A VEGETARIAN DIET CAN HELP REDUCE THE RISKS OF:

- Cardiovascular disease
- Hypertension
- Diabetes
- Obesity
- Cancer
- Osteoporosis
- Renal disease
- Dementia

Presenter:
Linda Sugimura, RD, CSP
Pediatric Nutritionist

Phone/Referrals: 510-428-3058 • Email: lsugimura@mail.cho.org
Phone consults available • www.childrenshospitaloakland.org
Vegetarian Diets in Children and Adolescents

**CLASSIFICATION OF VEGETARIANS**

<table>
<thead>
<tr>
<th>Classification</th>
<th>Foods Included</th>
<th>Foods Avoided</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lacto-ovo</td>
<td>Grains, legumes, nuts, seeds, fruits, vegetables, dairy products, eggs</td>
<td>Meat, fish, poultry</td>
</tr>
<tr>
<td>Lacto</td>
<td>Grains, legumes, nuts, seeds, fruits, vegetables, dairy products</td>
<td>Meat, poultry, fish, eggs</td>
</tr>
<tr>
<td>Vegan</td>
<td>Grains, legumes, nuts, seeds, fruit, vegetables</td>
<td>Meat, poultry, fish, eggs, dairy products</td>
</tr>
<tr>
<td>Macrobiotic</td>
<td>Grains, legumes, vegetables, wide use of sea vegetables, soy products, and Asian condiments, (nuts, seeds, fruit to a lesser extent), possibly fish</td>
<td>Meat, poultry, sometimes fish, dairy products, eggs, vegetables of nightshade family, tropical fruits, processed sweeteners</td>
</tr>
<tr>
<td>Fruititarian</td>
<td>Fruit, nuts, seeds</td>
<td>Meat poultry, fish, dairy products, eggs, grains, legumes, most vegetables (except tomatoes, eggplant, avocado, zucchini)</td>
</tr>
</tbody>
</table>

**NUTRITIONAL CONSIDERATIONS FOR VEGETARIANS**

1. **ENERGY**

- Diets high in bulk and fiber may interfere with adequate energy intake in young children, especially vegan children once weaned.
- The fiber content can be reduced by giving some refined grains, fruit juices, peeled fruits and vegetables.
- Provide energy dense snacks scheduled throughout the day.
- **High energy foods:**
  - Fats (avocado, nuts, nut butters, seeds, seed butters, olives, oils), dried fruits, whole fat dairy products.

2. **PROTEIN**

- Plant proteins can meet protein requirements when a variety of plant foods are consumed and energy needs are met.
- Complementary proteins don’t need to be consumed at the same meal.
- Protein recommendations for vegans: Vegan children may require 20-30% more protein due to the amino acid composition and digestibility of plant proteins.
- Protein containing foods:
  - Infant: Breast milk or formula, well-cooked or pureed legumes, mashed or blended tofu, cottage cheese or yogurt, cooked egg yolks.
  - Children: Legumes, grains, soy products, meat analogs, dairy products, eggs, nuts/nut butters, seeds/seed butters.

3. **IRON**

Iron found in plant food is nonheme iron which is sensitive to both inhibitors and enhancers of iron absorption. Because of the lower bioavailability of iron from a vegetarian diet, the recommended iron intakes for vegetarians are 1.8 times those of nonvegetarians.

- **Iron Sources:**
  - Whole or enriched grain and grain products
  - Iron fortified cereals
  - Legumes
  - Green leafy vegetables
  - Consume foods rich in Vitamin C

- **Inhibitors:** Phytates, calcium, polyphenolics in tea, coffee, herb teas, and cocoa, fiber (slightly)
- **Phytates:** Organic compound that stores phosphorus in seeds and grains
- **Zinc, iron, copper and calcium form insoluble chelates with phytate and these compounds can’t be absorbed in the digestive tract greatly reducing absorption of these minerals
- **Enhancers:** Vitamin C and other organic acids found in fruits and vegetables both enhance absorption and reduce the inhibitory effects of phytates
- **No long term adaptation to a high phytate diet**
NUTRITIONAL CONSIDERATIONS FOR VEGETARIANS

4. CALCIUM

- Calcium intake of lacto-ovo-vegetarians is similar to or greater than nonvegetarians
- Calcium intake of vegans tends to be lower than both groups
- EPIC-Oxford Study: bone fracture risk was similar in L-O-vegetarians with meat eaters, while vegans had a 30% greater risk of fractures possibly due to their lower calcium intakes
- Both higher protein and higher sodium intakes result in greater urinary calcium losses
- Diets high in fruits and vegetables reduce urinary calcium losses
- Limiting high oxalate vegetables maximizes calcium absorption (spinach, chard, wheat germ, dried beans, sweet potatoes, tea and cocoa)

High calcium foods:
- Calcium fortified soy milk, juices and food products
- Calcium precipitated tofu
- Dark green leafy vegetables including collard greens, kale, mustard greens, turnip greens, broccoli, bok choy
- Modest amounts of calcium are found in almonds, almond butter, blackstrap molasses, figs, and tahini

5. VITAMIN D

- Consider sun exposure including time of day, season, latitude, skin pigmentation, sunscreen use and age
- Low 25-hydroxy vitamin D levels and reduced bone mass have been low in vegan and macrobiotic groups

Vitamin D fortified foods:
- Cow’s milk
- Some yogurt
- Some brands of soy and rice milk
- Some cold cereals

Supplements:
- Vit D-2 ergocalciferol is plant based
- Vit D-3 cholecalciferol is animal based

6. VITAMIN B12

- Lacto-ovo-vegetarians consume adequate Vitamin B12 which is found in dairy foods and eggs
- Vegans must consume B12 from fortified foods and supplements including fortified breakfast cereals, rice and soy beverages, meat analogs, or Red Star Vegetarian Support Formula nutritional yeast
- Unfortified nutritional yeast, sea vegetables, tempeh, and algae are unreliable sources of Vitamin B12

7. ZINC

- Zinc intake of lacto-ovo-vegetarians and vegans is similar to nonvegetarians
- Phytate reduces zinc absorption and therefore vegetarians may need to consume greater zinc
- Overt zinc deficiency is not evident in western vegetarians

Zinc Sources:
- Dairy products
- Soy products
- Legumes
- Whole Grains
- Fortified grains and cereals
- Cheese
- Nuts

Enhance zinc absorption by using yeast leavened bread, fermented soy products, discarding soaking water for beans
Vegetarian Diets in Children and Adolescents

VEGETARIAN DIETS THROUGHOUT THE LIFE CYCLE

INFANTS
- Encourage breastfeeding—the quantity and quality of breast milk of vegetarian women is equal to non-vegetarian woman
- Supplement with Vitamin D
- Infants of vegan mothers with an inadequate source of Vitamin B12 should receive B12 supplementation

CHILDREN
- Growth of lacto-ovo-vegetarians similar to non-vegetarian peers; Poor growth associated only with very restrictive diets
- Frequent meals and snacks to meet energy needs
- Support use of some refined foods to meet energy needs

ADOLESCENTS
- No difference in age of menarche between lacto-ovo-vegetarians and non-vegetarians
- Vegetarian teens consume more fiber, iron, folate, vitamin A, and vitamin C, fruits, vegetables, fewer sweets, fast foods and salty snacks
- Assure that absence of meat fish and poultry is not replaced with "junk food"
- May be used to mask eating disorder, however

DAILY FOOD GUIDES FOR VEGETARIAN CHILDREN AND ADOLESCENTS

<table>
<thead>
<tr>
<th></th>
<th>1-4 years</th>
<th>5-6 years</th>
<th>7-12 years</th>
<th>13-19 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grains</td>
<td>4 servings*</td>
<td>6 servings</td>
<td>7 servings</td>
<td>10 servings</td>
</tr>
<tr>
<td>Vegetables</td>
<td>1 - 1½ servings</td>
<td>2 servings</td>
<td>3 servings</td>
<td>4 - 5 servings</td>
</tr>
<tr>
<td>Fruit</td>
<td>1½ - 3 servings</td>
<td>2 - 4 servings</td>
<td>3 servings</td>
<td>4 servings</td>
</tr>
<tr>
<td>Legumes</td>
<td>½ - 1 serving</td>
<td>1 - 2 servings</td>
<td>2 - 3 servings</td>
<td>2 - 3 servings</td>
</tr>
<tr>
<td>Nuts/Seeds†</td>
<td>½ - 1 serving</td>
<td>1 serving</td>
<td>1 serving</td>
<td>1 serving</td>
</tr>
<tr>
<td>Milk‡</td>
<td>3 cups</td>
<td>3 cups</td>
<td>3 cups</td>
<td>3 cups</td>
</tr>
<tr>
<td>Fat</td>
<td>3 - 4 tsp</td>
<td>4 tsp</td>
<td>5 tsp</td>
<td>4-5 tsps</td>
</tr>
</tbody>
</table>

1 SERVING:
Grains = ½ cup cooked grain, cereal, or pasta; 1 slice bread; or 1 ounce ready-to-eat cereal.
Vegetables =½ cup cooked or 1 cup raw; try to include one serving daily of dark green, leafy vegetables.
Fruit = 1 piece fresh fruit, ½ cup cooked or canned fruit, ¼ cup fruit juice, or ¼ cup dried fruit.
Legumes = ½ cup cooked beans, tofu, tempeh, or textured vegetable protein; 3 ounces meat analogue.
Nuts/Seeds = 2 tablespoons of nuts, nut butters, or seeds

* Suggested minimum number of servings. Some children and adolescents may need additional servings from one or more food groups to meet energy needs.
† Nuts can be replaced by 1 serving of full-fat soy product.
‡ This group included cow’s milk, breast milk, infant or toddler formula, and soymilk fortified with calcium, vitamin B-12, and vitamin D.