

Expanding the Model of Cancer Treatment:

How Diet & Nutrition Can Help Control Ovarian Cancer



Jeanne M. Wallace, Ph.D., C.N.C.

Nutritional Solutions, Inc., North Logan UT

eMail: nutritionalsolutions@comcast.net

Web: www.nutritional-solutions.net



The Role of Diet and Nutrition

- **Foundation Support** - heal whole person: body/mind/spirit
- **Complement Treatment** - surgery, radiation, chemotherapy, immunotherapy
- **Biologic Response Modifiers** - target vulnerable molecular pathways to help “control” cancer



Targets for Cancer Control

- Regulate gene expression (down-regulate oncogenes)
- Block “grow” messages (e.g., inflammatory compounds)
- Inhibit angiogenesis—the development of new blood vessels that nourishes tumor growth
- Boost immune competence
- Induce apoptosis (programmed cell death)
- Promote differentiation (maturation to healthy cell type)



**The Role of Nutrition:
Influencing
Cancer Genes**



Your Diet Influences Your Genes

Recent Research on Nutrient-Gene Interactions

Fortunately, your genes are plastic... you can change the messages that they express if you give them a different set of inputs.

—Jeffrey Bland, PhD

Nutritional regulation of gene expression.

Cousins RJ, *Am J Med*, 1999.

Bioactive substances of plant origin in food—impact on genomics.

Orzechowski A, et al, *Reprod Nutr Dev*, 2002.

Role of plant polyphenols in genomic stability.

Ferguson LR, *Mutat Res*, 2001.

Fatty acid regulation of gene expression.

Clarke SD et al., *Ann NY Acad Sci*, 2002.

High Vegetable Intake Improves Survival

A study of 609 women with invasive ovarian cancer reported a survival advantage for women with the highest vegetable intake compared to those with the lowest intake.

Dietary influences on survival after ovarian cancer. Nagle CM, et al., *Int J Cancer*, 2003;106(2):264-9.



Your Cancer “PHYTERS”: Phytonutrients

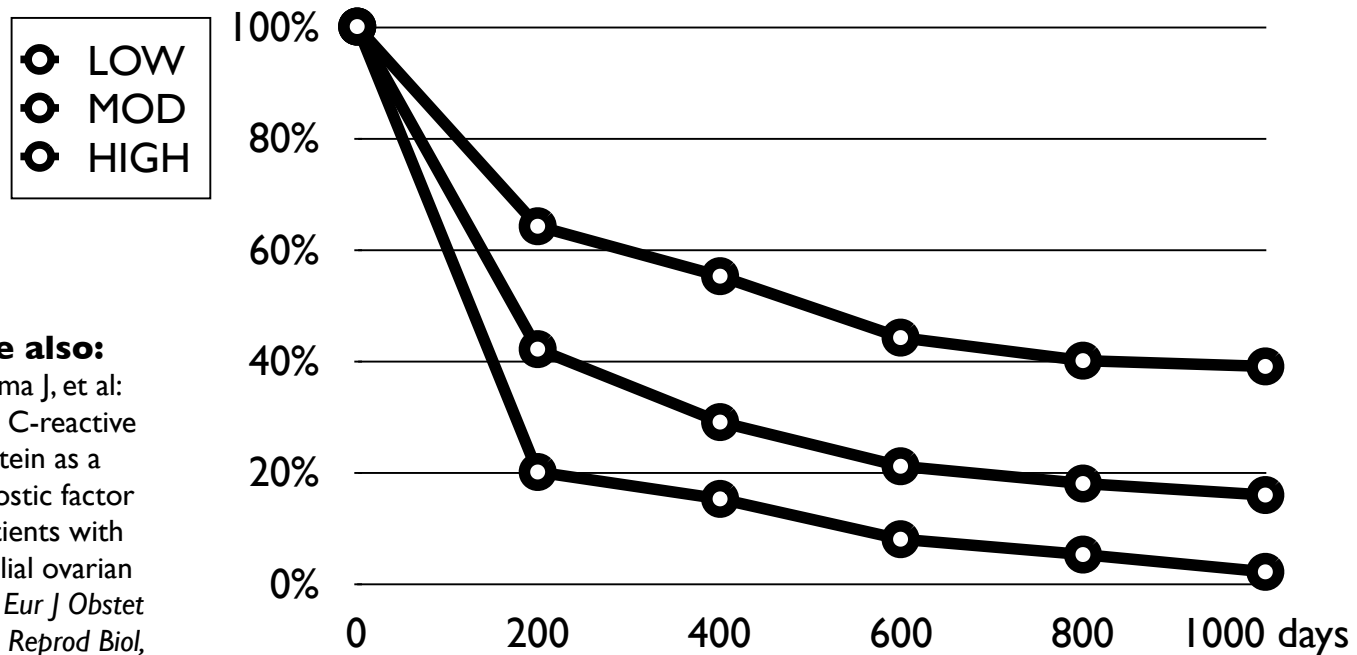
- Cruciferous family: broccoli, cabbage, cauliflower, Brussels sprouts, arugula, kale, mustard greens, rutabaga, kohlrabi, turnip
- Carotenoid family: red, yellow, orange, green vegetables & fruits
- Allium family: garlic, onion, leek, shallot, chive
- Berries: raspberries, blueberries, cherries, grapes
- Isoflavone family: soybean, flaxseed, lima beans
- Green tea
- Herbs & Spices: rosemary, orange/lemon zest



The Role of Nutrition: Ovarian Cancer & Inflammation

Inflammation & Cancer Survival

Survival of Cancer Patients Is Correlated to the Level of Inflammation



See also:
Kodama J, et al:
Serum C-reactive
protein as a
prognostic factor
in patients with
epithelial ovarian
cancer. *Eur J Obstet
Gynecol Reprod Biol*,
Jan 1999;82(1):
107-110.

SOURCE: McMillan DC, et al., Measurement of the systemic inflammatory response predicts survival in patients with cancer. *Nutr Cancer*, 2001;41(1):64-9.

Monitoring Your Inflammation



C-Reactive Protein

High Sensitivity C-Reactive Protein

Normal: < 0.8 mcg/L

Average in Cancer Patients: > 3.0

Target Range: < **1.0**

- Repeat testing every 4-6 months for Stage I-II cancer, every 6-8 weeks for Stage III-IV cancer
- Infection, fever, surgery, radiation, wound healing will elevate test results

Inflammation & Cancer

OMEGA-6 FATS

meat, poultry,
butter, egg yolk,
nuts, seeds,
vegetable oils (corn,
safflower, soy, etc.)

PRO-INFLAMMATORY Compounds

promote tumor growth &
spread, foster angiogenesis,
suppress immune function

OMEGA-3 FATS

cold-water fish,
flax, hempseed oil,
small amounts in
canola oil, black walnuts,
and leafy greens

ANTI- INFLAMMATORY Compounds

inhibit tumor growth,
anti-angiogenesis, bolster
immune function

Anti-Inflammatory Plan: **Eat to Beat Inflammation**

Anti-Inflammatory Supplements

Fish Oil

Bromelain

Boswellia

Curcumin

Quercetin

Ginger

*See your health-care
practitioner for supervision,
contraindications &
appropriate dosing.*

● Low-fat, plant-based diet with abundant fresh fruit & vegetable intake of all the rainbow colors

● Avoid hydrogenated, saturated and deep fried fats

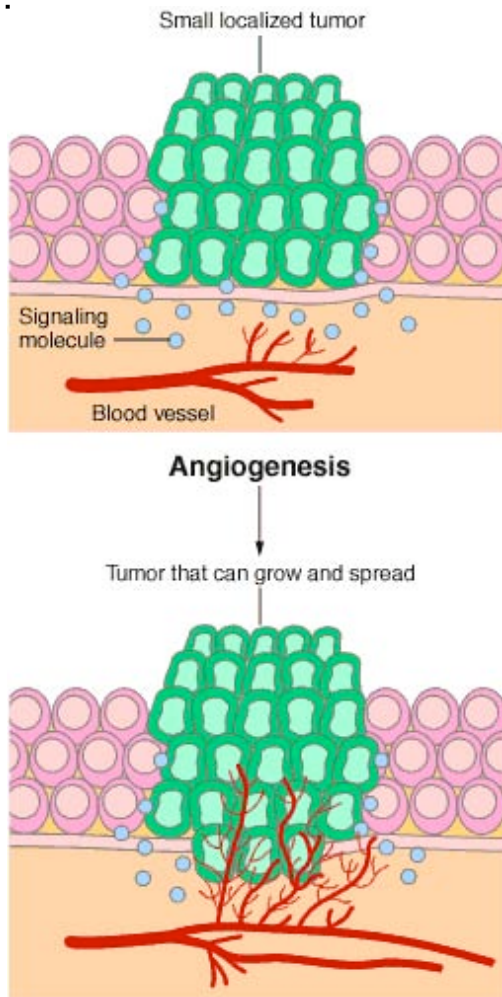
● Increase omega-3 intake (cold-water fish, flax seeds and flaxseed oil, leafy green vegetables)

● Limit omega-6 intake (one-to-one ratio with omega-3 fats)

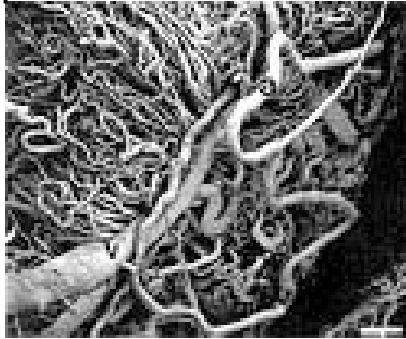


The Role of Nutrition: Ovarian Cancer & Angiogenesis

What is Angiogenesis?



- **DEFINITION:** the development of a network of blood vessels that fuels the growth and spread of a small cluster of cancer cells
- **IMPORTANCE:** without angiogenesis: tumors remain small and dormant
- **TREATMENT BENEFIT:** may yield less toxic treatment and avoidance of drug resistance



Angiogenesis & Ovarian Cancer

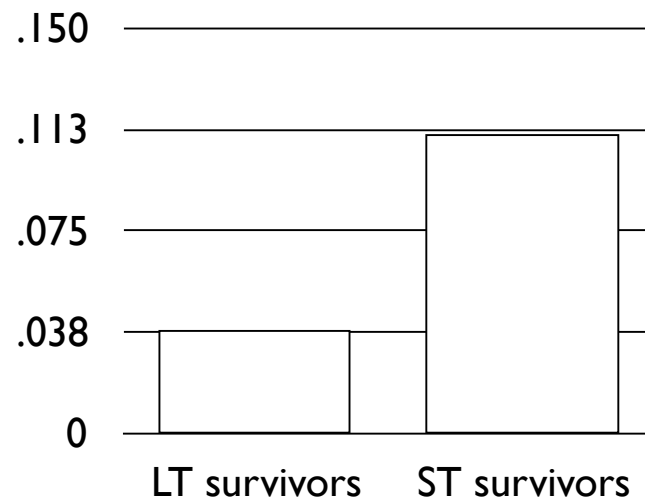
KEY STUDY

28 Women with Stage IIIc ovarian cancer

Examined density of blood vessels (marker of angiogenesis)

Blood vessel density for 6+ year survivors much lower than short term survivors

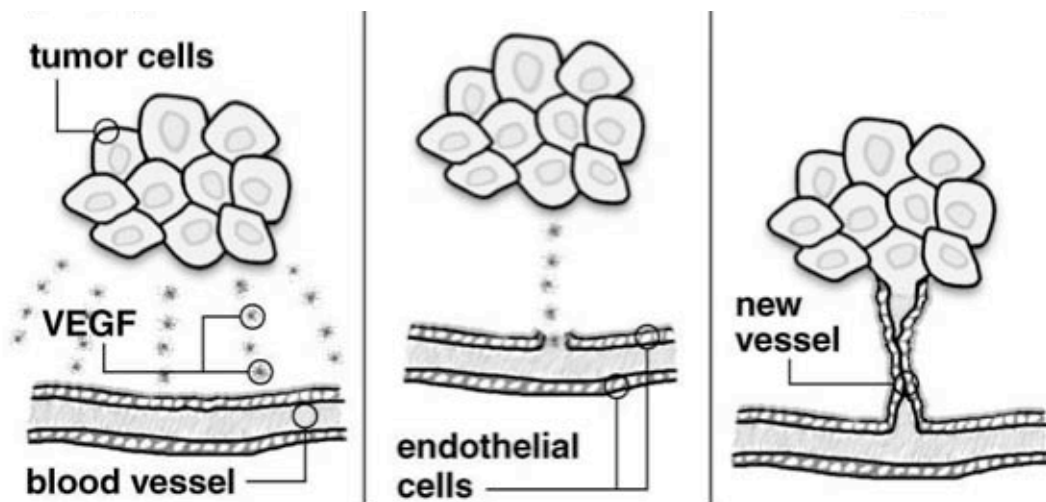
No significant differences in histology, node status, or amount of residual tumor



Amount of Angiogenesis

Tumor angiogenesis as a prognostic factor in ovarian cancer. Schoell W, et al: *Soc Gyn Onc (SGO) Annual Meeting*, Feb 7-11, 1998.

Nutrition & Angiogenesis

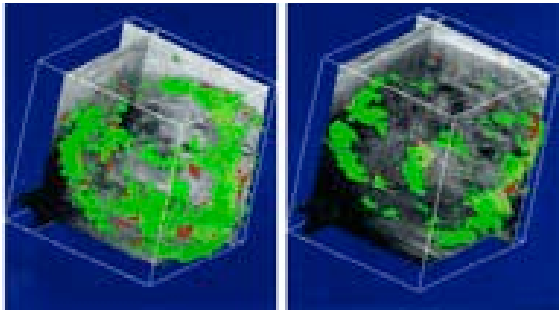


Compounds that Promote Angiogenesis:

VEGF, bFGF, TNF-a, Interleukin-1
**** ALL REQUIRE COPPER ****

Human Clinical Trials:

Copper & Angiogenesis



Doppler image showing the volume of tumor metastasis in a 59-yr old patient at baseline and following 8 weeks of copper reduction therapy

- Drs. Merajver & Brewer (Univ. of MI) conducted two clinical trials of copper depletion in patients with advanced Stage IV cancers
- Every patient who lowered their copper levels achieved stabilization of tumor growth, up to 2 years

Brewer G, Merajver S, et al: *Clin Cancer Res*, Jan 2000; 6:1-10.
Garnter EM, Brewer G, et al: *ASCO*, 2003: 925.

Copper Reduction Plan:

Avoid Intake of Copper

**Copper
Lowering
Supplements**

Molybdenum

Zinc

Sulfur

Chlorella

See your health-care practitioner for supervision, contraindications & appropriate dosing.

● Avoid foods high in copper: shellfish and organ meats



Copper Content of Foods

High Copper Foods

Liver	16 mg per 4 oz
Lobster	4 mg per 4 oz
Crab	1 mg per 4 oz
Oysters	2 mg per 4 oz

● Check drinking water (filter if copper pipes)

● Take only copper-free dietary supplements (check multiple vitamin)

● Avoid copper cookware

Monitoring Your Copper Levels

Testing Your Copper Levels



Serum Copper

Normal: 75-145 mcg/L

Average in Cancer Patients: 135-165

Target Range: 50% of baseline

Ceruloplasmin

Normal: 20-35 mg/dL

Average in Cancer Patients: 30-65

Target Range: 50% of baseline

Need 3 months to reduce blood Cu level; 6 months to reduce tumor Cu level

Maintain hemoglobin at $\geq 80\%$ of baseline (≥ 9.0 g/dL)

Repeat testing every 2-6 months (depending on stage of cancer)

Physician Supervision is a MUST!

Putting It All Together: Multi-Targeted Approach

AGENTS	Modulate Gene Express.	Anti-Inflammatory	Anti-Angiogenesis	OTHER
Bromelain		*	*	complement chemo, immune support
Quercetin	*	*	*	induce apoptosis, complement chemo, reduce invasion & metastasis
Fish Oil	*	*	*	reduce wasting/cachexia
Vits A & D	*			induce differentiation, apoptosis
Green tea	*	*	*	complement chemo
Selenium	*			complement chemo, induce apoptosis
PSK/coriolus			*	complement chemo, immune support

Nourish Your Health

Blessings on Your Healing Journey

Jeanne M. Wallace, Ph.D., C.N.C.

Nutritional Solutions, Inc.,
2935 North, 1000 East
North Logan UT 84341

Phone: (435) 755-9996

nutritionalsolutions@comcast.net
www.nutritional-solutions.net

