**ascorbic acid** (as-kor-bik acid)

- **Uses**: Treatment and prevention of vitamin C deficiency (scurvy) with dietary supplementation. Supplemental therapy in some G1 diseases during long-term parenteral nutrition or chronic hemodialysis. States of increased requirements include: Pregnancy, lactation, stress, hyperthyroidism, trauma, burns, and infancy. Unlabeled use: prevention of the common cold.

- **Action**: Necessary for collagen formation and tissue repair. Involved in oxidation reduction reactions; tyrosine, folic acid, iron, and carbohydrate metabolism; lipid and protein synthesis; cellular respiration; and resistance to infection. Therapeutic effects: Replacement in deficiency states. Supplementation during increased requirements.

- **Pharmacokinetics**: Absorption: Actively absorbed after oral administration by a saturable process. Distribution: Widely distributed. Crosses the placenta; enters breast milk. Metabolism and Excretion: Converted to compounds that are excreted by the kidneys. Half-life: Unknown.

- **Time/Action Profile (response to skeletal and hemorrhagic changes in scurvy)**

- **CONTRAINDICATIONS/Precautions**: Contraindicated in: Tartrazine hypersensitivity (some products contain tartrazine—FDA yellow dye #5). Use Cautiously in: Recurrent kidney stones; OB: Avoid chronic use of large doses in pregnant women.


- **Interactions**: Drug-Drug: If urinary acidification occurs, may increase excretion and effects of methotrexate, isoniazid, or tetracyclines. Large doses (>10 g/day) may increase response to warfarin. May increase iron toxicity when given concurrently with deferoxamine.

- **Route/Dosage**: PO (Adults): Scurvy—500 mg/day for at least 14 days. Prevention of deficiency—50–100 mg/day.
  
  PO (Children): Scurvy—100–300 mg/day for at least 14 days. Prevention of deficiency—30–45 mg/day.

  IM (Adults): Scurvy—100–500 mg/day for at least 14 days. IM (Children): Scurvy—100–300 mg/day for at least 14 days.

- **NURSING IMPLICATIONS**: Assessment
  
  - Vitamin C Deficiency: Assess for signs of vitamin C deficiency (faulty bone and tooth development, gingivitis, bleeding gums, loosened teeth) before and during therapy.

- **Lab Test Considerations**: Megadoses of ascorbic acid (>10 times the RDA requirement) may cause false-negative results for occult blood in the stool. May cause increased uric acid, urate, and cystine levels.

- **Potential Nursing Diagnoses**: Deficient knowledge, related to diet and medication regimen. (Patient/Family Teaching)

- **Implementation**: Often ordered as a part of multivitamin supplementation, because inadequate diet often results in multiple vitamin deficiencies.
Pressure in ampules may be increased at room temperature; wrap with protective cover before breaking.

PO:
Extended-release tablets and capsules should be swallowed whole without crushing, breaking, or chewing; contents of capsules may be mixed with jelly or jam. Chewable tablets should be chewed well or crushed before swallowing. Oral solution may be taken directly by mouth or mixed with fruit juice, cereal, or other food.

IM:
IM is usually the preferred parenteral route.

IV Administration
- pH: 5.5–7.0.
- Continuous Infusion: Diluent: Dilute dose in 1000 mL D5W, D10W, 0.9% NaCl, or 0.45% NaCl/LR or Ringer’s solution, 0.9% NaCl or Ringer’s solution, 0.45% NaCl/LR or Ringer’s solution. Rate: Infuse slowly.

Y-Site Compatibility: alfentanil, amikacin, atracurium, atropine, aztreonam, bevacizumab, benoxaprofen, benzyl alcohol, buprenorphine, butorphanol, calcium chloride, calcium gluconate, chlorpromazine, ciprofloxacin, cimetidine, clindamycin, cyclosporine, dexamethasone, digoxin, diphenhydramine, dobutamine, dopamine, doxycycline, epinephrine, esmolol, famotidine, fentanyl, fluconazole, folic acid, furosemide, gentamicin, glycopyrrolate, heparin, hydrocortisone, insulin, isoproterenol, ketorolac, labetalol, lidocaine, magnesium sulfate, milrinone, morphine, multivitamins, nafcillin, nalbuphine, naloxone, nitroglycerin, norepinephrine, ondansetron, oxacillin, oxytocin, penicillin G, pentazocine, phenobarbital, phenylephrine, phytonadione, potassium chloride, procainamide, prochlorperazine, promethazine, propranolol, procainamide, promethazine, pyridoxine, pyridostigmine, pyridoxine, quinidine, succinylcholine, sulfasalazine, thioridazine, theophylline, tetracycline, ticarcillin, ticlopidine, vancomycin, vasopressin, verapamil, warfarin, zidovudine.

Y-Site Incompatibility: aminophylline, azathioprine, ceftazidime, ceftriaxone, chloramphenicol, diazepam, diazoxide, etomidate, ganciclovir, hydralazine, hydroxycobalamin, midazolam, nitroprusside, papaverine, pentamidine, phenytoin, thiopental, trimethoprim/sulfamethoxazole.

Additive Compatibility: amikacin, calcium chloride, calcium gluconate, chlorpromazine, cyclosporine, dexamethasone, gentamicin, heparin, levofloxacin, methylprednisolone, parenteral 1% procaine, procainamide, promethazine, verapamil, warfarin.

Additive Incompatibility: bleomycin, radix, sodium bicarbonate, theophylline.

Patient/Family Teaching
- Advise patient to take medication as directed and not to exceed dose prescribed. Excess doses may lead to diarrhea and urinary stone formation. If a dose is missed, skip dose and return to dose schedule.
- Vitamin C Deficiency: Encourage patient to comply with diet recommendations of health care professional. Explain that the best source of vitamins is a well-balanced diet.
- Foods high in ascorbic acid include citrus fruits, tomatoes, strawberries, cantaloupe, and raw peppers. Gradual loss of ascorbic acid occurs when fresh food is stored, but not when it is frozen. Rapid loss is caused by drying, cooking, and canning.

Evaluation/Desired Outcomes
- Decrease in the symptoms of ascorbic acid deficiency.