

## ADULT AND PEDIATRIC GUIDELINES FOR THE USE OF HERBAL AND NUTRIENT SUPPLEMENTS DURING HEMATOPOIETIC STEM CELL TRANSPLANTATION (HSCT) AND HIGH-DOSE CHEMOTHERAPY

Patients may be using nutrient supplements or herbal preparations upon arrival for treatment or transplant. The dietitian and physician ask every patient about any supplements or herbals he or she uses during the initial evaluation. ***Our health care team recommends stopping use of all such preparations at this initial evaluation. These preparations may affect treatment or even cause a serious infection.***

There are four ***areas of concern*** about the use of nutritional supplements, herbals and other preparations during marrow or stem cell transplantation or high dose chemotherapy:

1. Interactions between preparations and prescribed medications may reduce the effectiveness of drugs routinely used during the course of transplantation or chemotherapy.
  2. Potential contamination of preparations derived from plants may cause bacterial, fungal or parasitic infections due to inadequate purification and sterilization. Even boiling water may not destroy some infectious organisms that can contaminate these products.
  3. A few specific preparations have been repeatedly associated with serious toxic side effects to the liver, blood, kidneys, heart and other body organs.
  4. The production, distribution, and labeling of herbal preparations and nutrient supplements are not regulated by the U.S. Food and Drug Administration. As a result, the dosage may vary from the dose listed on the label. Also, the product might contain ingredients not listed on the label.
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## Herbal and Botanical Preparations

Herbal and botanical preparations include a variety of products derived directly from plants. They may be sold as tablets, capsules, liquid extracts, teas, powders and topical preparations. There are no manufacturing regulations for the cleanliness or purity of these products. Therefore, there is a danger the products may be contaminated with fungus, bacteria, parasites or other chemicals, which can be *life-threatening* to a person with an impaired immune system, including persons receiving chemotherapy or transplantation. Even boiling water may not kill some organisms which can contaminate these products.

The health care team recommends that all herbal and botanical products be avoided during chemotherapy and as long as the immune system is impaired. The decision to use any preparation should be discussed with your physician, who will consider the effects of the product on your kidneys, liver and other organs, as well as your risk of infection and any interactions it may have with other medications.

Some herbals may decrease blood clotting. Persons with low platelet counts should not take *garlic* and *gingko bilboa*.

The following list includes herbal and botanical medications with known dangerous side effects and *should not be taken under any circumstance*. Other herbs and botanicals could be found to be dangerous in the future. Always talk with your physician before taking herbal and botanical preparations.

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|---|----------------------------------|
| • <b>Alfalfa</b>  | • <b>Kava Kava</b>               |
| • <b>Borage</b>   | • <b>Laetrile (Apricot Pits)</b> |
| • <b>Chaparral</b>  | • <b>Licorice Root</b>           |
| • <b>Chinese herbs</b>  | • <b>L-tryptophan</b>            |
| • <b>Coltsfoot</b>  | • <b>Lobelia</b>                 |
| • <b>Comfrey</b>  | • <b>Maté Tea</b>                |
| • <b>DHEA</b>   | • <b>Pau d' arco</b>             |
| • <b>Dieter's Tea (including senna, aloa, rhubarb root, buckthorn, cascara, castor oil)</b> | • <b>Pennyroyal</b>              |
| • <b>Ephedra or MaHuang</b>   | • <b>Sassafras</b>               |
| • <b>Groundsel or Life Root</b>   | • <b>St. John's Wort</b>         |
| • <b>Heliotrope or Valerian</b>   | • <b>Yohimbe and Yohimbine</b>   |

- **Do not use any product that is given as an injection into the central line or as an injection under the skin.**

## Vitamin and Mineral Supplements and Antioxidants

Patients are prescribed a multiple vitamin and mineral supplement that provides nutrients at levels approximately those of the Dietary Reference Intakes (DRI). In some instances, patients may wish to take higher doses of specific vitamins, minerals, or antioxidants. While higher doses are not suggested, the following is a list outlining the DRI and maximum amounts of supplements recommended. Higher doses may be toxic or interact with other medications.

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## Adult Daily Supplement Intake Recommendations

Micronutrient	Dietary Reference Intakes	Safe Upper Limits
Vitamin A	2700 – 3000 IU/ 800 – 1000 RE or mcg	No more than 10,000 IU or 3,000 mcg
Vitamin C (Ascorbic Acid)	120 mg	No more than 500 mg
Vitamin D (Calciferol)	200 – 600 IU or 5-15 mcg	No more than 2000 IU or 50 mcg
Vitamin E (-Tocopherol)	8 – 10 mg or IU	No more than 100 mg or IU while on anticoagulant therapy  No more than 800 mg or IU
β-Carotene	No DRI	No more than 25,000 IU or 15 mg
Folic Acid (Folate)	400 mcg	No more than 1000 mcg or 1 mg
Vitamin B <sub>1</sub> Thiamin	1.1 – 1.2 mg	While high intakes of B-vitamins may not be toxic, talk with your dietitian to discuss your particular needs
Vitamin B <sub>2</sub> Riboflavin	1.1 – 1.3 mg	
Niacin (mg of Niacin equivalents)	14 – 16 mg	
Vitamin B <sub>6</sub> Pyridoxine	1.3 – 1.7 mg	No more than 35 mg
Vitamin B <sub>12</sub> (Cobalamin)	2.4 mg	While high intakes of B-vitamins may not be toxic, talk with your dietitian to discuss your particular needs
Biotin	30 mcg	
Pantothenic Acid	5 mg	
Iron	12 – 15 mg	Iron supplementation is not recommended posttransplant.
Selenium	40 – 70 mcg	No more than 200 mcg
Calcium	1000 – 1200 mg	No more than 2500 mg

**Recommended Vitamin Brands (Vitamins brands that contain Iron and/or extra C are not recommended):**

One-a-Day 50 Plus<sup>®</sup>

Nature Made Mature Balance<sup>®</sup>

## Pediatric Daily Supplement Intake Recommendations

Micronutrient	Dietary Reference Intakes		Safe Upper Limits
VITAMINA	Birth – 1 yr	375 mcg/ 1250 IU	Birth – 10 yrs: more than 3000 mcg or  10,000 IU
	1 – 10 yr	400 – 700 mcg/ 1333 – 2333 IU	
	11 yrs +	800 – 1000 mcg/ 2700 – 3300 IU	11 yrs +: more than 6000 mcg or 20,000 IU
Vitamin C (L-ascorbic acid)	Birth – 6 mo.	30 mg	Birth – 10 yrs: no more than 250 mg 11 yrs +: no more than 500 mg
	7 – 12 mo.	35 mg	
	1 – 3 yrs.	40 mg	
	4 – 6 yrs.	45 mg	
	7 – 10 yrs.	45 mg	
	11 yrs. +	50 – 60 mg	
Vitamin D (Calciferol)	Birth – 18 yrs.	200 IU or 5 mcg	Birth – 12 mo: no more than 1000 IU or 25 mcg 1 - 18 yrs: no more than 2000 IU or 50 mcg
Vitamin E (Tocopherol – most active form)	Birth – 6 mo.	3 mg (pre-mature: 17 mg)	No more than 50 mg or 50 IU
	7 – 12 mo.	4 mg or 4 IU	
	1 – 3 yrs.	6 mg	
	4 – 10 yrs.	7 mg	
	11 yrs.+ Female	8 – 10 mg	
	11 yrs.+ Male	10 mg	
Beta – Carotene	No DRI		Birth – 10 yrs: no more than 15,000 IU or 9 mg  10 +: no more than 25,000 IU or 15 mg
Iron	Birth – 6 mo.	6 mg	Iron supplementation is not recommended posttransplant.
	6 mo. – 10 yrs.	10 mg	
	11 yrs.+ Female	15 mg	
	11 yrs.+ Male	12 mg	
Folic Acid (folate)	Birth – 6 mo.	65 mcg	No more than 65 mcg
	7 – 12 mo.	80 mcg	No more than 80 mcg
	1 – 3 yrs.	150 mcg	No more than 300 mcg
	4 – 8 yrs.	200 mcg	No more than 400 mcg
	9 – 13 yrs.	300 mcg	No more than 600 mcg
	14 - 18 yrs.	400 mcg	No more than 800 mcg
Vitamin B1: Thiamin	Birth – 6 mo.	0.2 mg	While high intakes of B-Vitamins may not be toxic, talk with your child’s dietitian to discuss your particular needs.
	7 – 12 mo.	0.3 mg	
	1 – 3 yrs.	0.5 mg	
	4 – 8 yrs.	0.6 mg	
	9 – 13 yrs.	0.9 mg	
	14 - 18 yrs.+ Female	1.0 mg	
	14 - 18 yrs.+ Male	1.2 mg	
Vitamin B2: Riboflavin	Birth – 6 mo.	0.3 mg	While high intakes of B-Vitamins may not be toxic, talk with your child’s dietitian to discuss your particular needs.
	7 – 12 mo.	0.4 mg	
	1 – 3 yrs.	0.5 mg	
	4 – 8 yrs.	0.6 mg	
	9 – 13 yrs.	0.9 mg	
	14 - 18 yrs.+ Female	1.0 mg	
	14 - 18 yrs.+ Male	1.3 mg	

## Pediatric Daily Supplement Intake Recommendations (cont'd)

Micronutrient	Dietary Reference Intakes		Safe Upper Limits
<b>Vitamin B: Niacin</b> (mg of Niacin equivalents)	Birth – 6 mo.	2 mg	No more than 2 mg
	7 – 12 mo.	4 mg	No more than 4 mg
	1 – 3 yrs.	6 mg	No more than 10 mg
	4 – 8 yrs.	8 mg	No more than 15 mg
	9 – 13 yrs.	12 mg	No more than 20 mg
	14 - 18 yrs.+ Female	14 mg	No more than 30 mg
	14 - 18 yrs.+ Male	16 mg	No more than 30 mg
VITAMIN B6: PYRIDOXINE	Birth – 6 mo.	0.1 mg	No more than 0.1 mg
	7 – 12 mo.	0.3 mg	No more than 0.3 mg
	1 – 3 yrs.	0.5 mg	No more than 30 mg
	4 – 8 yrs.	0.6 mg	No more than 40 mg
	9 – 13 yrs.	1.0 mg	No more than 60 mg
	14 - 18 yrs.+ Female	1.2 mg	No more than 80 mg
	14 - 18 yrs+ Male	1.3 mg	No more than 80 mg
Vitamin B12: (Cobalamin)	Birth – 6 mo	0.4 mcg	While high intakes of B-Vitamins may not be toxic, talk with your child's dietitian to discuss your particular needs.
	7 – 12 mo	0.5 mcg	
	1 – 3 yrs	0.9 mcg	
	4 – 8 yrs	1.2 mcg	
	9 – 13 yrs	1.8 mcg	
	14 - 18 yrs+	2.4 mcg	
Biotin	Birth – 6 mo	5 mcg	
	7 – 12 mo	6 mcg	
	1 – 3 yrs	8 mcg	
	4 – 8 yrs	12 mcg	
	9 – 13 yrs	20 mcg	
	14 - 18 yrs+	25 mcg	
Pantothenic Acid	Birth – 6 mo	1.7 mcg	
	7 – 12 mo	1.8 mcg	
	1 – 3 yrs	2 mcg	
	4 – 8 yrs	3 mcg	
	9 – 13 yrs	4 mcg	
	14 - 18 yrs+	5 mcg	
Selenium	Birth – 6 mo	10 mcg	Birth – 6 mo: no more than 100 mcg 6 mo+: no more than 200 mcg
	7 – 12 mo	15 mcg	
	1 – 10 yrs	20 – 30 mcg	
	11 yrs +	40 – 50 mcg	
Calcium	Birth – 6 mo	210 mg	Birth – 6 mo: 210 mg 7 - 12 mo: 270 mg 1 – 18 yrs: No more than 2500 mg
	7 – 12 mo	270 mg	
	1 – 3 yrs	500 mg	
	4 – 8 yrs	800 mg	
	9 – 18 yrs	1300 mg	

**Recommended Vitamin Brands: (Vitamins that contain Iron and/or extra C are not recommended):**

Centrum Jr®  
Bugs Bunny®

Flintstones®  
Fruity Chews® Tablets

Sesame Street®  
One-A-Day® Essential Tablets

## Antioxidants

A high intake of some antioxidants (vitamin C, vitamin E, and  $\beta$ -carotene) may protect against the development of certain types of cancer. However, taking antioxidant supplements during radiation and chemotherapy may reduce the effectiveness of these treatments in destroying diseased cells. Therefore, patients should stop antioxidant supplementation prior to chemotherapy and radiation.

Antioxidants may be inappropriate posttransplant due to interactions with medications, immunosuppressive therapy or other vitamins and minerals in your body. Your dietitian can provide you with more information. Patients considering taking antioxidants posttransplant should discuss this with their physician.

## B-Vitamins

The B vitamins (thiamin, niacin, riboflavin, pyridoxine (B<sub>6</sub>), folate, cobalamin (B<sub>12</sub>), biotin, and pantothenic acid,) are water-soluble nutrients that assist in energy production. High levels of supplementation may not be toxic. However, it is important to maintain a balance among these B-vitamins. High doses of one may have a negative effect.

## Specific Recommendations

As your immune system begins to recover and strengthen, you may be able to include herbal supplements and vitamins in your diet, dependent on the type of transplant you have had. Some people wish to start using the supplements they were taking prior to transplant. **It is critical to check with your health care team prior to taking any vitamin or herbal supplement, as some may put your still immature immune system at risk.**

## Allogeneic Transplantation

Patients undergoing allogeneic transplantation (from an unrelated or family donor) are at risk for infections until all immunosuppressive medications have been stopped and the patient is free of active chronic GVHD (graft versus host disease). Immunosuppressive medications include cyclosporine (Neoral<sup>®</sup>), tacrolimus (FK-506<sup>®</sup>), prednisone, thalidomide, Imuran<sup>®</sup>, Rapamycin<sup>®</sup>, mycophenolate mofetil (MMF, CellCept<sup>®</sup>) and interferon. Use of herbals or botanicals must be discussed with the attending and infectious disease physicians. If vitamin and mineral supplementation above the Dietary Reference Intake is desired, consult with both your physician and dietitian.

## Autologous Transplantation

Even beyond the neutropenic period, patients undergoing autologous transplantation may be at risk for infection. Herbals and botanicals should be avoided until patients have no active gastrointestinal (“GI”) problems and have been off prednisone therapy for one month. Use of herbals or botanicals after that time should be discussed with your physician, and under the

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direction of a licensed naturopathic physician. Vitamin and mineral supplementation above the DRI should be discussed with your physician and dietitian.

## Chemotherapy

Patients undergoing chemotherapy for stem cell mobilization or tumor debulking should follow the recommendations for autologous transplantation.