folic acid (foe-lik-a-aid)

- Apo-Folic, Folate, Folate; Novofolacid, vitamin B

**Pharmacologic: water soluble vitamins**

**Indications**

Prevention and treatment of megaloblastic and macrocytic anemias. Given during pregnancy to promote normal fetal development.

**Action**

Required for protein synthesis and red blood cell function. Stimulates the production of red blood cells, white blood cells, and platelets. Necessary for normal fetal development.

**Therapeutic Effects:** Restoration and maintenance of normal hematopoiesis.

**Pharmacokinetics**

**Absorption:** Well absorbed from the GI tract and IM and subcut sites.

**Distribution:** Half of all stores are in the liver. Enters breast milk. Crosses the placenta.

**Protein Binding:** Extensive.

**Metabolism and Excretion:** Converted by the liver to its active metabolite, dihydrofolate reductase. Excess amounts are excreted unchanged by the kidneys.

**Half-life:** Unknown.

**TIME/ACTION PROFILE (q in reticulocyte count)**

<table>
<thead>
<tr>
<th>ROUTE</th>
<th>ONSET</th>
<th>PEAK</th>
<th>DURATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>PO, IM, IV, Subcut</td>
<td>30–60 min</td>
<td>1 hr</td>
<td>unknown</td>
</tr>
</tbody>
</table>

**Contraindications/Precautions**

Contraindicated in: Uncorrected pernicious, aplastic, or normocytic anemias (neurologic damage will progress despite correction of hematologic abnormalities).

**Use Cautiously in:**

- Undiagnosed anemias.

**Adverse Reactions/Side Effects**

**Derm:** rash.

**CNS:** irritability, difficulty sleeping, malaise, confusion.

**Misc:** fever.

**Interactions**

**Drug-Drug:** Pyrimethamine, methotrexate, trimethoprim, and triamterene prevent the activation of folic acid (leucovorin should be used instead to treat overdoses of these drugs). Absorption of folic acid is decreased by sulfasalazine, antacids, or cholestyramine. Folic acid requirements are increased by estrogen, phenytoin, phenobarbital, primidone, carbamazepine, or corticosteroids. May increase phenytoin levels.

**Route/Dosage**

**Therapeutic Dose (Folic acid deficiency)**

<table>
<thead>
<tr>
<th>ROUTE</th>
<th>DOSE</th>
</tr>
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<tbody>
<tr>
<td>PO, IM, IV, Subcut (Adults and Children &gt;11 yr)</td>
<td>1 mg/day initial dose then 0.5 mg/day maintenance dose.</td>
</tr>
<tr>
<td>PO, IM, IV, Subcut (Children &gt;1 yr)</td>
<td>1 mg/day initial dose then 0.1–0.4 mg/day maintenance dose.</td>
</tr>
<tr>
<td>PO, IM, IV, Subcut (Infants)</td>
<td>15 mcg/kg/dose daily or 50 mcg/day.</td>
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**Recommended Daily Allowance**

<table>
<thead>
<tr>
<th>ROUTE</th>
<th>DOSE</th>
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<tbody>
<tr>
<td>PO (Adults and Children &gt;15 yr)</td>
<td>0.2 mg/day.</td>
</tr>
<tr>
<td>PO (Adults): Females of childbearing potential</td>
<td>0.4–0.8 mg/day.</td>
</tr>
<tr>
<td>PO (Children 11–14 yr)</td>
<td>0.15 mg/day.</td>
</tr>
<tr>
<td>PO (Children 7–10 yr)</td>
<td>0.1 mg/day.</td>
</tr>
<tr>
<td>PO (Children 4–6 yr)</td>
<td>0.075 mg/day.</td>
</tr>
<tr>
<td>PO (Infants 6 mo–1 yr)</td>
<td>0.05 mg/day.</td>
</tr>
</tbody>
</table>

**NURSING IMPLICATIONS**

**Assessment**

- Assess for signs of megaloblastic anemia (fatigue, weakness, dyspnea) before and periodically throughout therapy.
- **Lab Test Considerations:** Monitor plasma folic acid levels, hemoglobin, hematocrit, and reticulocyte count before and periodically during therapy.
- **Nursing Evaluation:** Serum concentrations of other B complex vitamins when given in high continuous doses.
Potential Nursing Diagnoses

Imbalanced nutrition: less than body requirements (Indications)
Activity intolerance (Indications)

Implementation

- Do not confuse folic acid with folinic acid (leucovorin calcium).
- Because of infrequency of solitary vitamin deficiencies, combinations are commonly administered (see Appendix A).
- May be given subcut, deep IM, or IV when PO route is not feasible.
- PO: Antacids should be given at least 2 hr after folic acid; folic acid should be given 2 hr before or 4–6 hr after cholestyramine. A 50-mcg/mL oral solution may be compounded ex tempore by pharmacist for use in neonates and infants.

IV Solution

- Use 0.1 mg/mL. Rate: 5 mg/min.

IV Administration

- pH: 8.0–11.0.
- Direct IV: Diluent: Dextrose or 0.9% NaCl. Concentration: 0.1 mg/mL. Rate: 5 mg/min.
- Continuous Infusion: May be added to hyperalimentation solution.
- Y-Site Compatibility: alfentanil, aminophylline, ascorbic acid, atracurium, atropine, azathioprine, aztreonam, benztropine, bumetanide, calcium gluconate, cefazolin, cefonocid, cefoperazone, cefotaxime, ceftriaxone, cefuroxime, chloramphenicol, cimetidine, clindamycin, cyanocobalamin, cyclosporine, dexamethasone, digoxin, diphenhydramine, doxorubicin, enalaprilat, ephedrine, epinephrine, epoetin alfa, erythromycin, esmolol, famotidine, fentanyl, fluconazole, furosemide, ganciclovir, glycopyrrolate, heparin, hydrocortisone, imipenem/cilastatin, indomethacin, insulin, ketorolac, labetalol, lidocaine, magnesium sulfate, mannitol, meperidine, methylprednisolone, metoclopramide, metoprolol, midazolam, multivitamins, nalbuphine, norepinephrine, pentamidine, pentazocine, phenytoin, prochlorperazine, promethazine, protamine, pyridoxine, quinupristin, ranitidine, sodium bicarbonate, streptokinase, sucralfate, su-fentanil, theophylline, ticarcillin/clavulanate, trimetaphan, vancomycin, vasopressin.
- Y-Site Incompatibility: amikacin, calcium chloride, chlorpromazine, clindamycin, dopamine, dobutamine, doxycycline, gentamicin, haloperidol, hydralazine, metaraminol, methyldopa, methylnitrite, nalbuphine, nafcillin, nalbuphine, norepinephrine, pentamidine, pentazocine, phenytoin, prochlorperazine, promethazine, promazine, pyridoxine, quinupristin, ranitidine, sodium bicarbonate, streptokinase, sucralfate, su-fentanil, theophylline, ticarcillin/clavulanate, trimetaphan, vancomycin, vasopressin.

Patient/Family Teaching

- Encourage patient to comply with diet recommendations of health care professional. Explain that the best source of vitamins is a well-balanced diet with foods from the four basic food groups. A diet low in vitamin B and folate will be used to diagnose folic acid deficiency without concealing pernicious anemia.
- Folic acid in early pregnancy is necessary to prevent neural tube defects.
- Foods high in folic acid include vegetables, fruits, and organ meats. Heat destroys folic acid in foods.
- Patients self-medicating with vitamin supplements should be cautioned not to exceed RDA. The effectiveness of megadoses for treatment of various medical conditions is unproven and may cause side effects.
- Explain that folic acid makes urine more intensely yellow.
- Internet patient to notify health care professional of rash occurs, which may indicate hypersensitivity.

Evaluation/Desired Outcomes

- Reticulocytosis 2–5 days after beginning therapy.
- Resolution of symptoms of megaloblastic anemia.
- Prevention of neural tube defects.

Why was this drug prescribed for your patient?