

**Medication—pH and Osmolarity Table**

<b>Drug (generic)</b>	<b>Trade Name</b>	<b>Diluents</b>	<b>pH</b>	<b>mOsmol/L</b>	<b>Phlebitis from drug</b>	<b>Line</b>
Acyclovir	Zovirax	NS @ 5mg/ml	10.5-11.6	316	yes	PICC/CL
Amikacin	Amikin	NS @ 5mg/ml	3.5-5.5	349		PICC/CL
Aminophylline	Phyllocontin	NS @ 5mg/ml	8.6 - 9	327		PICC/CL
Amiodarone	Cordarone	D5W @ 2mg/ml	4.1		yes	PICC/CL
Amphotericin B	Fungizone	D5W @ 0.1mg/ml		256	yes	PIV ML
Amphotericin B Albecet	Albecet	D5W @ 1-2mg/ml	5.5 - 6	~280	yes	PIV ML
Amphotericin B Ambisome	Ambisome	D5W @ 1-2mg/ml	5 - 6	~280	yes	PIV ML
Amphotericin B Amphotec	Amphotec	D5W @ 0.2-0.8mg/ml	5 - 6	~280	yes	PIV ML
Ampicillin - Sulbactam	Unasyn	NS 100ml	9 (8 - 10)	~400	yes	PICC/CL
Ampicillin 1 & 2 gm	Omnipen-N	NS 100ml	9 (8 - 10)	328 - 372		PICC/CL
Amrinone	Inamrinone	NS @ 2.5mg/ml	3.2 - 4	~300	yes	PICC/CL
Andiulafungin	Eraxis	100mg/250 mg NS or D5W				
Azithromycin 500 mg	Zithromax	NS @ 2mg/ml	6.4 - 6.8	~280	yes	PIV ML
Aztreonam 1 gm	Azactam	SWI 10ml	6 (4.5-7.5)			PIV ML
Aztreonam 1 - 2 gm	Azactam	NS 100 ml	6 (4.5-7.5)	315-352		PIV ML
Aztreonam 1- 2 gm Frozen	Azactam	Dextrose 50ml	5.0 - 5.6	270 - 330		PIV ML
Bleomycin	Blenoxane	NS@3units/ml	4.5 - 6	~300		PIV ML
Carboplatin	Paraplatin	D5W 0.2 - 2 mg/ml	5 - 7	~250		PIV ML
Carmustine	BiCNU	D5W 250 - 500ml	5.6 - 6			PIV ML
Caspofungin	Cancidas	NS @ 0.28-0.35 mg/ml	6.6		yes	PIV ML
Cefamandole 1 gm	Mandol	SWI 10 ml	6-8.5	466		PIV ML
Cefamandole 1 gm	Mandol	NS 100ml	7 (6-8.5)	314		PIV ML
Cefazolin 1 - 2 gm	Ancef	SWI 10 ml	4.5-7	293		PIV ML
Cefazolin 1 - 2 gm	Ancef	NS 100 ml	4.5-7	317 - 351		PIV ML
Cefazolin 1 gm Frozen	Ancef	Dextrose 50ml	5.4 - 6.4	270 - 330		PIV ML
Cefazolin 500mg Frozen	Ancef	Dextrose 50ml	5.4 - 6.4	270 - 330		PIV ML
Cefepime 1 - 2 gm	Maxipime	NS 100 ml	4 - 6	307		PIV ML

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Cefmetazole 2gm	Zefazone	NS 100 ml	4.2 - 6.2	317		PIV ML
Cefoperazone 1 gm	Cefobid	SWI 10ml	5 (4.5-6.5)	290		PIV ML
Cefoperazone 1 gm	Cefobid	NS 100ml	5 (4.5-6.5)	307		PIV ML
Cefoperazone 1gm Frozen	Cefobid	Dextrose 50ml	5.3 - 5.8	276 - 324		PIV ML
Cefoperazone 2 gm Frozen	Cefobid	Dextrose 50ml	5.3 - 5.8	276 - 324		PIV ML
Cefotaxime 1 - 2 gm	Claforan	NS 100 ml	5-7.5	344 - 351		PIV ML
Cefotaxime 1 gm	Claforan	SWFI 10 ml	5-7.5	357		PIV ML
Cefotaxime 1 - 2 gm Frozen	Claforan	Dextrose 50ml	6.2 - 6.8	270 - 330		PIV ML
Cefotetan 1 gm	Cefotan	NS 100 ml	4.5-6.5	~380		PIV ML
Cefotetan 2 gm	Cefotan	NS 100 ml	4.5-6.5	~420		PIV ML
Cefotetan 1- 2 gm Frozen	Cefotan	Dextrose 50ml	5.0 - 6.4	270 - 330		PIV ML
Cefotetan 1 gm	Cefotan	SWI 10 ml	4.5-6.5	400		PIV ML
Cefoxitin 1 - 2 gm	Mefoxin	NS 100 ml	4.2-8	319 - 355		PIV ML
Cefoxitin 1 gm	Mefoxin	SWI 10 ml	4.2-8	390		PIV ML
Cefoxitin 1- 2 gm Frozen	Mefoxin	Dextrose 50ml	5.9 - 6.6	270 - 330		PIV ML
Ceftazidime 1 gm	Tazicef	SWI 10 ml	5.5 - 8	240		PIV ML
Ceftazidime 1 gm Frozen	Tazicef	Dextrose 50ml	5.4 - 6.0	270 - 330		PIV ML
Ceftazidime 1-2 gm	Tazicef	NS 100 ml	5.5 - 8	330		PIV ML
Ceftazidime 2 gm	Tazicef	SWI 20 ml	5.5 - 8	240		PIV ML
Ceftazidime 2 gm Frozen	Tazicef	Dextrose 50ml	5.4 - 6.0	270 - 330		PIV ML
Ceftizoxime 1 gm	Cefizox	SWI 10 ml	5.5-8	350		PIV ML
Ceftizoxime 1 gm	Cefizox	NS 100 ml	6 - 8	320		PIV ML
Ceftizoxime 1-2 gm Frozen	Cefizox	Dextrose 50ml	6.7 - 8.0	270 - 330		PIV ML
Ceftriaxone 1 - 2 gm	Rocephin	NS 100 ml	6.6-6.7	350		PIV ML
Ceftriaxone 1 gm	Rocephin	SWI 10 ml	6.6-6.7	423		PIV ML
Ceftriaxone 1-2gm Frozen	Rocephin	Dextrose 50ml	6.2 - 6.9	270 - 330		PIV ML
Cefuroxime 0.75 - 1.5g	Zinacef	NS 100 ml	6-8.5	~300		PIV ML
Cefuroxime 1.5 gm Frozen	Zinacef	Dextrose 50ml	5.2 - 5.8	270 - 330		PIV ML

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Cefuroxime 1gm	Zinacef	SWI 10 ml	6-8.5	357		PIV ML
Cefuroxime 750mg Frozen	Zinacef	Dextrose 50ml	5.2 - 5.8	270 - 330		PIV ML
Chloramphenicol 1 gm	Chloromycefin	SWI 10 ml	6.4-7	344		PIV ML
Chloramphenicol 1 gm	Chloromycefin	NS 100 ml	6.4-7	330		PIV ML
Cidofovir	Vistide	NS 100 ml	7.4	~300		PIV ML
Cimetidine	Tagamet	NS 50 ml	3.8 - 6	314		PICC/CL
Ciprofloxacin 200 mg	Cipro	D5W 100 ml	3.3-4.6	285	yes	PICC/CL
Ciprofloxacin 400 mg	Cipro	D5W 200 ml	3.3-4.6	285	yes	PICC/CL
Cisplatin	Platinol	NS 0.05 - 2mg/ml	3.5 - 6	~300		PICC/CL
Cladribine	Litak	NS 500 ml	5.7 - 8	~300	yes	PIV ML
Clindamycin 600 mg	Cleocin	NS 100 ml	6.3 (5.5-7)	294		PIV ML
Clindamycin 900 mg	Cleocin	NS 100 ml	6.3 (5.5-7)	294		PIV ML
Cyclophosphamide	Cytoxan	NS 250ml	6.9 (3 - 7.5)	~300		PIV ML
Cytarabine	Antineoplastic or Cytotoxic	NS @ 100mg/ml	5 (4-6)	~300		PIV ML
Dacabazine	Imidazole Carboxamide	10mg/ml SWI	3 - 4	109		PICC/CL
Dacabazine	Imidazole Carboxamide	NS 250 ml	3 - 4	~300		PICC/CL
Daclizumab 5mg/ml	Zenapax	NS 50 ml	6.9	~300		PIV ML
Dactinomycin	Dactinomycin	SW 0.5 mg/ml	5.5 - 7	189		PIV ML
Dactinomycin	Dactinomycin	NS or D5W 50 ml	5.5 - 7	~300		PIV ML
Daptomycin	Cubicin	5 mg/ml	4.5 - 5.0	364		PIV ML
Daunorubicin HCl	Daunomycin	NS 15 ml	4.5 - 6.5	~300		PIV ML
Daunorubicin HCl	Daunomycin	NS 100 ml	4.5 - 6.5	~300		PIV ML
Deferoxamine	Desferal	SW @ 250mg/ml	4 - 6			PIV ML
Dexrazoxane	Zinecard	NS @ 5mg/ml	3.5 - 5.5		yes	PICC/CL
Dextrose 10%		NA	4.0 (3 - 6.5)	505		PIV ML

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Dextrose 5%		NA	4.0 (3 – 6.5)	252		PIV ML
Dextrose 5% Sod Chl 0.45%		NA	4.0 (3 – 6.5)	406		PIV ML
Dextrose 5% Sod Chl 0.45%+KCl 20mEq		NA	4.0 (3 – 6.5)	447		PIV ML
Dextrose 5% Sod Chl 0.45%+KCl 40mEq		NA	4.0 (3 – 6.5)	487		PIV ML
Dextrose 5% Sod Chl 0.9%		NA	4.0 (3 – 6.5)	560		PIV ML
Dobutamine HCL	Dobutrex	NS @ 4mg/ml	3.5 (2.5-5.5)	280	yes	PICC/CL
Docetaxel	Taxotere	NS 0.3-0.9mg/ml			yes	PICC/CL
Dolasetron	Anzemet	SW @ 20mg/ml	3.2 - 3.8	285	yes	PICC/CL
Dopamine HCL	Dobutrex	D5W	3.3(2.5-4.5)	277	yes	PICC/CL
Doripenem	Doribax	5 mg/ml	4.5 - 5.5			PIV ML
Doxorubicin		SW 2 mg/ml	2.5 - 4.5	280		PICC/CL
Doxorubicin		NS @ 2 mg/ml	3.8 - 6.5			PICC/CL
Doxorubicin HCL Liposome		D5W 250ml	6.5			PIV ML
Doxycline 100mg-200mg	Vibramycin	NS @ 1mg/ml	1.8-3.3	310		PICC/CL
Enalaprilat	Acepril	D5W 50ml	6.5 - 7.5			PIV ML
Epirubicin - Ellence	Ellence	SW 2mg/ml	3.0			PICC/CL
Epirubicin - Pharmorubicin	Pharmorubicin	SW 2mg/ml	4 - 5.5			PICC/CL
Ertapenum	Invanz	1 GM/10 ml	7.5			PICC/CL
Erythromycin 500 mg	Erythrocin	NS 100 ml	7(6.5 - 7.7)	291	yes	PICC/CL
Erythromycin 1 gm	Erythrocin	NS 250 ml	7(6.5 - 7.7)	290	yes	PICC/CL
Etoposide	VP-16	NS 0.2-0.4 mg/ml	3 - 4		yes	PICC/CL
Etoposide phosphate	VePesid	NS 10mg/ml	3 - 4	~290	yes	PICC/CL
Famotidine	Pepcid	NS 50ml	5 - 5.6	290		PIV ML
Floxuridine	Fudr	NS @ 10mg/ml	4 - 5.5	355		PIV ML
Fluconazole 100 mg	Diflucan	NS 50 ml	4 - 8	315		PIV ML
Fluconazole 200 mg	Diflucan	NS 100 ml	4 - 8	315		PIV ML
Fludarabine	Fludara	NS 100 ml	7.2 - 8.2	352		PIV ML

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Fluorouracil	5-FU, Adrucil	SW @ 50mg/ml	9.2	650		PIV ML
Foscarnet	Foscavir	SW @ 24mg/ml	7.4	271	yes	PICC/CL
Fosphenytoin	Cerbyx	NS @1.5-25PE/ml	8.6-9		yes	PICC/CL
Ganciclovir < 500 mg	Acyclovir	NS 100 ml	11.0	320	yes	PICC/CL
Gatifloxacin	Tequin	D5W 10mg/ml	3.5 - 5.5		yes	PICC/CL
Gemcitabine	Gemzar	NS 40mg/ml	2.7-3.3			PICC/CL
Gentamicin 100 - 250 mg	Garamycin	NS 100 ml	3-5.5	280 - 290		PICC/CL
Granisetron	Sancuso	SW 1mg/ml	4.7 - 7.3	290		PIV ML
Hemin for injection	Panhematin	SW @ 7mg/ml	8 - 9.5	~300	yes	PIV ML
Heparin sodium		NS 1000 units/ml	5 - 8	283-384		PIV ML
Heparin sodium (Premix D5)		25,000 u /250 ml	5.5 (5 - 6)	298		PIV ML
Heparin sodium (Premix N5)		25,000 u /250 ml	7 (6 - 8)	322		PIV ML
Hydrocortisone	Hydrocortisone	SW @ 50mg/ml	7 - 8	360		PIV ML
Hydromorphone	Dilaudid	SW 10mg/ml	4 - 5.5	~333		PIV ML
Ibandronate	Boniva	3.375 mg/3 ml RTU				
Idarubicin	Idamycin	1 mg/ml	3.5			CL
Ifosfamide	Ifex	NS@0.6-20mg/ml	6			PIV ML
Imiglucerase	Cerezyme	NS 20 units/ml	6.1			PIV ML
Imipenem/cilastatin	Primaxin	NS @ 5mg/ml	6.5-7.5	310	yes	CL
Infliximab		NS@0.4-4mg/ml	7.2	~300		PIV ML
Intravenous immunoglobulins	Gamma globutin, other	3% to 12%	4 - 7.2	~300		PIV ML
Infiximab	Remicade	NS @ 0.4-4 mg/ml	7.2	~300		PIV ML
Irinotecan	Camptothecin-11	D5W @ 0.12-1.1mg/ml	3 -3.8			CL
Iron Dextran Intravenous	Infed	NS @ 50mg/ml	5.2 - 6.5	2000	yes	CL
Iron Dextran Intravenous	Infed	NS @ 0.1mg/ml	5.2 - 6.5		yes	CL
Iron Sucrose Injection	Venofer	NS 100 ml	10.5 - 11.1	1250	yes	CL

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Itraconazole	Sporanox	NS 3.3mg/ml	4.8		yes	CL
Leucovorin	Wellcovorin	SW 10mg/ml	8.1	274		PIV ML
Levofloxacin 250 mg	Levaquin	D5W 50 ml	3.8-5.8	~250	yes	CL
Levofloxacin 500 mg	Levaquin	D5W 100 ml	3.8-5.8	~250	yes	CL
Linezolid	Zyvox	Dextrose 2mg/ml	4.8	290		PIV ML
Meperidine	Demerol	SW 50mg/ml	3.5 - 6	302		PIV ML
Meropenem	Merrem	NS @ 5mg/ml	7.3 - 8.3	~300	yes	CL
Methicillin 1 gm	Staphcillin	SWI 10 ml	7.6 (6-8.5)	510	yes	CL
Methicillin 2- 3 gm	Staphcillin	100 ml NS	7.6 (6-8.5)	371 - 415	yes	CL
Methotrexate	Rheumatrex, Trexall	SW @ 25 mg/ml	8.5	~300		PIV ML
Methylprednisolone 500 mg	Solu-Medrol	D5W100 ml	7 - 8	301		PIV ML
Methylprednisolone 1 gm	Solu-Medrol	D5W250 ml	7 - 8	319		PIV ML
Metoclopramide	Reglan	SW @ 5 mg/ml	4.5 - 6.5	280		PIV ML
Metoclopramide	Reglan	NS @ 1.25mg/ml	4.4	285		PIV ML
Metronidazole	Flagyl	NS @ 5mg/ml	5 - 7	310		PIV ML
Micafungin	Mycamine	NS 0.05mg/ml	5 - 7			PIV ML
Milrinone	Primacore	D5W 200mcg/ml	3.2 - 4			CL
Minocycline	Minocin	NS @ 0.1-0.2mg/ml	2 - 2.8	~300		CL
Mitomycin	Mutamycin	SW @ 0.5mg/ml	6 - 8	9		PIV ML
Mitoxantrone	Novantrone	NS @ 0.2mg/ml	3 - 4.5	~300	yes	CL
Morphine Sulfate	MS	NS 10mg/ml	4 (2.5-6.0)	295	yes	PIV ML
Nafcillin 1 - 3 gm	Unipen	NS 100 ml	6-8.5	361 - 398	yes	PIV ML
Nafcillin 1-2 gm Frozen	Nafcil	Dextrose 50ml	6.7 - 7.2	276 - 324	yes	PIV ML
Nicardipine	Cardene SR	NS @ 0.1mg/ml	3.5	~300		CL
Natalizumab	Tysabrio	300 mg / 15 ml	6.1			PIV ML
Octreotide	Sandostatin	SW @0.5mg/ml	3.9 - 4.5	279		CL
Ofloxacin	Floxin	D5W @ 4mg/ml	3.8 - 5.8	252		
Ondansetron	Zofran	D5W 32mg/50ml	3.3 - 4	270		CL

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Oxacillin 1 gm	Bactocil	SWI 10 ml	6-8.5	398	yes	CL
Oxacillin 1 - 2 gm	Bactocil	NS 100 ml	6-8.5	321 - 356	yes	CL
Oxacillin 1-2 gm Frozen	Bactocil	Dextrose 50ml	6.8 - 7.2	270 - 324	yes	CL
Paclitaxel	Taxol	D5W @ 0.3-1.2 mg/ml	4.4 - 6.5			CL
Pamidronate	Aredia	NS @ 0.09mg/ml	6 - 7.4	~300	yes	CL
Pantoprazole 40mg	Protonix	NS 100ml	9.0-10.0	295		CL
Parenteral Nutrition		Amino acids-dextrose-fat	5.5	>600	yes	CL
Parenteral Nutrition		Amino acids-dextrose	5.3 - 6.3	>800	yes	CL
Penicillin GK 1-3 MU Frozen	Amoxil, Larotid, Polymox	Dextrose 50ml	6.8 - 7.2	276 - 324		PIV ML
Penicillin GK or Na	Pfizerpen	NS @ 50units/ml	7 (6-8.5)	420		PIV ML
Pentamidine IVPB		D5W @ < 3mg/ml	4 - 4.4	455	yes	CL
Phenytoin	Dilantin	NS @ 5mg/ml	12	312	yes	CL
Piperacillin	Pipracil	SWI @ 163mg/ml	5.5-7.5	439		PIV ML
Piperacillin	Pipracil	NS @ 40mg/ml	5.5-7.5	404		PIV ML
Piperacillin/tazobactam 2.25-4.5gm Frozen	Zosyn	Dextrose 50ml	6.2 - 6.7	270 - 330		PIV ML
Piperacillin/tazobactam 3.375 gm	Zosyn	NS 100 ml	5.1-5.4	445		PIV ML
Plicamycin	Mithracin	NS 1000ml	7	~300		PIV ML
Potassium chloride premix	KCL, K-Dur	0.4 mEq/ml	5	800	yes	CL
Potassium chloride premix		0.3 mEq/ml	5	600	yes	CL
Potassium chloride premix		0.2 mEq/ml	5	400		PIV ML
Potassium chloride premix		0.1 mEq/ml	5	200		PIV ML
Quinupristin-dalfopristin	Synercid	D5W @ 2mg/ml	4.5 - 5		yes	CL
Ranitidine 50mg	Zantax	NS 50ml	6.7 - 7.3	302		PIV ML
Rifampin < 600 mg	Rifadin	D5W 100 ml	7.8-8.8			PIV ML
Rituximab	Rituxan, MabThera	NS or D5W 1 - 4 mg/ml	6.5			PIV ML

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Sargamostim	Leukine	NS @ 10mcg/ml	7.1 - 7.7	~300		PIV ML
Sodium Chloride 0.45%		NA	5.0 (4.5 – 7.0)	154		PIV ML
Sodium Chloride 0.9%		NA	5.0 (4.5 – 7.0)	308		PIV ML
Sodium ferric gluconate	Ferlecit	125 mg/NS 100 ml	7.7 - 9.7		yes	PICC/CL
Streptozosin	Streptomycin	D5W 100mg/ml	3.5 - 4.5			PIV ML
Sulfamethoxazole/Trimethoprim 80&400/5ml	Bactrim	D5W 100ml	10	541	yes	CL
Teniposide	Vumon	NS @ 0.4mg/ml	5 (4 - 6.5)			PIV ML
Thiotepa	Tespa	NS @ 1mg/ml	5.5 - 7.5	269		PIV ML
Ticarcillin 3 gm	Ticar	NS 100 ml	6 - 8	442		PIV ML
Ticarcillin/clavulanate 3.1 gm	Timentin	SW @ 86mg/ml	6 - 8	573		PIV ML
Ticarcillin/clavulanate 3.1gm	Timentin	NS 100 ml	5.5-7.5	450		PIV ML
Ticarcillin/clavulanate 3.1gm Frozen	Timentin	Dextrose 50ml	6.8 - 7.2	265 - 305		PIV ML
Tobramycin 100 - 250 mg	Nebcin	NS 100 ml	3-6.5	290		CL
Topotecan	Hycamtin	D5W 50ml	2.5 - 3.5			CL
Trastuzumab	Hereptin	NS 250 ml	6	~300		PIV ML
Trimetrexate	Neutrexin	D5W @ 0.25-2mg/ml	3.5 - 5.5			CL
Vancomycin 1.5 gm	Vancocin	NS 250 ml	2.5-4.5	~300		CL
Vancomycin 1-1.25gm	Vancocin	NS 250 ml	2.5-4.5	290		CL
Vancomycin 500mg	Vancocin	NS 100 ml	2.5-4.5	291		CL
Vancomycin 1 gm Frozen	Vancocin	Dextrose 200ml	3.5 - 4.3	266 - 302		CL
Vancomycin 500mg Frozen	Vancocin	Dextrose 100ml	3.5 - 4.3	266 - 302		CL
Vincristine	Oncovin, Vincasar	SW 1mg/ml	3.5 - 5.5	610		CL
Vinblastine	Velban	NS 1mg/ml	3.5 - 5	278		CL
Vindesine	DAVA, Eldesine, Eldisine	NS 1mg/ml	4.2 - 4.5			PIV ML
Vinorelbine	Navelbine	D5W @1.5-3mg/ml	3.5		yes	CL



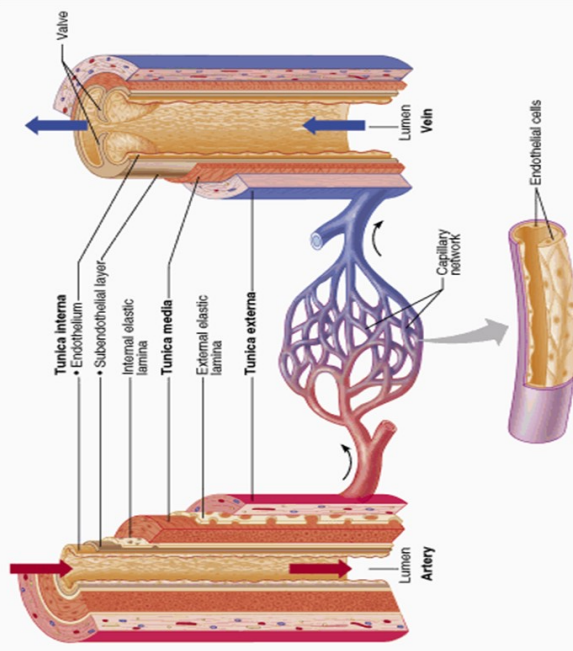
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Zidovudine	Retrovir	D5W @ 4mg/ml	5.5	~260	yes	CL
Zoledronic Acid	Reclast	5mg / 100 ml RTU	6 - 7			PIV ML

### REFERENCES

1. Trissel LA Handbook on Injectable Drugs 11th Edition ASHP Bethesda, MD 2001
2. Cahart BL, Nazareno AR 2002 Intravenous Medications 18th Edition Mosby St Louis 2001
3. Manufacturers Patient Package Inserts

### Artery & Vein



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### Anatomy

Veins have three layers

- Tunica intima—inner—prevents clotting except when damaged
- Tunica media—middle—muscle, vasoconstriction and vasodilatation
- Tunica adventitia—outer—nerve endings, pain

### Drug pH and Osmolarity

- pH Range
  - >7 = Base
  - 7 = Neutral
  - <7 = Acid
- Blood = 7.35-7.45
- Osmolarity = concentration of solutes in a solution
- Tonicity = response of the cells to that solution
- **Synopsis pH & Osmolarity**
  - Drugs with:
    - >pH under 5 or over 9
    - >Osmolarity over 500
  - May cause:
    - >Vein phlebitis, infiltration, and extravasations