



# PARENTERAL NUTRITION (PN) SOLUTIONS & DRUG COMPATIBILITY GUIDELINES

PN solutions are very complex mixtures of different components including amino acids, dextrose, electrolytes, minerals, trace elements, vitamins and sometimes other additives/drugs such as heparin. The decision to Y-site a medication with PN should be considered carefully.

In some instances, medications may be visually compatible with PN solutions but there is insufficient data to indicate whether or not the drug is chemically stable or, as in the case of antibiotics, the antimicrobial activity is retained.

When deciding on compatibility of a drug(s) with PN solutions, remember to consider the compatibility of the drug(s) with additional ingredients/drugs (i.e. heparin, levocarnitine) that may be present in the PN solutions.

**Ideally** any drug administered to a patient on PN should be given through a **separate IV site or catheter lumen**.

Read comments below where indicated by notation number (i.e. 4,7)

## PARENTERAL NUTRITION COMPATIBILITIES (Y-site)

Acetaminophen	DOBUtamine	Morphine
Alprostadil	DOPamine	Nitroglycerin
Amikacin <sup>1</sup>	Enalaprilat	Norepinephrine
Amoxicillin/clavulanate	Famotidine	Octreotide
Caffeine	fentaNYL	Ondansetron
ceFAZolin <sup>2</sup>	Fluconazole	Penicillin G Sodium
Cefepime	Gentamicin	PHENobarbital
cefoTAXime	Granisetron	Phytonadione (Vitamin K <sub>1</sub> )
cefOXItin	Heparin	Piperacillin-Tazobactam
ceftAZIDime	HYDROmorphine	Potassium acetate
cefUROXime	Insulin (Regular)	Potassium chloride
chlorproMAZINE	Intralipid Fat Emulsion	Pyridoxine (Vitamin B <sub>6</sub> )
Clindamycin	Isoproterenol	SMOFIipid Fat Emulsion
Co-trimoxazole	Levocarnitine	Sodium Acetate
Dexamethasone	LORazepam	Sodium Chloride
Dexmedetomidine	Meropenem	Tobramycin
Digoxin	metroNIDAZOLE	Vancomycin
diphenhydrAMINE	Milrinone	Zidovudine

- Compatibilities can never be guaranteed, therefore, it is preferable to interrupt the PN solution or use a separate IV site to administer a drug (even if the drug is listed as compatible). However, if the patient's clinical status requires uninterrupted PN, then drugs on the compatible list may be administered through the same Y-connection with the PN solution (amino acid-dextrose) still running.
- This applies only to standard PN solutions, for those solutions with higher concentrations please contact pharmacy for compatibility information.
- If a drug is not listed as compatible, the prescriber is responsible to make the decision to run (or not to run) a drug concurrently with parenteral solution. The prescriber must document this decision on an order sheet.  
ex. Drug X may be run concurrently with parenteral nutrition during infusion.

# PARENTERAL NUTRITION (PN) INCOMPATIBILITIES

**MUST NOT be run concurrently**

acetaZOLAMIDE	Caspofungin	Magnesium Sulfate <sup>3</sup>
Acyclovir	cefTRIAxone <sup>4</sup>	Midazolam
Amiodarone	Ciprofloxacin <sup>5</sup>	Pantoprazole
Amphotericin B deoxycholate	cycloSPORINE <sup>6</sup>	phenyTOIN
Amphotericin B Lipid Complex	Diazepam	Potassium Phosphate <sup>7</sup>
Amphotericin B Liposome	Ertapenem	Sodium Bicarbonate <sup>8</sup>
Ampicillin <sup>9</sup>	Ibuprofen	Sodium Phosphate <sup>10</sup>
Calcium Chloride <sup>11</sup>	Indomethacin	Voriconazole
Calcium Gluconate <sup>12</sup>		

## NOT RECOMMENDED DUE TO INSUFFICIENT OR CONFLICTING DATA

Albumin <sup>13</sup>	EPINEPHrine <sup>14</sup>	Labetalol	Palonosetron
Alteplase	Esmolol	LevETIRAcetam	Phentolamine
Aminophylline <sup>15</sup>	Ethacrynic Acid	Levofloxacin	phenyLEPHrine
Antithymocyte Globulin (rabbit)	Filgrastim	Levosimendan	Propranolol
Atropine	Fish Oil Emulsion <sup>16</sup> (Omegaven)	Linezolid	Protamine
Azithromycin	Furosemide <sup>17</sup>	methyLPREDNISolone <sup>18</sup>	Rifampin
Bivalrudin	Glucagon	Metoclopramide <sup>19</sup>	Rocuronium
Cidofovir	hydrALAZINE	Moxifloxacin	Salbutamol
Cisatracurium	Hydrocortisone <sup>20</sup>	Mycophenolate	Tacrolimus <sup>21</sup>
Cloxacillin <sup>22</sup>	Ketamine <sup>23</sup>	Naloxone	Vasopressin
Deferoxamine	Ketorolac	Neostigmine	Verapamil

**If a medication is incompatible with PN and a separate site is not possible:**

- Stop the PN solution temporarily.
- Adequately flush tubing with compatible solution before and after drug administration.
- **Check composition of PN before flushing to ensure the patient will not receive excessive potassium, sodium, etc. over a short period of time.**
- Administer the drug through a separate line that has a Y- connection to the PN line as close as possible to the patient.

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- <sup>1</sup> Amikacin: If PN also contains heparin, only compatible when heparin less than or equal to 1 unit/mL.
  - <sup>2</sup> ceFAZolin: Solutions with high dextrose concentrations (25%) have precipitated immediately.
  - <sup>3</sup> Addition of calcium, phosphate, magnesium or sodium bicarbonate may result in the formation of precipitate. The interaction is a complex one and is affected by many factors including mineral concentration, pH and temperature.
  - <sup>4</sup> cefTRIAxone is contraindicated in neonates if they require treatment with calcium containing intravenous solutions including parenteral nutrition because of the risk of precipitation. For neonates IV cefTRIAxone and calcium containing IV solutions should not be administered within 48 hours of each other. In patients other than neonates, cefTRIAxone and calcium containing IV solutions may be administered sequentially to one another as long as the lines are thoroughly flushed between infusions with a compatible fluid. cefTRIAxone should not be administered via Y-site with parenteral nutrition because of the risk of precipitation.
  - <sup>5</sup> Ciprofloxacin and phosphates (often found in PN) are incompatible across a broad range of phosphate concentrations.
  - <sup>6</sup> Non-PVC equipment must be utilized for intravenous administration of cycloSPORINE
  - <sup>7</sup> Addition of calcium, phosphate, magnesium or sodium bicarbonate may result in the formation of precipitate. The interaction is a complex one and is affected by many factors including mineral concentration, pH and temperature.
  - <sup>8</sup> Addition of calcium, phosphate, magnesium or sodium bicarbonate may result in the formation of precipitate. The interaction is a complex one and is affected by many factors including mineral concentration, pH and temperature.
  - <sup>9</sup> Ampicillin is more stable in NaCl or in sterile water for injection than in dextrose. When administering with PN, it is probably safest to temporarily discontinue PN. Flush IV line with saline before and after administering ampicillin.
  - <sup>10</sup> Addition of calcium, phosphate, magnesium or sodium bicarbonate may result in the formation of precipitate. The interaction is a complex one and is affected by many factors including mineral concentration, pH and temperature.
  - <sup>11</sup> Addition of calcium, phosphate, magnesium or sodium bicarbonate may result in the formation of precipitate. The interaction is a complex one and is affected by many factors including mineral concentration, pH and temperature.
  - <sup>12</sup> Addition of calcium, phosphate, magnesium or sodium bicarbonate may result in the formation of precipitate. The interaction is a complex one and is affected by many factors including mineral concentration, pH and temperature.
  - <sup>13</sup> Albumin: Based on available evidence, the addition of albumin to PN cannot be recommended, due to risk of infection, physical and chemical incompatibilities. However, the addition of albumin to PN has occurred under special circumstances. Occlusion of filters has occurred with albumin concentrations greater than or equal to 25 grams/L and occasionally 10.8 grams/L. If administering at Y-site connect on the patient side of 0.2 micron filter to avoid clogging the filter.
  - <sup>14</sup> EPINEPHrine is rapidly destroyed by metals such as iron, copper and zinc.
  - <sup>15</sup> Aminophylline: Variable stability with PN has been demonstrated. White precipitate formed immediately in select formulations.
  - <sup>16</sup> Fish oil emulsion: No compatibility data available. Has been connected at a Y-site connection with PN in NICU with no apparent problems.
  - <sup>17</sup> Furosemide: conflicting compatibility with PN has been demonstrated. Small amounts of precipitate form immediately in select formulations.
  - <sup>18</sup> methylPREDNISolone contains phosphate buffers which may precipitate in solutions high in calcium or magnesium content. Do not administer with PN containing calcium greater than 1.5 mEq%, phosphate greater than 1.5 mmol% or magnesium greater than 0.8 mEq%.
  - <sup>19</sup> Metoclopramide: Variable stability depending upon PN composition.
  - <sup>20</sup> Hydrocortisone contains phosphate buffers which may precipitate in solutions high in calcium or magnesium content. Do not administer with PN containing calcium greater than 1.5 mEq%, phosphate greater than 1.5 mmol% or magnesium greater than 0.8 mEq%.
  - <sup>21</sup> Non-PVC equipment must be utilized for intravenous administration of tacrolimus.
  - <sup>22</sup> Cloxacillin: Little information available in literature to suggest compatibility or incompatibility with PN. Cloxacillin

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has been connected at a Y-site connection with PN in NICU with no apparent problems

<sup>23</sup> Ketamine: No information available in the literature regarding compatibility with PN or lipids. Ketamine has been connected at the Y-site connection with PN, Intralipid<sup>®</sup> 20% and HYDROmorphine or morphine in 6L oncology, with no apparent problems with pain control or lines.