

Nutrition for Family Living

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August, 2003 Topics

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To answer your question: taste, swallowing and nutrition for the elderly

Q: I have been asked to do a presentation for nursing home staff who work with the elderly. They would like tips on enhancing flavor and making food easier to swallow.

A: Here's some information summarized from a few articles that should get you off to a good start. On the topic of swallowing, I'd encourage you to stay general and not get into anything technical. Dysphagia is a specialized field and I assume you're already planning to refer questions beyond "the basics" to appropriate experts (doctors, speech therapists, dietitians).

Enhancing flavor

What causes poor diets among the elderly? The obvious factors: social and physical changes, including solitary living; food availability; financial changes; depression, indifference to eating; marital status; companionship; immobility; disease. The not-so-obvious factors: loss or decline in taste and smell.

Flavor refers to the combination of taste, smell, appearance, and feel. Taste is perceived throughout the entire oral area, not just the tongue. By the time people reach their 70's, they may have a greatly reduced number of taste buds remaining. Reduced saliva makes swallowing more difficult, digestion less efficient, and dental problems more prevalent. Also, many adults over age 70 have lost most of their sense of smell. In order to recognize even a familiar smell, such as baking cookies or a roasting turkey, that smell must be much more concentrated.

Ingredients that enhance flavor

- Flavor extracts can stimulate taste buds and smell receptors. Vanilla or almond extracts can be added to fruit or baked goods. Meat or poultry extracts can be added to soups, sauces or stews.
- Try adding a strongly flavored food as an ingredient in a recipe. These could include tangy cheeses, garlic, onions, olives, sun-dried tomatoes, flavored vinegars, citrus fruits, and ripe berries.
- A recipe might taste too strong for a younger person but just right for someone with aging taste buds. It may take up to 2-1/2 times the amount of seasoning called for before an elderly person considers it "just right." Cooks may need to experiment.



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- In an effort to improve flavor, older adults may add more dressings or sauces containing a lot of fat. For people who need to watch their calorie intake, this is not necessarily a good thing.
- A small amount of cheese, sauce or dressing can make strongly flavored vegetables (broccoli, cabbage, Brussels sprouts) more tasty.

Flavor-enhancing techniques

- Create sensory appeal. Food should appeal to all senses; it should vary in color, size, texture, temperature, and even the sounds it makes when served or eaten.
- Choose foods that are fresh, brightly colored, full flavored, and seasonal. Eye appeal generates more salivary, gastric, pancreatic, and intestinal secretions that may help digestion.
- Use “smell memory” to stimulate appetite. Fill the house with the smell of fresh baked cookies or Mama’s chicken soup.
- If there is no medical reason for sodium restriction, salt is an effective flavor enhancer.

Marcus J. Pleasing Palates Past Their Prime. *Today’s Dietitian*, June 2003. p 30-33.

Mattes RD. The chemical senses and nutrition in aging: challenging old assumptions. *J Am Diet Assoc*, 2002; 102(2); 192-196.

Swallowing difficulties

The term dysphagia refers to the feeling of difficulty in passing food or liquid from the mouth to the stomach. It can be caused by poor teeth, ill-fitting dentures, gastro-esophageal reflux (stomach acid moving up the esophagus to the pharynx), stroke, tumors, or as a consequence of surgery of the head, neck or throat. Swallowing disorders are evaluated by an otolaryngologist (head and neck doctor), and a speech pathologist may provide therapy.

Dysphagia can be serious because if a person cannot swallow well, they may not be able to eat enough of the right foods to stay healthy or maintain their weight. If a person with a swallowing disorder inhales food instead of swallowing it, they may not be able to cough adequately to get it back up. Food or liquid that stays in the lungs can lead to aspiration pneumonia. A registered dietitian will work with a speech pathologist to recommend textures of food that will be safe for a person with a swallowing disorder.

<http://www.entnet.org/healthinfo/throat/swallowing.cfm> American Academy of Otolaryngology-Head and Neck Surgery webpage.

Implications for educators

Nutrition is of prime importance to the health and quality of life of the elderly. Educators can offer caregivers some basic suggestions for ways to make eating more appealing to older adults whose senses of taste and smell are declining. They should also understand that difficulty with chewing and swallowing are common among the elderly and may impact their willingness to eat and consume a balanced diet.



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Comparing dietary quality: 1965 vs 1996

Americans are eating healthier diets than they were in 1965, but the difference in dietary quality between people with more education and those with less education has become greater.

Researchers at the University of North Carolina looked at USDA survey data from 1965 and 1994-1996 to examine whether income or education had a greater effect on dietary quality.

In 1965, there were only minor differences in eating habits among different income and education groups. College-educated adults took in more iron, calcium and fresh fruit than people with less education, but they also consumed more saturated fat. Between 1965 and 1996, overall dietary quality improved for all income and education groups, but people with more education improved their diets the most. In 1996, the highest diet quality was found among college-educated, white women.

The major exception to the overall improvement in dietary quality was a drop in calcium intake, which was related to a drop in milk consumption. There was also a disappointingly small decrease in added sugars, fat, salt and alcohol.

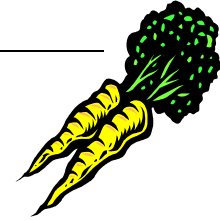
It is not clear why education, rather than income, was related to the improvement. It may be due to a combination of knowledge, skills, beliefs and attitudes that develop as a result of being part of the educational system. Other research has shown education to be more strongly associated with disease than occupation or income. The difference in diet quality between educational levels may help explain the health disparity among socioeconomic groups.

Popkin BM, Zizza C, Siega-Riz AM. Who is leading the change? US dietary quality comparison between 1965 and 1996. *Am J Prev Med.* 2003;25(1).



Bioavailability of lutein from yellow carrots

Straight from the Tanumihardjo laboratory!
Kirsten L. Mollrem's master's project



Lutein is a non-provitamin A carotenoid, which means that it is not converted to vitamin A like β -carotene is in the body. It is measurable in human blood and tissues, and is found in foods such as egg yolks, corn, and leafy green vegetables. Lutein and zeaxanthin have been identified as the carotenoids that constitute the macular pigment in the back of the human eye. Studies have indicated that there is a relationship between the lack of thickness of this pigment and the increased risk for developing the eye disease, age-related macular degeneration, which is the leading cause of blindness in people over 55 years old.

Because the human body cannot make carotenoids, we must get them from food sources. But just because a food contains carotenoids and other nutrients, does not mean that the body can use the nutrients. The term *bioavailability* refers to the amount of a nutrient that is absorbed and available for use or storage by the body. Carotenoid bioavailability is a complex area of study, as many factors influence the digestion and absorption of carotenoids. Some of these factors include the plant structure; fat present in the meal which increases absorption; other carotenoids in the food or meal competing for absorption; the amount of carotenoid consumed; alcohol and fiber which decrease carotenoid absorption; and food processing that can increase bioavailability. For example, cooking the vegetables actually increases the bioavailability of carotenoids.

Carrots are a familiar, widely consumed vegetable. Carrots exist naturally throughout the world in colors other than orange, including yellow, white, red, and purple, and they contain varying amounts of different carotenoids. Our lab conducted a study investigating lutein bioavailability from yellow carrots. The objective was to determine to what extent the lutein in these specialty yellow carrots is bioavailable in humans and to compare this bioavailability to that from a supplement of lutein in oil.

Nine healthy, non-smoking students, aged 23-28 years, enrolled in this study. The subjects remained in the study for 50 days including a 1-week washout period before the study and between each leg of the study that lasted 15 days. Blood samples were taken throughout the study. Three treatments included the yellow carrot (1.7 milligrams (mg) lutein), a white carrot (0 mg lutein), and a lutein supplement in oil (1.7 mg lutein). Subjects were required to follow a strict diet limiting their intake of carotenoids, especially lutein. Subjects were fed their cooked carrots and supplements in foods daily, including a breakfast carrot smoothie, 2 carrot muffins, and carrot soup. Subjects did not know what treatment they were receiving.

We thought that the lutein from the carrots would be bioavailable, but not as bioavailable as the lutein from an oil supplement. To determine this, we analyzed the subjects' blood samples. Significant increases in blood lutein concentrations were noted in all participants after receiving the yellow carrots and the supplement. The concentrations increased by an average of 95% after yellow carrot treatment and by an average of 130% after receiving the lutein supplement treatment. The lutein from the carrots was absorbed 65% as well as the lutein from the supplement, indicating very good relative bioavailability.

An intake of 1.7 mg of lutein, as provided in this study, is a value that is close to an estimated mean dietary lutein intake. Rock and others determined the mean dietary lutein intake of 2,786 people to be 1.3 ± 0.9 mg/day. A $\frac{1}{2}$ cup serving of cooked spinach provides 6.3 mg lutein; 1 cup



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of raw spinach provides 3.6 mg lutein; and ½ cup cooked corn provides 1.5 mg lutein. During this study, subjects received a daily total of 337 g of chopped yellow carrot from the muffins, smoothies, and soup. A 1-cup (128 g) serving of these raw carrots could provide 0.7 mg of lutein, thereby possibly increasing daily lutein intake from foods.

Implications: This study showed that lutein from the cooked yellow carrots is highly bioavailable. Because increasing lutein consumption may prevent macular degeneration, new dietary sources of lutein would be helpful for people to increase their intake, because other issues exist with the richest dietary sources of lutein. Egg yolks are a very bioavailable source of lutein, but they are also high in cholesterol. Spinach is a good source of lutein, but spinach is an unpopular vegetable. Carrots, on the other hand, are a very familiar and widely consumed vegetable. The introduction of “cut & peel” or “baby” carrots to the market increased carrot consumption by 50% between 1975 and 1995. Carrots are a convenient source of nutrients because they are produced in the United States year-round, and have an excellent shelf-life for storage and transport. The yellow carrot is a novel dietary source of lutein and if successfully introduced into the market and accepted by consumers, is a good source of bioavailable lutein.

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Highlights from IFT 2003

In mid-July, Sue Nitzke attended the Institute of Food Technologists conference in Chicago. Over 20,000 participants attended educational sessions and showed off their research findings or new products/ingredients. Here are some highlights:

1) IFT Keynote Speaker Tommy Thompson gave an opening keynote stating "All of us need to make sure that Americans eat safe foods in healthy portions and healthy varieties." Thompson hopes the food industry will assist him with fighting the obesity and diabetes epidemics sweeping the nation. He applauded companies that have taken the steps to improve the health of Americans, and encouraged others to follow their lead. He said he looks forward to working with them to make Americans healthier, stronger, and more informed to make healthy choices.

2) A panel, composed of Lester Crawford, Deputy Commissioner of the Food and Drug Administration (FDA); Todd Abraham, vice president of research, Kraft Foods; Leah Evans, senior vice president R&D, Pizza Hut; Elizabeth Sloan, Sloan Trends and Solutions, Inc; and Mike Pariza, University of Wisconsin, shared lists of what they thought would be the top five trends in 2005. There was general agreement among the panel that food safety and food security were the topics of the moment. There was also consensus among the panelists that the obesity epidemic in this country will influence the future of the food industry. Todd Abraham stated: "obesity is the health concern. It's the second largest controllable cause of death in the United States." Diabetes is an epidemic, too, said Liz Sloan. The incidence of insulin sensitivity is on the rise, and not just among the adult population. "Kids have poor dietary habits-more than a third of children get no exercise at all, nearly 20 percent of children smoke and drink, and more than 85 percent do not get five servings of fruit and vegetables per day." The desire for pure food is increasing. Consumers want products free of antibiotics, genetically modified organisms (GMOs), trans fatty acids, and cholesterol, said Evans. Other trends mentioned by panelists included nutrigenomics, an aging population, environmental sustainability, setting international standards for food safety, and the ongoing debate about biotechnology and GMOs. In the end, though, it was convenience that once again reigned. The panelists agreed that consumers want ready-to-eat, ready-to-heat, and products packaged for on-the-go consumption, and they're willing to pay for it."

3) In a session on the politics of obesity, portion size was mentioned over and over as a big problem (no pun intended). Sheila Cohn from the National Restaurant Association (a graduate of our department in 1999) pointed out that the average restaurant steak is 8 ounces or 2-3 Pyramid servings, while many cookies qualify for 8 servings from the grain group! In 1970, a Joy of Cooking recipe for brownies said it was 30 servings but the latest edition now shows the same recipe to make only 16 brownies. A large serving of fries at a large fast food chain was 2.4 ounces in 1955, which is now sold as a small order -- and so on and so forth. J. Pelaez from Yum! Brands (KFC, Pizza Hut, Taco Bell, A&W and Long John Silvers) explained a conundrum for businesses like his with an example of Taco Bell's "Border Lites" reduced calorie versions of their popular menu items. In spite of extensive product development and promotions, customers failed to buy the "healthier" items and the product line was eventually dropped. This brings us "full circle" to Tommy Thompson's plea for the food industry to help make Americans healthier, stronger and more informed. My observation at the conference was that some companies will resist such changes with all their corporate might while others are willing to do their part if they can figure out a way that doesn't represent too much of a risk to the "bottom line."



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Wisconsin awarded Team Nutrition grant

Wisconsin has been chosen to receive one of USDA's Team Nutrition grants for the coming year. The 2003 Wisconsin Team Nutrition project will use a three-pronged approach to help school-age children improve their eating and physical activity habits through improved school nutrition environments and community supports. Relying heavily on partnerships for success, this approach will include (1) promotion of School Breakfast programs, (2) education of school and community partners on improving the school nutrition environment, and (3) promotion of healthy eating and physical activity through fun, informative, student-led initiatives that incorporate nutrition education and service learning.

Congratulations to Julie Allington and her colleagues at DPI for putting together a winning proposal. For more details see <http://www.usda.gov/news/releases/2003/07/0257.htm>.