 5–710 ppm at the end of the day
- 451 mono intoxications
- 452 after oral administration in mice
- 453 several days after exposure
- 454 17-month-old child
- 455 post-mortem blood concentrations
- 456 simultaneous use of alcohol and disulfiram
- 457 0.2–0.35 mg/L at 2 h, 0.05–0.16 mg/L at 12 h
- 458 in poor metabolizers
- 459 diazepam plus nordazepam (see Table)
- 460 peak plasma concentration of an oral standard dose of 800 mg clodronate
- 461 a lethal blood concentration of nicotine is about 2 mg/L, corresponding to appr. 4 mg/L plasma
- 462 cotinine concentration in urine in a 15-month-old female 12 h after admission to ICU was 1.7 mg/L; she died at hospital day 44
- 463 median blood hexane level of 1,200 unexposed United States citizens
- 464 data from 13 fatalities, post-mortem femoral blood
- 465 mg/kg; 11 persons with certified deaths by intoxication with more than one drug and/or with drugs in combination with a significant concentration of ethanol
- 466 prodrug of 4-hydroxybutyrate (GHB)
- 467 active metabolite 7-hydroxymitragynine with appr. 30 times higher potency at μ -opioid receptors
- 468 a peak plasma concentration of 0.0034 mg/L diclazepam was achieved after oral intake of 1 mg diclazepam
- 469 peak plasma concentration after 1 μ g/kg intranasal dexmedetomidine 0.00025–0.00028 mg/L (0.25–0.28 ng/mL). Peak plasma concentration of 0.00034 mg/L (0.34 ng/mL) 38 min after an intranasal dose of 84 μ g to 6

- healthy men; the same dose given by 10 min intravenous infusion to the same subjects produced median end of infusion peak plasma level of 0.0035 mg/L (3.5 ng/mL)
- 470 three fatal cases with more than one drug and/or with drugs in combination with a significant concentration of ethanol
- 471 four cases
- 472 blood concentrations of emetine were measurable in only 6 of 10 emergency room adult patients who received 30 mL of ipecac syrup for treatment of drug or chemical overdose
- 473 arterial blood enflurane levels present in 4 adult surgical patients during enflurane anaesthesia
- 474 fatalities after enflurane abuse
- 475 appr. 3 mg/L 6 h after the last dose in 20 patients who received 400 mg twice a day over a period of 4 days
- 476 peak plasma levels 1–2 hours after ingestion
- 477 intramuscular; intravenous: 2 min
- 478 endogenous plasma epinephrine concentrations in 40 supine resting adults
- 479 peak plasma levels 1–2 h after ingestion of 50–100 mg
- 480 prodrug of the active compound eslicarbazepine
- 481 in one case 200 mg/L in serum during hospital treatment; 650 mg/L in post-mortem blood
- 482 under treatment with fomepizole or ethanol during high-efficiency hemodialysis
- 483 under treatment with fomepizole but without hemodialysis
- 484 concentration range in 7 fatal ethylone cases
- 485 seven fatal ethylphenidate cases
- 486 peak plasma concentrations after 0.5 and 1 mg etizolam, respectively
- 487 post-transplantation, trough levels of everolimus should be maintained at 3–8 ng/mL when used in combination with other immunosuppressive drugs (calcineurin inhibitor and glucocorticoid) and at 6–10 ng/mL when used without a calcineurin inhibitor. In the treatment of tuberous sclerosis complex, it is recommended that everolimus concentrations should be managed at 5–15 ng/mL

- 488 prodrug of penciclovir
- 489 active metabolite fenofibric acid, therapeutic plasma concentration 5–11 mg/L
- 490 active metabolite amphetamine
- 491 serum fenitrothion concentrations in n=27 adults who survived poisoning with this chemical
- 492 prodrug of the active metabolite 5-hydroxymethyl-tolterodine (5-HMT)
- 493 a single 8 mg oral extended-release dose in 14 healthy adults yielded an average peak plasma concentration of 0.005 mg/L at 5 h; peak plasma levels of 5-HMT in poor cytochrome P450 2D6 metabolizers were approx. twice those in extensive metabolizers
- 494 as 5-hydroxymethyltolterodine (5-HMT)
- 495 20 healthy younger adults receiving 1.25 or 5 mg oral doses once daily for 1 week attained average peak plasma levels of 0.001 or 0.0043 mg/L, respectively, at 12 h after the first dose and 0.005 or 0.018 mg/L, respectively, at 12 h after the last dose
- 496 a single oral 100 mg dose given to n=24 healthy fasting adults resulted in a median peak plasma flibanserin concentration of 0.413 mg/L
- 497 serum concentration in eight nonfatal poisonings
- 498 one patient
- 499 a single oral 0.5 mg dose given to one adult resulted in a peak serum concentration of 8 ng/mL (8 h post-ingestion)
- 500 19 h after ingestion of 3 mg flubromazolam
- 501 one patient
- 502 mg/kg; sum of flunitrazepam and 7-aminoflunitrazepam in 175 persons dying solely from flunitrazepam overdose
- 503 n=12 adults arrested for impaired driving
- 504 ante-mortem; post-mortem 0.48 mg/L
- 505 in four fatal cases
- 506 intoxication with AH-7921 and 2-FMA, and other drugs
- 507 median of 6 case reports: post-mortem 1.3–6.8 mg fluoxetine/L blood and median 2.1 (0.9–5.0) mg norfluoxetine/L blood

- 508 at 10 h after drug intake under steady state conditions
- 509 blood flurazepam concentrations in 3 adult deaths due solely to flurazepam
- 510 concentration suggested by the manufacturer to cause adequate inhibition of alcohol dehydrogenase activity (Antizo® package insert, 1997)
- 511 2.4–3.2 h after a single 10 mg or 20 mg oral dose
- 512 as fosinoprilat
- 513 prodrug of amprenavir
- 514 2.6–3.1 hours after the last of 40 or 80 mg oral doses twice daily for 2 weeks
- 515 water soluble prodrug of propofol
- 516 data from n=13 fatalities
- 517 prodrug of 4-hydroxybutyrate (GHB)
- 518 fatalities
- 519 background blood gold levels in n=130 German citizens: 0.0001 (0.00001–0.0029) mg/L
- 520 immediate release dosage form; extended release: 10–50 h
- 521 two children, ages 4 and 5, accidentally given haloperidol doses of 2 and 5 mg p.o.
- 522 endogenous plasma concentrations in healthy adults
- 523 the elimination $t_{1/2}$ of glycerol depends upon the glycerol concentration ($t_{1/2} = [G]_0/2k$); the serum glycerol concentration decreases more rapidly in the late phase of the observation period
- 524 in poisoned patients
- 525 post-mortem blood glyphosate levels in n=16 adults who intentionally ingested overdoses; death was strongly associated with greater age, larger ingestions and high plasma glyphosate concentrations on admission (> 734 mg/L)
- 526 5 fatal cases after abuse by inhalation or ingestion with suicidal intent
- 527 analytical testing was performed 3 months after autopsy

- 528 for 6-acetylmorphine, plasma levels in 11 patients 15 min after the end of smoking of 150–400 mg diacetylmorphine (heroin) were 0.068 (0.015–0.156) mg/L, and 0.021 and 0.009 mg/L after 45 and 90 minutes, respectively.
- 529 nine neurology patients receiving daily oral therapy with 1150–2900 mg hydroxytryptophan plus 200 mg of carbidopa for 8–54 months had steady state peak plasma hydroxytryptophan levels averaging 9.4 (range 3.0–17) mg/L
- 530 co-administration of carbidopa resulted in a doubling of the elimination half-life of 5-HTP
- 531 4 h post-ingestion; survived with supportive measures
- 532 adults with unusually high oral doses of 5 to 75 mg/kg idebenone achieved average peak plasma levels of 1.64–9.53 mg/L
- 533 7 h post-ingestion
- 534 a single oral 100 mg dose given to 6 adult male congestive heart failure patients resulted in an average peak plasma concentration of 1.3 mg/L at 1.4 h
- 535 1 hour after a single oral 200 mg dose to six healthy, younger, fasting men
- 536 the elimination of isoflurane follows a 3 term exponential decay, with half-lives of 6.7 minutes, 1.3 h, and 58 h representing the vessel-rich, muscle, and fat compartments, respectively.
- 537 deaths after self-administration of isoflurane
- 538 the metabolites isosorbide-5-mononitrate (IS-5-MN) and isosorbide-2-mononitrate (IS-2-MN) show pharmacological activity
- 539 the sublingual administration of 5 mg ISDN to n=6 healthy young man resulted in an average peak plasma concentration of 0.016 mg/L ISMN at 30 minutes; peak plasma levels in n=7 patients receiving chronic high dose therapy (360–720 mg ISDN daily) ranged from 0.046–0.224 mg/L (ISDN), 0.179–0.512 mg/L IS-2-MN, and 0.91–1.97 mg/L IS-5-MN
- 540 the United Kingdom established a threshold of 0.02 mg/L for blood ketamine as being indicative of impaired driving ability (UK GOV 2014)
- 541 active metabolite norketotifen
- 542 active metabolites ortho- and para-hydroxyatorvastatin; reference plasma concentration 0.013–0.043 mg/L and 0.001–0.005 mg/L, respectively

- 543 active metabolite lovastatin hydroxy acid; reference plasma concentration 0.003–0.018 mg/L
- 544 active metabolite simvastatin hydroxy acid; reference plasma concentration 0.001–0.009 mg/L
- 545 (major) active metabolite canrenone
- 546 metabolites 11-hydroxyyohimbine (active) and 10-hydroxyyohimbine
- 547 in subclavian blood
- 548 (active?) metabolite norolanzapine, therapeutic range 0.006–0.024 mg/L
- 549 metabolites norquetiapine, 7-hydroxyquetiapine, and 7-hydroxy norquetiapine
- 550 paliperidone (9-hydroxyrisperidone) could be a prescribed antipsychotic (parent drug) and a metabolite of risperidone
- 551 a case with severe hypoglycemia: serum concentration 1 h after hospital admission; O-desmethyltramadol 1.3 mg/L, N-desmethyltramadol 3.3 mg/L, acetaminophen 109.5 mg/L
- 552 the 'gray baby syndrome' occurs in newborns who develop excessive serum concentrations of the drug
- 553 serum cathine concentrations in n=19 khat cases of suspected driving under the influence of drugs
- 554 serum cathinone concentrations in 16 of 19 khat cases of suspected driving under the influence of drugs
- 555 three days after ingestion of a liquid containing hexavalent chromium (Cr(VI)) and inorganic arsenic (iAs) the total Cr concentrations were 2.18 and 1.07 mg/L in whole blood and plasma, respectively, and 4.54 mg/L Cr(VI) in erythrocytes
- 556 appr. six h after oral ingestion of 300 mg clindamycine-HCl
- 557 metabolic precursor of lorazepam (see Table)
- 558 persons survived 1–3 days before they died
- 559 in combination with 0.035 mg/L etizolam (see Table) in femoral blood
- 560 elimination of enflurane follows a 3-term exponential decay, with half-lives of 18 min (17% of the absorbed dose, located in the central compartment), 3.2 h (41% from the muscle tissue compartment) and 36 h (42% from the fat compartment)
- 561 in femoral blood; in heart blood 14,585 ng/L

- 562 blood ketamine and norketamine concentrations in n=14 impaired drivers averaged 0.42 (range 0.17-0.85) mg/L and 0.61 norketamine (range 0.19-1.4) mg/L, respectively
- 563 six healthy women given a single oral 50 mg tablet attained peak plasma levels averaging 0.61 mg/L benzydamine
- 564 a target range of 3-7 mg/L for the trough serum infliximab concentration was suggested for inflammatory bowel disease patients
- 565 post-mortem femoral blood concentrations found in four cases where other (illegal) drugs were involved
- 566 active metabolite N-desmethyltrimipramine (= nortrimipramine)
- 567 active metabolites O-desmethylvenlafaxine (major) and N-desmethylvenlafaxine
- 568 active metabolite N-desmethylenzalutamide
- 569 high dose therapy in cancer patients
- 570 enantiomer of milnacipran (see Table)
- 571 active metabolites monoethylglycinexylidide (MEGX) and glycinexylidide (GX)
- 572 active metabolite desipramine, $t_{1/2}$: 15–25 h (see Table)
- 573 active metabolite norlorcainide, $t_{1/2}$: 28 h, therapeutic plasma concentration appr. –1.5 (-2) mg/L
- 574 (minor) active metabolite lorazepam
- 575 post-mortem (3 days post-admission)
- 576 depending on the route of administration
- 577 endogenous level
- 578 depending on the dose protocol and leucovorin application; minimal cytotoxic concentration appr. 0.01 $\mu\text{mol/L}$ (= appr. 0.005 mg/L)
- 579 24 h, 48 h, and 72 h after high-dose i.v. infusion, target concentrations < 10 $\mu\text{mol/L}$ (4.6 mg/L), < 1 $\mu\text{mol/L}$ (0.46 mg/L), and < 0.1 $\mu\text{mol/L}$ (0.046 mg/L), respectively
- 580 active metabolite of MDMA
- 581 major metabolite 5-methylpyrithyldione

- 582 nonenzymatically transformed to 2,2-dichlorovinyl-dimethyl-phosphate (dichlorvos, DDVP) (see Table)
- 583 maximum plasma concentration after applying 2 mg of sunscreen (spray or lotion) per 1 cm² to 75% of body surface area at 0 h on day 1 and 4 times on day 2 through day 4 at 2-h-intervals (each n=12 healthy volunteers)
- 584 major and active metabolite O-desmethyltramadol; further metabolites N-desmethyltramadol and N, O-didesmethyltramadol
- 585 steady state after Kratom tea for 7 days in nine chronic, regular, healthy users
- 586 in case one, plasma moclobemide was 2.8 mg/L with 1.8 mg/L clomipramine; in case two plasma moclobemide 18 mg/L; in case three 60.9 mg/L; none of the patients showed serious effects during 24 h of observation. Plasma moclobemide at 10 to 30 times therapeutic was not associated with major toxic effects; see eg. ref. [516].
- 587 active metabolite of the prodrug moexipril
- 588 in unexposed adults
- 589 sum naltrexone and 6 β -naltrexol
- 590 measurement of serum netilmicin concentrations, with maintenance within the ranges 6 to 10 mg/L (peak) and 0.5 to 2 mg/L (trough), are desirable
- 591 active metabolite N-desethoxybuti(y)nin; therapeutic plasma concentration 0.01-0.08 mg/L
- 592 active metabolite 6-oxymorphol
- 593 neutropenia is related to the duration that plasma concentrations were $\geq 0.05 \mu\text{mol/L}$ or $> 0.1 \mu\text{mol/L}$
- 594 elimination of bisphosphonates is extremely slow, and their terminal half-life can be as long as 10 years in humans
- 595 the use of a nomograph/nomogram relating plasma drug concentration, time since ingestion and hepatotoxicity is helpful in evaluating the need for antidotal treatment, see eg. ref. [1148, 1149]
- 596 paraoxon is the active metabolite of parathion
- 597 active metabolites 7-hydroxypericyazine and pericyazine sulphoxide
- 598 also an active metabolite of thiopental

- 599 58-year-old woman who ingested 26 g of naproxen in a suicidal attempt and developed cardiovascular shock, hypocoagulability and thrombopenia
- 600 active metabolite perindoprilat
- 601 whole blood concentration
- 602 monitoring and management of therapy by International Normalized Ratio (INR) and by the thromboplastin time (Quick test)
- 603 for invasive aspergillosis
- 604 active metabolite N-desalkylquetiapine (= norquetiapine, $t_{1/2}$: 10–13 h); therapeutic plasma concentration 0.1–0.25 mg/L
- 605 given to cancer patients in a phase I study
- 606 controlled anesthesia
- 607 active enantiomer of racemic modafinil
- 608 as modafinil
- 609 major active metabolite of acetylsalicylic acid
- 610 C_{max} ; six healthy adults inhaled a single high dose of vaporized salvinorin A (n=4, 21 μ g/kg; n=2, 18 μ g/kg body weight)
- 611 asymptomatic silver workers
- 612 16 h post-ingestion of 1700 mg sitagliptin
- 613 mixed intoxication with several other drugs and ethanol
- 614 peripheral blood (urine: 88 mg/L), plus 0.58 mg oxycodone/L blood
- 615 C_{max} at 2 h
- 616 in non-exposed citizens
- 617 active metabolite quinalaprilat, therapeutic plasma concentration 0.6–1.8 mg/L
- 618 as quinalaprilat
- 619 active metabolite trandolaprilat, therapeutic plasma concentration 0.001–0.006 mg/L, $t_{1/2}$: 16–24 h
- 620 peak plasma concentration
- 621 active 3-hydroxymethyl metabolite, $t_{1/2}$: 13–15 h

- 622 $t_{1/2}$ 10–12 h for the metabolite trichloroethanol and 70–85 h for the metabolite trichloroacetic acid
- 623 $t_{1/2}$ 12–13 h for the metabolite trichloroethanol and 86–99 h for the metabolite trichloroacetic acid
- 624 the plasma concentration of the active metabolite 3-desacetylvecuronium ($t_{1/2}$: 2 h) may exceed that of vecuronium
- 625 $t_{1/2}$ of the metabolite O-desmethylvenlafaxine: 10–20 h
- 626 post-mortem baseline zinc concentrations: 4.0–8.7 mg/L
- 627 whole body
- 628 peak plasma concentrations at end-of-infusion after doses of 4–16 mg
- 629 at 1–3 h
- 630 at 1.5–2 h
- 631 active metabolite 4-(4-guanidinobenzoyloxy)phenylacetic acid
- 632 C_{max} and $t_{1/2}$, respectively, after a single oral 200 mg camostat mesilate dose in five healthy adults
- 633 as arsenious acid, after infusion of arsenic trioxide

Abbreviations: *appr.* approximately, *AUC* area under the (blood plasma concentration-time) curve, C_{max} maximum (peak) plasma/serum concentration, C_{min} minimum (trough) plasma/serum concentration (usually at steady state), *h* hour/hours, *ICU* intensive care unit, *min* minutes, *mol wt* molecular weight, *ref.* reference(s), *SD* standard deviation, $t_{1/2}$ terminal elimination half-life (if not stated otherwise), t_{max} time to peak concentration (C_{max})

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