

Compounds in Training set	CLb ml/min	Calculation Method	Administration Route	Population Studied	Sample Collection Method	collection period	Analytical Method	Molecular Weight	Charge Status	Substrate of Efflux transporter	Reference
<b>Penicillins:</b>											
ampicillin	0.163	Xbile/AUC	i.v	5 patients	T-tube	12 hr	Microbiology	349	zwitter		Brogard JM, et.al. Chemotherapy. 1977;23(4):213-26 CLb amounted to 9.8 ml/hr.
azlocillin	8.9 ± 9.8	Vbile/Cp,ss	infusion	5 healthy subjects	Duodenal aspiration		HPLC	461.47	anion		Gundert-Remy U, et.al. Br J Clin Pharmacol. 1982 Jun;13(6):795-801.
mezlocillin	98.6 ± 42.5	Vbile/Cp,ss	infusion	8 healthy subjects	Duodenal aspiration	6 hr	HPLC	539.58	anion		Gundert-Remy U, et.al. Clin Pharmacol Ther. 1983 May;33(5):656-62
	89.5 ± 28.3		infusion	5 healthy subjects	Duodenal aspiration		HPLC				Gundert-Remy U, et.al. Br J Clin Pharmacol. 1982 Jun;13(6):795-801.
penicillin G (benzylpenicillin)	0.49	CL * %bile	i.v	5 healthy subjects	Duodenal aspiration			334.39	anion	MRP2	Brogard JM, et.al. Antimicrob Agents Chemother. 1980 Jul;18(1):69-76. % of dose: 0.1; CLtot: 5 - 9 ml/min/kg (Goodman & Gilman)
piperacillin	2.24 ± 0.56	Xbile/AUC	short infusion	3 healthy volunteers	duodenal aspiration	6 hr	HPLC	517.56	anion		Ghibellini G, et.al. Br J Clin Pharmacol. 2006 Sep;62(3):304-8 Biliary clearance corrected for EF was 0.032±0.008 ml/min/kg
<b>Cephalosporins:</b>											
cefaclor	0.189	CLpo * %bile	p.o	10 patients	T-tube	12 hr	Bioassay	367.81	zwitter		Brogard JM, et.al. J Antimicrob Chemother. 1987 May;19(5):671-8. % of Dose: 0.05. CLpo: 5.41 ml/min/kg, Clin Pharmacokinet. 1992 Mar;22(3):169-210
cefixime	9.75	Xbile/AUC	p.o	10 patients	T-tube	24 hr	HPLC	453.45	anion		Westphal JF, et.al. Clin Pharmacol Ther. 1993 Nov;54(5):476-84 % fo Dose: 5. Apparent total clearance: 195 ± 88 ml/min
cefotetan	3.33	CL* %bile	i.v	7 healthy subjects	duodenal perfusion	7 hr	HPLC	575.62	anion	MRP2	Lanzini A, et.al. Gut. 1989 Jan;30(1):104-9 % of dose: 10.86; CLtot:1.84 L/h. Clin Pharmacokinet. 1994 Apr;26(4):248-58.
cefpiramide	2.8	Xbile/AUC	i.v	10 patients	T-tube	24 hr	HPLC	612	anion	MRP2	Brogard J, et.al. Antimicrob Agents Chemother. 1988 Sep;32(9):1360-4
ceftazidime	0.22	Xbile/AUC	i.v	12 patients	T-tube	12 hr	HPLC	548.59	anion		Brogard JM, et.al. J Antimicrob Chemother. 1987 May;19(5):671-8. CLb: 13.1 ml/hr
	0.5	CL* %bile	i.v	10 patients	T-tube	6 hr	HPLC				Walstad RA, et.al. Eur J Clin Pharmacol. 1986;31(3):327-31
ceftriaxone	4.87 ± 2.50		infusion	6 healthy subjects	duodenal perfusion	8 hr	LC	554	anion	MRP2	Arvidsson A, et.al. Eur J Clin Invest. 1988 Jun;18(3):261-6.
	4.75 ± 5.56	Vbile/Cp,ss	infusion	4 healthy subjects	duodenal perfusion	6-8 hr	HPLC				Arvidsson A, et.al. J Antimicrob Chemother. 1982 Sep;10(3):207-15
cephaloridine	0.239	CL* %bile	i.v	5 patients	T-tube	12 hr		417.5	zwitter		Brogard JM, et.al. J Antimicrob Chemother. 1987 May;19(5):671-8
<b>Other beta-lactam antibiotics:</b>											
tazobactam	0.47 ± 0.40	Xbile/AUC	short infusion	5 patients	T-tube	7 hr	HPLC	300.29	anion		Westphal J, et.al. Antimicrob Agents Chemother. 1997; 41(8):1636-40.
<b>Quinolone Antibiotics:</b>											
temafloxacin	3.17 ± 2.17	Xbile/AUC	p.o	10 patients	T-tube	72 hr	HPLC	417.39	zwitter		Sörgel F, et.al. Clin Pharmacokinet. 1992;22 Suppl 1:33-42 CLb: 0.19 ± 0.13 L/hr
rufloxacin	0.4 ± 0.2	Xbile/AUC	p.o	12 patients	T-tube	72 hr	HPLC	363.41	zwitter		Privitera G, et.al. Antimicrob Agents Chemother. 1993;37(12):2545-9

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<b>Other antibiotics:</b> erythromycin	80.3	CL* %bile	i.v	2 patients	duodenal aspiration	20 hr	Bioassay	733.95	cation	MRP2, P-gp	TAKIMURA Y, et.al. Antibiotic Med Clin Ther. 1955 Oct;1(10):561-6 % of dose: 12.6. CL: 9.1 ml/min/kg. (Goodman & Gilman)
<b>Anti-cancer Agents:</b> cyclophosphamide	0.45	CL* %bile	i.v	1 patient	T-tube	32 hr	GC	261.09	neutral		Dooley JS, et.al. Cancer Chemother Pharmacol. 1982;9(1):26-9. % of Dose: 3.5%; CLs: 795 ml/hr
epirubicin	345.6	Xbile/AUC	i.v	3 patients	T-tube	96 hr	Chromatography	543.52	cation	MRP2, P-gp	Camaggi CM, et.al. Cancer Chemother Pharmacol. 1986;18(1):47-50 CLb: 32.5, 8.1, 21.6 L/hr
idarubicin	22	Xbile/AUC	p.o	2 patients	T-tube	7 d	LC	497.49	cation	P-gp	Pannuti F, et.al. Cancer Chemother Pharmacol. 1986;16(3):295-9. % of Dose: 0.36. AUC/Dose: 2.6, 2.8 (ng*hr/ml/mg)
irinotecan (CPT-11)	66	CL* %bile	infusion	1 patient	T-tube	72 hr	HPLC	586	cation	MRP2; P-gp	Slatter JG, et.al. Drug Metab Dispos. 2000 Apr;28(4):423-33 % of Dose: 18.46. CLtot: 12.4 ± 3.02 L/h/m2
methotrexate (MTX)	19.5 - 58.2	Xbile/AUC	p.o	1 patient	T-tube	39 hr	HPLC	454.45	anion	MRP2	Nuernberg B, et.al. Arthritis Rheum. 1990 Jun;33(6):898-902
taxol	11.55	CL* %bile	infusion	1 patient	T-tube	48 hr	HPLC	853.93	neutral	MRP2, P-gp	Monsarrat B, et.al. J Natl Cancer Inst Monogr. 1993;(15):39-46 % of dose: 3; CL: 5.5 ml/min/kg (Goodman and Gilman)
vincristine (VCR)	12.9	CL* %bile	i.v	1 patient	T-tube	2 hr	Radioactive/HPLC	824.98	cation	MRP2, P-gp	Jackson DV Jr, et.al. Clin Pharmacol Ther. 1978 Jul;24(1):101-7 % of Dose: 10.47 (parent); CLtot: 0.106 L/hr/kg Drugs. 1992;44 Suppl 4:1-16
<b>Dye:</b> DBSP	400		i.v	7 patients	T-tube	24 hr	Spectrometry	636.24	anion	MRP2	Meijer DK,, et.al. Eur J Clin Pharmacol. 1983;24(4):549-56
indocyanine green (ICG)	236.1 ± 21.5	CL* %bile	i.v	15 patients	T-tube	18 hr	Spectrometry	755.01	anion	MRP2	Meijer DK, et.al. Eur J Clin Pharmacol. 1988;35(3):295-303 % of Dose: 88.5, 75.6 and 80.8. CL(ml/min): 262, 287 and 321.
<b>Quaternary ammoniums:</b> metocurine	2.03	CL* %bile	i.v	10 patients	T-tube	48 hr	Radioactive	654.85	cation		Meijer DK, et.al. Anesthesiology. 1979 Nov;51(5):402-7 % of Dose: 2.1; CLtot: 96.9 ml/min
pipecuronium	3.5	CL* %bile	i.v	6 patients	T-tube	24 hr	HPLC/TLC	604.92	cation		Wierda JM, et.al. Eur J Anaesthesiol. 1991 Nov;8(6):451-7 % of Dose: 2; CLtot: 2.5 ml/min/kg
vecuronium	31.6	CL* %bile	i.v	6 patients	T-tube	24 hr	Fluorometric	558.85	cation	P-gp	Br J Anaesth. 1986 Sep;58(9):988-95. % of dose: 10.5; Clsys: 4.30 ml/min/kg Br J Anaesth. 1986 Sep;58(9):983-7.
<b>H2-antagonists:</b> cimetidine	9.9	CL* %bile	i.v	6 healthy subjects		8 hr		252.34	cation	P-gp	Somogyi A, et.al. Clin Pharmacokinet. 1983 Nov-Dec;8(6):463-95 % of Dose in bile: 1.8%; CLsys: 500 - 600 ml/min.
famotidine	0.447	CL* %bile	i.v	2 patients	T-tube	24 hr	HPLC	337.45	cation	P-gp	Klotz U, et.al. Eur J Clin Pharmacol. 1990;39(1):91-2 % of dose: 0.09; CL: 7.1 ml/min/kg. (Goodman & Gilman.)
ranitidine	10.7	CL* %bile	i.v	3 patients	T-tube	24 hr	HPLC	314	cation	P-gp	Klotz U, et.al. Eur J Clin Pharmacol. 1990;39(1):91-2 % of dose: 1.47; CL: 10.4 ml/min/kg. (Goodman & Gilman.)

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<b>NSAIDs:</b>											
paracetamol/acetaminophen	2.27	CL/F*%bile	p.o	6 patients	T-tube	8 hr	HPLC	151.2	neutral	MRP2; P-gp	Siegers CP, et.al. Pharmacology. 1984;29(5):301-3 % of dose: 0.57; F: 88%. CL: 5 ml/min/kg (Goodman & Gilman.)
tolfenamic acid	1.2 ± 0.3	Xbile/AUC	infusion	8 patients	T-tube	24 hr	Radioactive/TLC	261	anion		Pentikäinen PJ, et.al. Eur J Clin Pharmacol. 1984;27(3):349-54
<b>Other compounds:</b>											
acebutolol	36	CL/F*%bile	p.o	2 patients	T-tube	24 hr	TLC	336.43	cation	P-gp	Kaye CM. J Pharm Pharmacol. 1976 May;28(5):449-50 % of dose: 2.8; F: 37 ± 12%. CL: 6.8 ± 0.8 ml/min/kg (Goodman & Gilman)
cyclosporine (CyA)	4.46	CL/F*%bile	p.o	patients	T-tube		HPLC/RIA	1202.6	neutral	P-gp	Venkataramanan R, et.al. Trans. Proc., 1985, Vd XVII, No 1: 286-289 % of dose: 0.17; F: 0.2; CL: 7.5 ml/min/kg(Goodman & Gilman)
Digoxin	106 ± 40	Vbile/Cp, mid	i.v	5 healthy subjects	duodenal perfusion	8 hr	Radioimmunoassay	781	neutral	P-gp	Hedman A. et.al. Br J Clin Pharmacol. 1991 Jul;32(1):63-7
	134 ± 57 95 ± 24	Vbile/Cp,mid		8 healthy subjects	duodenal perfusion	> 6 hr	Radioimmunoassay				Hedman A, et.al. Clin Pharmacol Ther. 1990 Jan;47(1):20-6
napsagatran	305		infusion	healthy subjects			HPLC	558.6	zwitter		Lavé T, et.al. J Pharm Pharmacol. 1999 Jan;51(1):85-91
valsartan	30.18	CL* %bile	i.v	1 patient	T-tube	24 hr	HPLC	435.5	anion	MRP2	Brookman LJ, et.al. Clin Pharmacol Ther. 1997 Sep;62(3):272-8 % of dose: 88; CLtot: 0.49 ml/min/kg (Goodman & Gilman)

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vindesine	29		i.v.	1 patient	T-tube	20 hr	Radioimmunoassay	753.93	cation	MRP2, P-gp	Hande K, et.al. Cancer Treat Rev. 1980 Sep;7 Suppl 1:25-30
carbamazepine	9.1	CL <sub>po</sub> * %bile	p.o	4 patients	T-tube	72 hr	GC	236.27	neutral		Terhaag B, et.al. Int J Clin Pharmacol Biopharm. 1978;16(12):607-9 % of dose: 1; CL <sub>po</sub> : 13 ± 0.5 ml/min/kg. Goodman & Gilman.
cefotiam	6.6	CL* %bile	i.v.	10 patients	T-tube			525.63	zwitter		Brogard JM, et.al. J Antimicrob Chemother. 1987 May;19(5):671-8 % of Dose: 1.8. CL <sub>tot</sub> : 22 L/hr. Antimicrob Agents Chemother. 1985 Feb;27(2):177-80
menogaril	17.1	CL* %bile	i.v.	2 patients	T-tube	24 hr	HPLC	541.55	cation		Egorin MJ, et.al. Cancer Res. 1986 Mar;46(3):1513-20 % of Dose: 2.1; CL <sub>tot</sub> : 28.18 ± 3.33 L/hr/m <sup>2</sup>
apalcillin	16.96	CL* %bile	i.v.	10 patients	T-tube	12 hr	Bioassay	521.54	zwitter		Brogard JM, et.al. Antimicrob Agents Chemother. 1984;26(3):428-30 % of Dose: 12.2; CL <sub>tot</sub> : 139.0 ml/min. Antimicrob Agents Chemother. 1984 Jan;25(1):105-8
diclofenac	2.94	CL* %bile	i.v.	1 patient	T-tube	8 hr	Radioactive	296	anion		Stierlin H, et.al. Xenobiotica. 1979 Oct;9(10):611-21 % of Dose: 1; CL: 4.2 ml/min/kg. Goodman & Gilman.
sulbactam	0.62	CL* %bile	i.v.	5 patients	T-tube	4 hr	HPLC	233.24	anion		Morris DL, et.al. Rev Infect Dis. 1986 Nov-Dec;8 Suppl 5:S589-92 % of Dose: 0.24; CL <sub>tot</sub> : 3.7 ml/min/kg; Clin Pharmacokinet. 1992 Mar;22(3):169-210
rifampicin	4.56	CL* %bile	p.o	patients	T-tube	12 hr	Chromatography	822.94	zwitter		Acocella G, et.al. Pharmacol Res Commun. 1978 Mar;10(3):271-88 % of Dose: 1.86; CL <sub>tot</sub> : 3.5 ml/min/kg; Goodman & Gilman.
rocuronium	20.83	CL* %bile	i.v.	11 patients	T-tube	48 hr	HPLC	530.8	cation		Proost JH, et.al. Br J Anaesth. 2000 Nov;85(5):717-23 % of Dose: 7; CL <sub>tot</sub> : 3.3-5.2 ml/min/kg; Goodman & Gilman.
floxacin	2.98	CL <sub>po</sub> * %bile	p.o.	9 patients	T-tube	72 hr	HPLC	369.34	zwitter		Hayton WL, et.al. Antimicrob Agents Chemother. 1990;34(12):2375-80 % of Dose: 3.5; CL <sub>tot</sub> : 85.1 ± 48.6 ml/min
d-tubocurarine	6.61	CL* %bile	i.v	10 patients	T-tube	48 hr	Radioactive	610.76	cation		Meijer DK, et.al. Anesthesiology. 1979 Nov;51(5):402-7 % of Dose: 11.8. CL <sub>tot</sub> : 56 ml/min.
disopyramide	1.08	CL/F* %bile	p.o.	3 patients	T-tube	48 hr	HPLC	339.47	cation		le Corre P, et.al. Chirality. 1992;4(2):80-3 % of Dose: 1.5 (R-), 0.7 (S-); F: 0.85;  CL <sub>tot</sub> : 1.2ml/min/kg; Goodman & Gilman.
meperidine	2.38	CL* %bile	i.v	2 normal Volunteers	Duodenal Intubation	2.5 hr	GC	247.33	cation		J Pharmacokinet Biopharm. 1984 Jun;12(3):289-313 Dunkerley R, et.al. Clin Pharmacol Ther. 1976 Nov;20(5):546-51 % of Dose: 0.2; CLs: 1190 ml/min
olsalazine (ADS)	4.67	CL* %bile	i.v.	5 healthy Volunteers	Duodenal Aspiration	up to 4.5 hr	HPLC	302.24	anion		Ryde M, et.al. Eur J Drug Metab Pharmacokinet. 1987;12(1):17-24 % of Dose: 5.6 ± 4.5. CL <sub>sys</sub> : 5 L/hr Eur J Clin Pharmacol. 1988;34(5):481-8
mebendazole	5.7	Vbile/Cp	p.o.	1 patient	T-tube	12 hr	HPLC	295.29	neutral		Witassek F, et.al. Eur J Clin Pharmacol. 1983;25(1):81-4
pancuronium ((Pavulon)	8.32	CL* %bile	i.v.	7 patients	T-tube	30 hr	Fluorimetric/TLC	574.9	cation		Agoston S, et.al. Acta Anaesthesiol Scand. 1973;17(4):267-75 % of Dose: 6.6. CL: 1.8 ± 0.4 ml/min/kg. Goodman & Gilman.

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bumetanide	3.86	CL/F * %bile	p.o	1 patient	T-tube	48 hr	Radioactive/TLC	364.42	anion		Halladay SC, et.al. Clin Pharmacol Ther. 1977 Aug;22(2):179-87 % of Dose: 1.7. F: 0.787, Clsys: 2.55 ml/min/kg. Clin Pharmacol Ther. 1988 Nov;44(5):487-500
cefamandole	0.822	CL * %bile	i.v.	7 patients	T-tube	6 hr	Bioassay	462.48	anion		Ratzan KR, et.al. Antimicrob Agents Chemother. 1978 Jun;13(6):985-7 % of Dose: 0.412 ± 0.09. CLtot: 2.85 ml/min/kg; Clin Pharmacokinet. 1992 Mar;22(3):169-210