

## Vitamins A, B6, B9, B12, and D

### ❖ Vitamin A, retinol/carotenoids - fat-soluble

- Influences - Night vision, immune system, cell growth, healthy skin, strong bones, mineral metabolism in body
  - 3 Health conditions with excess – fetal malformations, acute Vitamin A toxicity (headache, blurred vision, nausea, dizziness, aching muscles, coordination issues), chronic hypervitaminosis (dry skin, painful muscles and joints, fatigue, depression)
  - 3 Health conditions with deficiency – malformations of craniofacial structures, limbs and internal organs, rough skin, sinus trouble, night blindness
    - Supplement - pregnancy 770mcg/lactation 1300mcg
      - ◆ 5 Food sources - yellow/orange fruits and vegetables (carrots, sweet potatoes, pumpkin, cantaloupe, mango), egg yolks, liver, alfalfa, spinach, broccoli, kale, and dairy products
        - Source of negative impact – Orlistat (weight-loss treatment) decreases absorption of Vitamin A
        - Source of positive impact – Vitamin E enhances absorption
          - Other – plant sources have to be converted inside the body, and conversion rates are low. Supplements of this vitamin are risky because large quantities cause certain birth defects

### ❖ Vitamin B6, pyridoxine – water soluble

- Influences – healthy nervous system, production of antibodies, muscle formation and function, DNA production
  - 3 Health conditions with excess – ataxia, painful and disfiguring dermatological lesions, photosensitivity, nausea, and heartburn
  - 3 Health conditions with deficiency – nausea, leg cramps, depression, miscarriage, PTB, LBW, low APGAR scores
    - Supplement - pregnancy 1.9mg/lactation 2.0mg
      - ◆ 5 Food sources - enriched grains (brown rice, cereal bread), blackstrap molasses, bananas, prunes, starchy vegetables, walnuts, hazelnuts, beans, pork, salmon, chicken, turkey, beef, and organ meat
        - Source of negative impact – heat, ultraviolet light, malabsorption syndromes

□ Source of positive impact – magnesium enhances uptake

❖ Vitamin B9, folate – water soluble

□ Influences – DNA synthesis, cell division, RBC production, prevents neural tube defects

- 3 Health conditions with excess – reduced number of NK cells, accelerated progression of preneoplastic lesions (increases risk of colorectal and other cancers),
- 3 Health conditions with deficiency – NTDs, LBW, PTB, FGR, congenital defects, depression
  - Supplement – pregnancy 600mcg/lactation 500mcg
    - ◆ 5 Food sources – folate (beans, lentils, asparagus, spinach, peanuts, peas, corn, chicken, orange juice) folic acid (enriched grains – rice, flour, cereal, pasta, and bread)
  - Source of negative impact – B6 increases folate requirements, antiepileptic medications
  - Source of positive impact – other B vitamins
    - Other – folic acid supplements and fortified food absorbs better than naturally occurring folate

❖ Vitamin B12, cobalamins - water-soluble

□ Influences – production of red blood cells, neurological function, DNA synthesis, fetal brain development, gene expression, cell differentiation, organ formation

- 3 Health conditions with excess – difficult to get excess because the body does not store it
- 3 Health conditions with deficiency – pernicious anemia, preeclampsia, FGR, neural tube defects, miscarriage, PTB
  - Supplement - pregnancy 2.6mcg/lactation 2.8mcg
    - ◆ 5 Food sources – milk, cheese, eggs, oysters, clams, crab, salmon, beef, chicken, turkey, green leafy vegetables, and fortified cereal
  - Source of negative impact – vitamin C degrades B12, large amounts of folate, gastric acid inhibitors
  - Source of positive impact – healthy intestinal flora helps with production
    - Other – rarely contained in plants/vegans should consider supplementation

❖ Vitamin D, calciferol - fat-soluble

- Influences – Helps the body use calcium, maximizes fetal bone growth, healthy nervous system, immune function, heart function, normal clotting, mineral metabolism in body
- 3 Health conditions with excess – hypercalcemia (nausea, vomiting, muscle weakness, neuropsychiatric disturbances, pain, loss of appetite, dehydration, polyuria, excessive thirst, and kidney stones), renal failure, calcification in soft tissues,
- 3 Health conditions with deficiency – rickets, bone deformities (rickets, osteomalacia), nausea, weakness
  - Supplement - pregnancy and lactation 600-4000IU
    - ◆ 5 Food sources - butter, milk, fatty fish (salmon, tuna, herring, sardines, mackerel), fish liver oils, eggs, alfalfa, nettle, and fortified products
  - Source of negative impact – High Vitamin A decreases Vitamin D uptake, certain medications, sunscreen use, season changes
  - Source of positive impact – magnesium improves Vitamin D levels, sunlight

## RESOURCES

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