

# Food for thought... healthy diet for people living with brain tumors

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# Topics

§ **Diet and Cancer Connection**

§ **Healthy Eating During Treatment**

§ **Sample Meals**



# Diet & Cancer...

## Carcinogenic Agents

- § **N-nitrosamines (processed meat)**
- § **PHA (polycyclic aromatic hydrocarbons)**
  - Smoked or barbequed meat
  - Cooking at high temps (grilling, roasting, frying)
- § **HCA (heterocyclic amines)**
  - Grilled or fried meats (beef, fish, poultry, pork)
  - Oven roasting or baking are safest

*National Cancer Institute*



# Other Carcinogenic Agents

## § Alcohol

- ↑ rates of breast, stomach and other cancers

## § Pesticides

- ↑ rates of cancer in farmers and those exposed to pesticides

## § Sugar?

- Insulin-resistance and diabetes ↑ risk for certain cancers (bladder, brain, breast, colon)

*Larsson et al, 2006;2007, Consensus statement, Cancer J Clin 2010; 60:207-21*

# Minimize Pesticides, Consider Organic “Dirty Dozen”

- § Apples
- § Peaches
- § Nectarines
- § Strawberries
- § Cherries
- § Grapes
- § Pears
- § Raspberries
- § Bell peppers
- § Greens (kale, lettuce, mustard greens, spinach)
- § Celery
- § Potatoes



# Reduce Cancer Eat Cruciferous Vegetables!

§ Isothiocyanate iberin (bioactive agent in cruciferous vegetables) inhibited glioblastoma cell growth

## § What to eat?

- Broccoli
- Brussels sprouts
- Cabbage
- Cauliflower
- Kale
- Mustard greens



- *Jadhav U, et. al Journal of Pharmacological Science, February 2007*

# Raw or Cooked?

## § Broccoli

- 30% more phytochemicals absorbed when raw



## § Carrots & tomatoes?

- Beta-carotene & lycopene more bioavailable when cooked

## § Aim for 9 servings/day (5-6 veggies, 3-4 fruit)

§ *National Cancer Institute*

# Beverages & Cancer

## § Caffeinated beverages

§ 5 or more cups coffee, tea or soda ↓ glioma risk in cohort study of 335 cases

§ *Holick, et. al, Cancer Epidemiology, biomarkers & prevention, 2010*

## § Green tea

– EGCG (epigallocatechin-gallate) inhibitory effect on malignant brain tumors

– > 10 cups/day ↓ cancer incidence

§ *Yokoyama, Neuro-oncology, January 2001*

## § Water

- Filter water, reduce toxins
- Stainless steel bottles/mugs
- Avoid hard plastic (contains BPA)
  - Environmental estrogen



# Other Beverages

## § Alcohol

- Increases cancer risk, less best!

## § Aspartame (NutraSweet)

- Consumption not associated with ↑ risk for brain cancer based on 2006 study
- NIH-AARP study, relied on subjects' diet histories
- Not many formal studies done



# Sugar and Brain Cancer

- § Brain tumors consume more glucose
- § High blood sugar levels & insulin-resistance associated with **worse** survival in brain tumor patients

– *J Clinical Oncology*,  
2009; 27: 1082



# Low Carb Diet?

- § **Aggressive brain tumors need glucose to grow**
- § **2007 study using “Ketocal” (high fat/low carb diet supplement)**
- § **Adult mice given ketocal, tumor growth assessed**
  - Reduced growth of intra-cerebral tumors by 65 & 35% in ketocal groups, enhanced health & survival of animals compared to controls
  - Ketones produced from fat breakdown in absence of carbohydrate, used for energy by brain & heart
- § **Low carb diet controls seizures**

§ *Zhou, et. al, Nutrition & Metabolism, 2007*

# Patient Trial of Low Carb Diet

## § Wursburg trial (Germany)

- Patients that exhausted all other treatments put on low carb diets
  - High drop out rate due to non-compliance
  - 5 patients that followed diet for 3 months stabilized or improved, tumors slowed or stopped growing
    - High quality plant oils (hemp seed, linseed oil)
    - Protein from soy & animal products
- § *Schmidt, Kammerer, 2005*

- Based initially on 1924 research by Otto Warburg
- Research to continue

# What to Eat During Treatment

- § **Chemotherapy may cause nausea and anorexia**
  - Set a schedule, eat small/frequent meals
  - Lower expectations
  - Weight maintenance VS gain
- § **Eat healthy & nutrient dense (eggs, nuts, seeds, dried fruit, low fat dairy, etc)**
- § **Make it easy**
  - Keep food near bed
  - Pace eating & drinking with commercials

# Issues during treatment

## § Nausea



- Bland foods
- Mashed potatoes, cottage cheese, cheese sticks
- Apple sauce, canned fruit in juice
- Soft vegetables (peas, cooked beans)
- Try ginger (tea, sweet potatoes, oatmeal)

# Other issues...Diarrhea

§ Antibiotics

§ Radiation Therapy

§ Chemotherapy

Try:

- BRATY diet
- Bananas
- Rice
- Applesauce
- Toast
- Yogurt /kefir or probiotics to colonize gut



# Dysphagia



- § **Difficulty swallowing**
- § **May occur with head and neck cancers**
- § **May need thickened beverages or pureed diet**
- § **Work with a qualified speech therapist**
- § **Tube feeding may be indicated if weight loss & dysphagia do not resolve**

# Optimize Energy (*not* weight gain)

## § Include protein at meals

- Helps stabilize blood sugar
- Aids in immunity
- Meat, fish, poultry, beans, dairy, soy, nuts



## § Eat high fiber foods at meals

- Aids in weight & blood sugar control
- Whole grain breads, cereals, fruits/vegetables

## § Drink plenty of fluids

- Prevents dehydration/fatigue
- Aids in regularity

# Sample Meals

- § Eggs with whole wheat toast, fruit
- § Yogurt with fruit and light granola
- § Beans with brown rice and salsa
- § Salad with chicken or fish
- § Cheese, crackers and fruit
- § Cottage cheese & melon



# Supplements During Radiation & Chemotherapy

- § Use of vitamin C, E, beta-carotene controversial
- § Free radicals produced during therapy needed to destroy cancer cells
- § Nutrients from food VS pills

§ National Cancer Institute



# Exercise

## § Longer lifespan in patients with advanced glioma

- Regular/brisk exercise (45 minutes, 5 -7 days)
- Life extended by 22 months compared to 13 months in sedentary individuals

– *Journal of Clinical Oncology* , June, 2011



# Conclusions

## § Eat 'clean'

### – Plant-based diet

- Lots of fruits & vegetables, whole grains, organic when appropriate
- Maintain (or lose weight) to prevent insulin resistance

### – Keep it simple

- Small, frequent meals. Nutrient (not calorie) dense.
- Don't smoke, limit alcohol, drink green tea/caffeine.

## § Exercise regularly



# Thank You!

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