

Antioxidant Use and Cancer Treatments

Interpreting Facts for Patients

Barbara L. Winters, PhD, RD

winters@es.marywood.edu

Marywood University
Scranton, PA

Evidence-Based Approach

- **Challenges in an exciting area**
- **Antioxidants: Be aware of the unknowns**
- **Continued Training**
 - **Peer review literature & courses**
 - **Ethical practices**
 - **Make use of known facts**

Cancer Treatment

Chemotherapy

- **Alkylating Agents** - cyclophosphamides
- **Anthracycline Antibiotics** - doxorubicin
- **Platinum Compounds** - cisplatin
- **Mitotic Inhibitors** - vincristine
- **Antimetabolites** - 5-fluorouracil
- **Camptothecin Derivatives** - topotecan
- **Biological Response Modifiers**- interferon
- **Hormonal Therapies** – tamoxifen

Radiation

Maintain Weight & Meet Nutrient Needs

Cancer Treatment Effects

- Digestive difficulties
- Weight loss
- Micronutrient deficiencies
- Fatigue



Data: Antioxidants During Treatment

- Levels of vitamins A, C, and Se ↓ during chemotherapy for breast cancer
- Vitamin C & antioxidant enzymes levels are significantly ↓ in children with acute lymphoblastic leukemia
- Vitamin E & retinol ↓ during Tx with doxorubicin

Evidence-Based Research

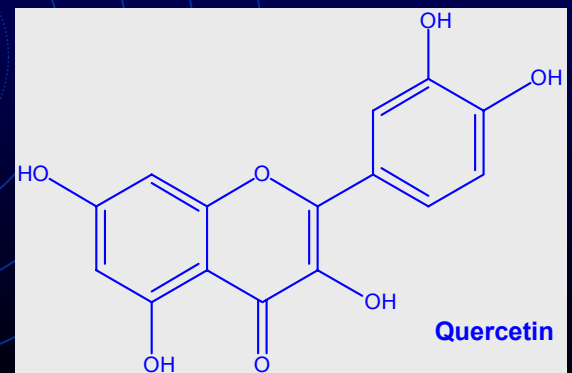
- Benefits of normalizing antioxidant levels during treatment have not been established.
- Prevention vs. Treatment
- Research evidence is complex and mixed

Overcoming Drug Resistance

- Antioxidant – Quercetin
- ↑↑ doxorubicin in breast cancer cells
- ↓↓ daunorubicin in colon cancer cells
- Differences in cell types

Scambia G et al. *Chemother Pharmacol* 1994;43:459-64

Critchfield JW et al. *Biochem Pharm* 1994;48:1437-45.



Beta Carotene & Chemotherapy

- **Beta-Carotene *Plus*:**
- Cyclophosphamide - ↑ tumor killing in solid tumors (mice)
- 5-FU - ↓ effect on reducing tumor cell in fibrosarcomas

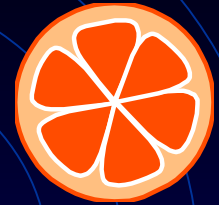
Thatcher et al. 1980 Cancer

Seifter et al. In Prasad K ed. Vit Nutr and Cancer 1984

Antioxidants: Interference

- **St. John's Wort**
- Interferes w/ metabolism of drugs
 - Cytochrome P450
- ↓↓ plasma levels of protease inhibitors, cyclosporin, cyclophosphamides

Flavones Antioxidants

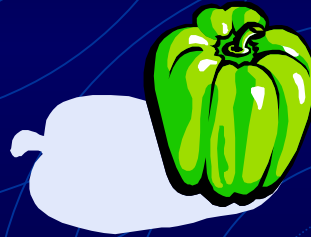


Hydroxyflavones

Apigenin

Luteolin

- Luteolin-6-C-glucoside
- Luteolin-7-glucosylrutinoside
- Luteolin-7-sophoroside



Methoxyflavones

Nobiletin

Sinensetin

Tangeretin

Selenium & Chemotherapy

- Se decreased nephrotoxicity of cisplatin and increased “antitumor” activity in animals
- Human study w/ Se was associated with reduction in nephrotoxicity
- **Long-term survival not explored**

Naganuma et al. J Pharm Dyn 1984
Hu et al. Biol Trace Elem Res 1997



Interpreting Facts for Patients



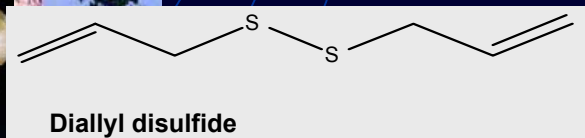
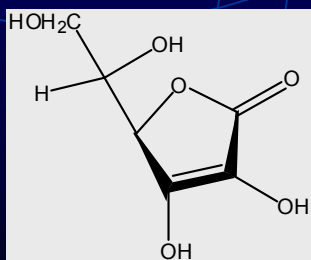
beta-carotene

Vitamin E



Selenium

Vitamin C



Diallyl disulfide

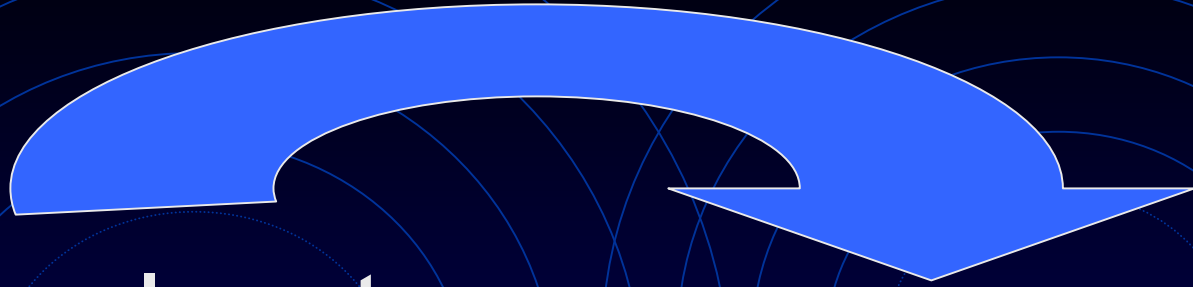
Antioxidants: How do we respond?

- **Support antioxidants during therapy ?**
 - Understanding of pharmacokinetics of the therapeutic agent & the supplement
 - Drug Clearance:
 - Extended or diminished exposure
 - Pharmacologist
 - Computer modeling

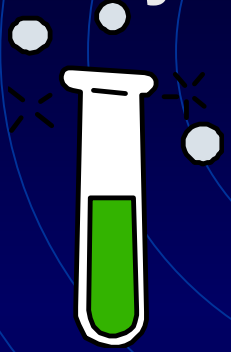
Antioxidants: How do we respond?

- Ignore lifestyle practices ?
- Forbid use during treatment ?

**Patients: No matter what they are told,
can still go home and do what they want**



Dietary Supplements



Nutrition Counseling



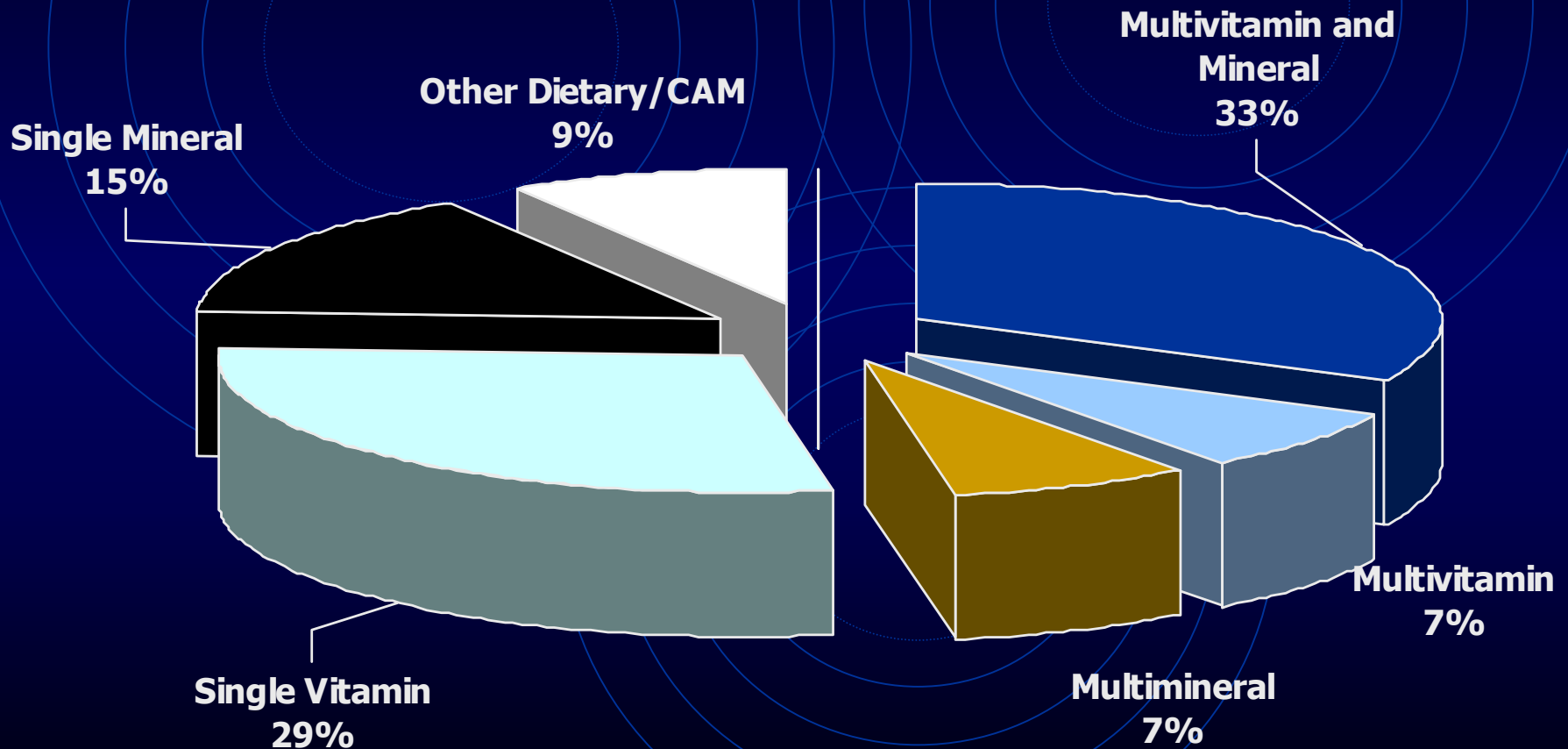
**Explore the use of
dietary supplements
during cancer
therapy**

Maintain an Open Dialog

- **Cancer Patient's Practices:**
- **Supplement Use: *Women's Intervention Nutrition Study (WINS) CA 45504***
- **American Health Foundation, UCLA-Harbor, UCLA, BIDMC Harvard Medical School**

WINS: Baseline Supplement Intake

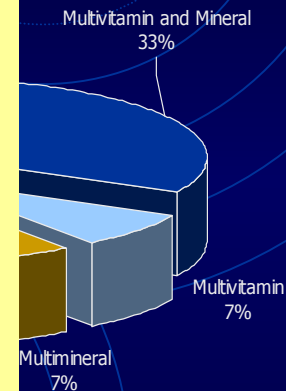
■ **81%** taking supplements



WINS: Baseline Supplement Intake by Product Type

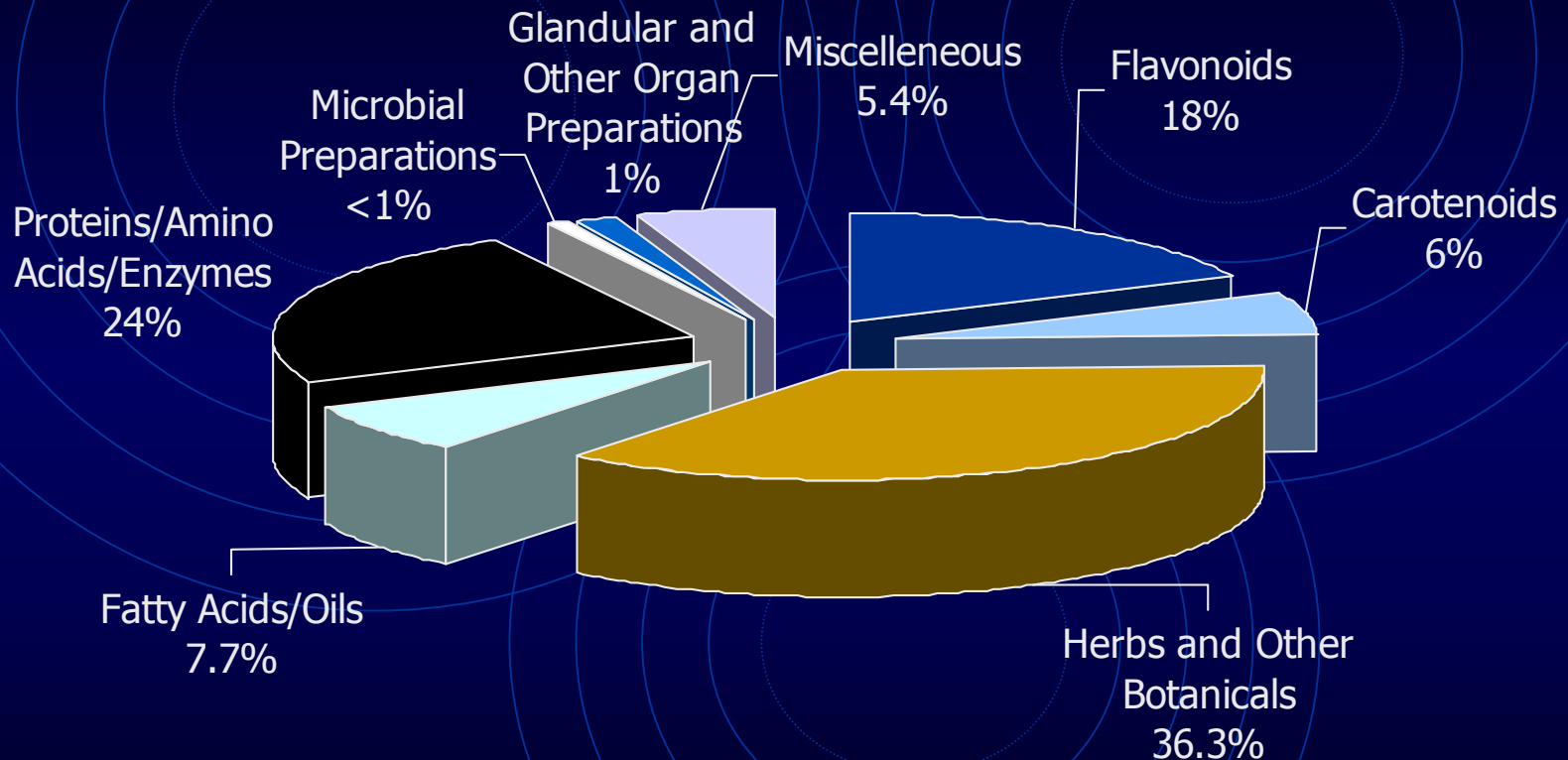
Vitamin E
Vitamin C
B-Caroten
Selenium

<u>%</u>	<u># Formulations</u>
45%	1-3
55%	4
10%	8+



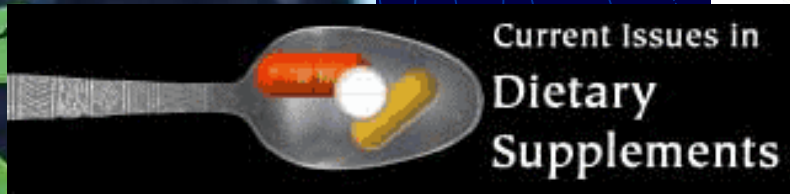
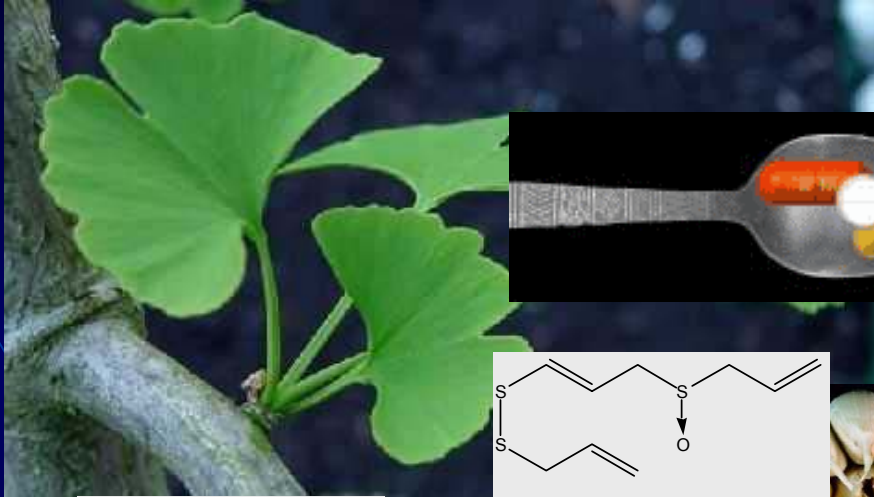
■81% taking supplements

WINS Baseline Complementary Supplements Intake

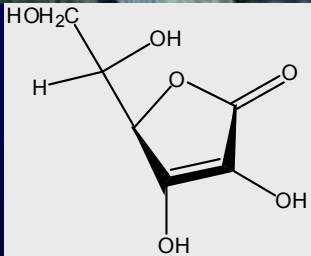
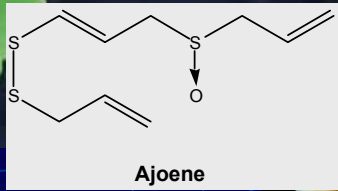


81% taking supplements of which **53%** are taking complementary.

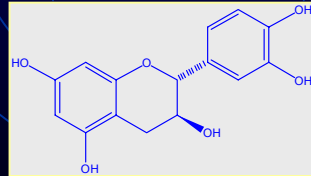
Protocols on Antioxidant Use



beta-carotene



Catechin



Reported Practices: Antioxidants During Tx

- Pharmacy policy against supplement use
- No formal policy: stays in nursing/MDs/RDs
- Ok, as long as below UL w/ complementary at recommended level on label
- Conflicting information given to Pts
- Counseled: Informed decision
- Monitor use and suggest delay – post Tx

Critical Considerations

Tumor: stage, type of CA, Tx

Diet: Baseline

Medical History

Genetics

Age: Adults or Children

**Lifestyle Practices:
weight,
smoking status, alcohol...**

Interpreting Facts for Patients

- Could the patient be sacrificing long-term cure for short-term improvement?
- Could the use of a single or multiple antioxidant combination be of benefit?

Interpreting Facts for Patients

- Evidence the supplement provides a safe means to tolerate therapy & that it will facilitate the patient in completing the protocol?
 - **What is the Efficacy ?**
- Have the risk/benefits been explained to the patient and have they understood?

Antioxidants & Cancer Treatment

- The number of individuals with suggestions and opinions outweighs the quantity/quality of supporting evidence.



Cancer Treatment & Control

Multi-Disciplined Training and Education

**Evidence
Based
Research**

**Dietary Supplements
Functional Foods
Genetics and Variable Responses
Counseling Techniques
Bio-behavioral Studies
Medical /Clinical Studies
Therapeutic agents**

**Evidence
Based
Counseling**



Welcome to the National
CARDS database Cancer
Institute

Center for the Study of
Alternative and Complementary Medicine

Welcome to the IBIDS
database

AMERICAN DIETETIC ASSOCIATION

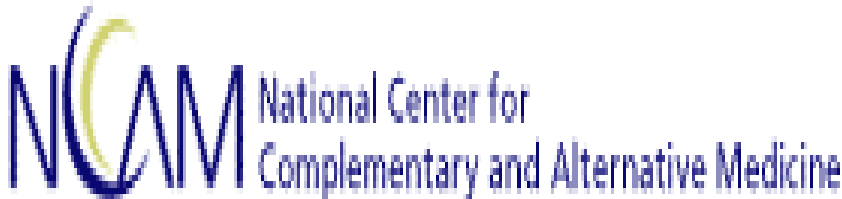
M. D. Anderson Cancer Center's
Complementary/Integrative Medicine Education
Resources (CIMER) website

- What Are Dietary Supplements?
- About ODS
- Announcements & News Releases
- Conferences, Meetings, & Events
- Grants, Awards, & Contracts
- Partnering Opportunities
- ODS Databases



Welcome to the "Botanicals for
Women's Health" CE course.

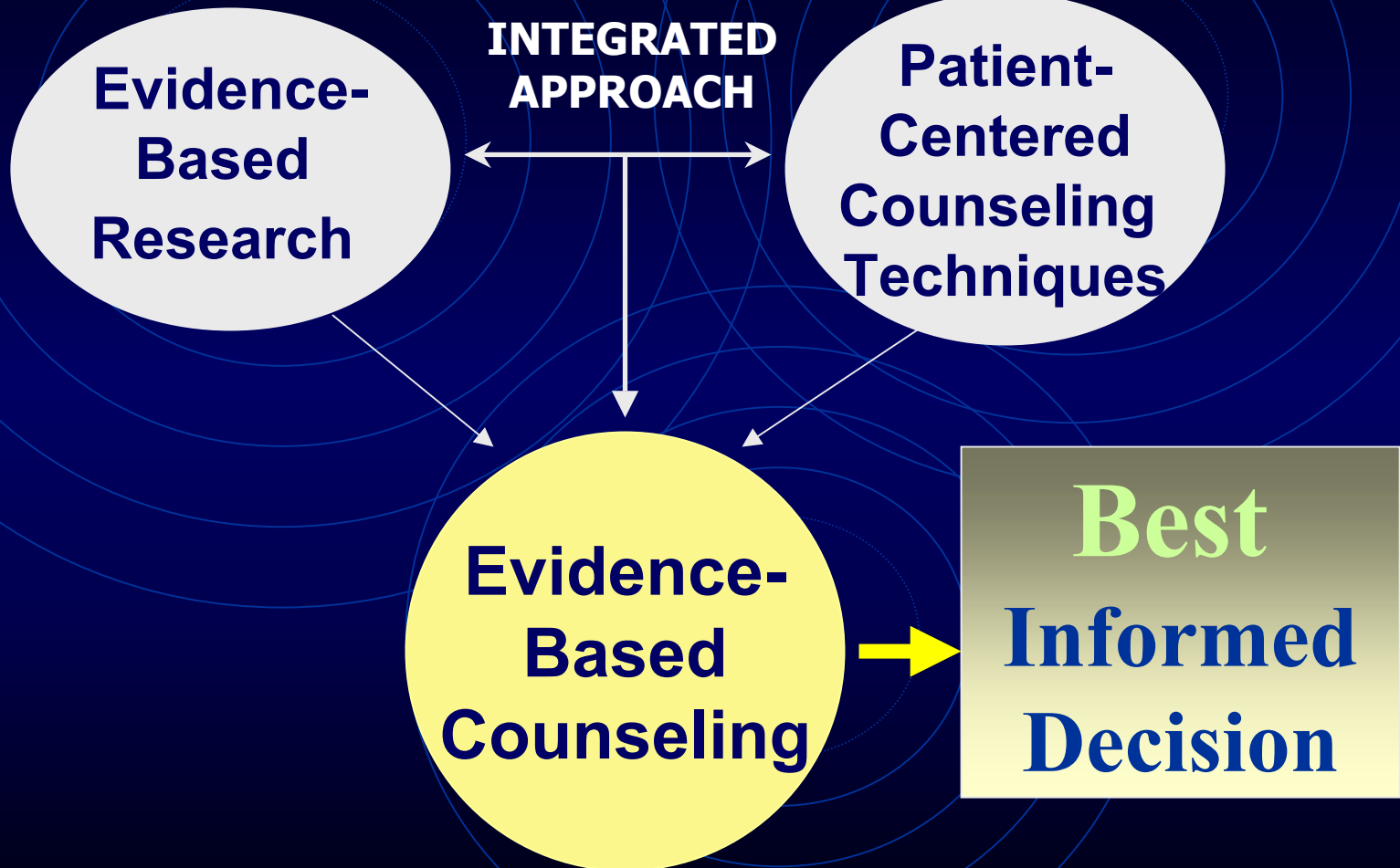
NAPRALERT



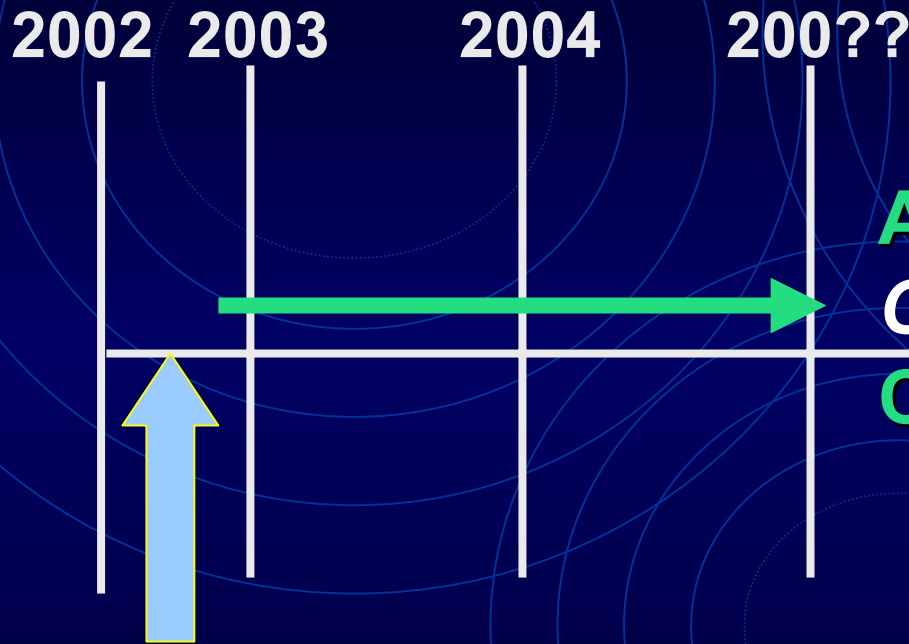
"WHAT IS BOTANICAL DIETARY
SUPPLEMENT RESEARCH?" AND
OTHER FAQs Univ. Illinois at Chicago

Antioxidants Use During Cancer Treatments

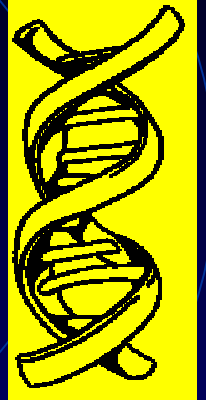
GOALS:



Recommendations during cancer treatment: Now and in the Future



Antioxidants:
Genetically Tailored
Counseling Strategies



Evidence-Based Counseling