“Nutrition and kidney cancer”

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Disclosure

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“Pili nuts are a rich buttery tasting nut grown in the volcanic soil of the Philippine peninsula. High in protein, calcium and potassium, pili nuts are a healthy snack with a delicious flavor. They also make a wonderful addition to desserts and baked goods. Try these dry roasted and unsalted pili nuts for yourself and discover what makes them so unique and incredible.”
Objectives

• To discuss how nutrition and diet may have an impact on patients with kidney cancer

• To discuss the potential immunomodulatory effect of dietary protein restriction
“Nutrition is nourishment or energy that is obtained from food consumed or the process of consuming the proper amount of nourishment and energy. An example of nutrition is eating a healthy diet”
Why focus on diet and cancer?
Cancer is impacted by diet and lifestyle

- Diet is intimately linked with development of prostate cancer\(^1\)\(^-\)\(^9\).
  - Vegetable and legume consumption
    - Lower CaP incidence\(^4\),\(^5\),\(^6\)
    - Lower chance of CaP progression & mortality post diagnosis \(^4\),\(^5\),\(^6\),\(^7\)
    - Reduced circulating Insulin-like Growth Factor 1 (IGF-1)\(^2\)
      - IGF-1 is a potent mutagen linked to the development and progression of CaP
  - Animal proteins
    - Higher incidence, progression and mortality related to CaP\(^1\),\(^3\),\(^4\),\(^8\),\(^9\)
    - Aggressive / Advanced stage CaP\(^2\),\(^8\),\(^9\)
    - Increased circulating IGF-1\(^1\),\(^2\)
    (Yang, Chavarro, et al 2015, Cancer Prevention Research)

Dietary protein content and cancer

- Moderate to high protein consumption results in increased cancer incidence and mortality
- Shift from Eastern to Western diet results in increased cancer incidence


Western diet compared to low protein diet consumption results in high circulating insulin growth factor (IGF-1)

Association of Low-Fat Dietary Pattern With Breast Cancer Overall Survival
A Secondary Analysis of the Women’s Health Initiative Randomized Clinical Trial

Rowan T. Chlebowski, MD, PhD; Aaron K. Aragaki, MS; Garnet L. Anderson, PhD; Michael S. Simon, MD, MPH; JoAnn E. Manson, MD, DrPH; Marian L. Neuhausser, PhD; Kathy Pan, MD; Marcia L. Stefanick, PhD; Thomas E. Rohan, MBBS, PhD; Dorothy Lane, PhD; Lihong Qi, PhD; Linda Snetselaar, PhD; Ross L. Prentice, PhD

RESULTS Of 1764 women diagnosed with breast cancer during the dietary intervention period, mean (SD) age at screening was 62.7 (6.7) years and age at diagnosis was 67.6 (6.9) years. With 516 total deaths, breast cancer overall survival was significantly greater for women in the dietary intervention group than in the usual-diet comparison group (10-year survival of 82% and 78%, respectively; hazard ratio [HR], 0.78; 95% CI, 0.65-0.94; P = .01). In the dietary group there were fewer deaths from breast cancer (68 vs 120; HR, 0.86; 95% CI, 0.64-1.17), other cancers (36 vs 65; HR, 0.76; 95% CI, 0.50-1.17), and cardiovascular disease (27 vs 64; HR, 0.62; 95% CI, 0.39-0.99).

CONCLUSIONS AND RELEVANCE In women who received a diagnosis of breast cancer during the dietary intervention period, those in the dietary group had increased overall survival. The increase is due, in part, to better survival from several causes of death.
Key Messages

- Start with shifts, or small changes:
  - All foods and beverages count toward a healthier meal pattern
  - Shift toward more nutrient-dense choices within and across food groups
  - Small changes add up
  - Accommodate personal tastes and cultural preferences to make the shift easier to maintain

 Courtesy of Rachel Bordogna, RDN

#TABLE 1. American Cancer Society Guidelines on Nutrition and Physical Activity for Cancer Prevention

<table>
<thead>
<tr>
<th>ACS RECOMMENDATIONS FOR INDIVIDUAL CHOICES</th>
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<tbody>
<tr>
<td>Achieve and maintain a healthy weight throughout life.</td>
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<tr>
<td>• Be as lean as possible throughout life without being underweight.</td>
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<tr>
<td>• Avoid excess weight gain at all ages. For those who are currently overweight or obese, losing even a small amount of weight has health benefits and is a good place to start.</td>
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<td>• Engage in regular physical activity and limit consumption of high-calorie foods and beverages as key strategies for maintaining a healthy weight.</td>
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<td>Adopt a physically active lifestyle.</td>
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<td>• Adults should engage in at least 150 minutes of moderate intensity or 75 minutes of vigorous intensity activity each week, or an equivalent combination, preferably spread throughout the week.</td>
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<tr>
<td>• Children and adolescents should engage in at least 1 hour of moderate or vigorous intensity activity each day, with vigorous intensity activity occurring at least 3 days each week.</td>
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<td>• Limit sedentary behavior such as sitting, lying down, watching television, or other forms of screen-based entertainment.</td>
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<tr>
<td>• Doing some physical activity above usual activities, no matter what one's level of activity, can have many health benefits.</td>
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<tr>
<td>Consume a healthy diet, with an emphasis on plant foods.</td>
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<tr>
<td>• Choose foods and beverages in amounts that help achieve and maintain a healthy weight.</td>
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<tr>
<td>• Limit consumption of processed meat and red meat.</td>
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<tr>
<td>• Eat at least 2.5 cups of vegetables and fruits each day.</td>
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<tr>
<td>• Choose whole grains instead of refined grain products.</td>
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<td>If you drink alcoholic beverages, limit consumption.</td>
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<tr>
<td>• Drink no more than 1 drink per day for women or 2 per day for men.</td>
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“Know you own BMI”

Body Mass Index (BMI) Chart for Adults

- **Obese** (BMI 30 & Above)
- **Overweight** (BMI 25-30)
- **Normal** (BMI 18.5-25)
- **Underweight** (BMI < 18.5)

Weight [lbs] vs. Height (no shoes) vs. Weight [kg] chart.
The objectives of a cancer dietician

• Identify goals of healthy eating for cancer survivorship

• Identify risks for malnutrition

• Gain tools to gradually change eating habits

Courtesy of Beth Kirsch, RDN
Cancer diet

• Depends on Goals

• Treatment

• Current Side Effects

• Appetite

Courtesy of Beth Kirsch, RDN
Goals of nutrition during treatment

- Weight maintenance
- Adequate hydration
- Avoid nutrition related treatment breaks
- Maintain skin integrity
Malnutrition

• 50-80% of patients may develop malnutrition or cachexia during treatment

• Malnutrition is associated with increased morbidity, mortality & decreased response to therapy

• Nutrition support may help prevent or diminish the progression of malnutrition

Courtesy of Beth Kirsch, RDN
Characteristics of malnutrition

- Decreased energy intake over 5 days
- Weight loss (1-2% over 1 week)
- Subcutaneous fat and muscle loss
- Fluid accumulation
- Decreased functional capacity

Courtesy of Beth Kirsch, RDN
Inflammation

• What is it?
  – a” disorganized” immune response

• Why is it harmful?
  – It tends to suppress the good immune response against germs and tumors cells by inducing “immunotolerance”

Courtesy of Beth Kirsch, RDN
Anti-inflammatory eating

- Reduces risk for cancer
- Reduces risk for diabetes
- Reduces risk for heart disease
- Improves mood
- Reduces joint pain
- Improves blood pressure

Courtesy of Beth Kirsch, RDN
Foods cause inflammation

- Processed foods
- Excess meat - especially red meat
- Saturated fat
Anti-inflammatory eating

• Avoid processed foods

• Eat more plant based foods

Courtesy of Beth Kirsch, RDN
Why plant based eating?

- High in vitamins, minerals, fiber
- High in Phytochemicals
  - Give plants color and flavor
  - Cancer and inflammation fighters

Courtesy of Beth Kirsch, RDN
Plant based eating

• Eat more Vegetables & Fruit
  – 1 ½ cups of fruits & 2-3 cups of vegetables daily

• Fill half your plate with Vegetables & Fruit

Courtesy of Beth Kirsch, RDN
Plant based eating

- Change the way you think about meat
  - Use as a garnish
  - Limit red meat (including pork) to less than 18 oz. per week
  - Use beans as a protein source

Courtesy of Beth Kirsch, RDN
Plant Based Eating

• Increase intake of beans, seeds, nuts
  – Good source of minerals
  – Good source of fiber
  – Good source of healthy fats
  – Use in place of some or all of meat in an entrée for protein

Courtesy of Beth Kirsch, RDN
Plant based eating

• Eat sea food twice a week
  – Fatty fish like salmon provides omega -3 fatty acids
  – Low in saturated fat

Courtesy of Beth Kirsch, RDN
Plant based eating

• Use healthy fats in cooking & eating
  – Extra virgin olive oil, nuts, seeds, avocados
Plant based eating

- Switch to Whole Grains
  - Contain more fiber
  - More vitamins/minerals
  - Less processed
  - Look for the words “whole wheat” on the label
  - Complex Carbohydrates
  - High in phytochemicals
  - Examples: old fashioned oats, quinoa, whole wheat bread

Courtesy of Beth Kirsch, RDN
Plant based eating

Replace Refined Grains
- White Flour
  - Enriched Flour
  - All Purpose Flour
- White Rice
- Parboiled Rice
- Cream of Wheat
- Desemred Cornflour

Use Whole-Grains
- Whole-Wheat
  - Spelt
- Brown Rice
- Wild Rice
- Oats
- Whole-Grain Cornmeal

Courtesy of Beth Kirsch, RDN
Plant based eating

- Avoid simple/processed sugars
HEALTHY EATING PLATE

Use healthy oils (like olive and canola oil) for cooking, on salad, and at the table. Limit butter. Avoid trans fat.

The more veggies – and the greater the variety – the better. Potatoes and French fries don’t count.

Eat plenty of fruits of all colors.

Drink water, tea, or coffee (with little or no sugar). Limit milk/dairy (1-2 servings/day) and juice (1 small glass/day). Avoid sugary drinks.

Eat a variety of whole grains (like whole-wheat bread, whole-grain pasta, and brown rice). Limit refined grains (like white rice and white bread).

Choose fish, poultry, beans, and nuts; limit red meat and cheese; avoid bacon, cold cuts, and other processed meats.

Stay Active!

Harvard School of Public Health
The Nutrition Source
www.hsph.harvard.edu/nutritionsource

Harvard Medical School
Harvard Health Publications
www.health.harvard.edu

Courtesy of Beth Kirsch, RDN
Mediterranean Pyramid

In Moderation
Wine

Every Day
Water

Weekly: Moderate Portions
Poultry, Eggs, Cheese and Yogurt

Often: at least Twice each Week
Fish and Seafood

Every Day: Base Each Meal
Around these Foods
Vegetables, Fruits, Whole Wheat Grains, Olive Oil,
Beans, Nuts, Legumes and Seeds, Herbs and Spices

Every Day
Be Physically Active;
Enjoy Meals with Others

Courtesy of Beth Kirsch, RDN
My take home message

• To reduce inflammation, especially during immunotherapy, I would recommend the following:
  – Avoid dairy product, red meat
  – Increase plant-based proteins and fibers
  – Increase cruciferous vegetables (broccoli, cauliflower, and cabbage)
  – Eat more fish

• The only supplements I would consider are Vitamin D and Vitamin C

• I would integrate dietary changes with regular physical activity
Dietary protein restriction inhibits tumor growth in human xenograft models of prostate and breast cancer

Luigi Fontana1, 2, 3, *, Remi M. Adelaiye5, 8, *, Antonella L. Rastelli1, Kiersten Marie Miles1, 2, Eric Ciamporcer06, 4, 5, Valter D. Longo2, Holly Nguyen6, Robert Vessella6, and Roberto Pili1, 5

[Graph showing tumor size (mm²) over days of measurement for 21% and 7% protein diets.]
Low protein diet increases the antitumor effect of immunotherapy

Dietary Protein Restriction Reprograms Tumor-Associated Macrophages and Enhances Immunotherapy

Ashley Orillion¹,², Nur P. Damayanti³, Li Shen⁴, Remi Adelaiye-Ogala¹⁴, Hayley Affronti⁵, May Elbanna⁶, Sreenivasulu Chintala⁷, Michael Ciesielski⁸, Luigi Fontana⁹, Chinghai Kao⁹, Bennett D. Elzey⁶,⁷, Timothy L. Ratliff⁸, David E. Nelson⁹, Dominic Smiraglia⁸, Scott I. Abrams¹⁰, and Roberto Pili¹.
Low protein diet increases the antitumor effect of immunotherapy in a renal cell carcinoma model

Orillion A et al Clin Cancer Res 2018
Low-protein diet in cancer: ready for prime time?

Pili R and Fontana L (2018)
Immunomodulation by protein diet restriction

Pilot randomized study normal vs low protein diet with sipuleucel-T
Future personalized dietary interventions for kidney cancer patients

Dissociate into single cells

Establish cell lines and tumors

Assessment of tumor metabolism

Primary tumor and adjacent normal tissues

Peripheral blood

Isolate mononuclear cells

Dietary interventions:
- Protein restriction
- High fiber content
- Alternate fasting
Diet and gut microbiota: A new frontier in medicine and oncology

- Diet
- Selective interventions
- Gut bacteria
- Cancer growth
- Immunity
SNAC Clinic (Science, Nutrition And Cancer Clinic) at Indiana University

RCC cancer patients:
- s/p nephrectomy
- metastatic disease)

- Evaluation for metabolic syndrome/Bone health (DEXA scan)
- Diet assessment / recommendations
- Diet/weight monitoring
- Diet/weight monitoring
- Baseline
- 1 month
- 3 months
- 6 months

Blood and stool samples
Evaluation for inflammation
Integrating the dietician as a personal trainer

Patients need different counseling depending on the stage of their disease:

- Early stage disease patient may benefit for weight loss if BMI is high
- Late stage disease patient may need weight maintenance
A comprehensive approach for kidney cancer patients
Summary

• There is an unmet need to integrate nutritional support for kidney cancer patients

• Our overall goals are:
  – Integrate immune-based therapies and dietary interventions for kidney cancer
  – Improve patient quality of life and implement survivorship initiatives for patients with recurrent or advanced kidney cancer
  – Establish a JNKCF chapter in Indianapolis
Thanks for Listening!

Special thanks to:

-Beth Kirsch, RDN, Clinical Dietitian Specialist (IU Health Simon Cancer Center)

-Rachel Bordogna RDN, Clinical Dietitian Specialist (Purdue University)