



Myths and Facts about Cancer management

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COMPREHENSIVE CANCER CENTERS OF NEVADA

BOARD OF DIRECTORS NEVADA CANCER COALITION

Is cancer a death sentence?

- ▶ In the United States, the likelihood of dying from cancer has dropped steadily since the 1990s
- ▶ Five-year survival rates for some cancers, such as breast, prostate, and thyroid cancers, now are 90 percent or better
- ▶ The 5-year survival rate for all cancers combined is currently about 67 percent
- ▶ The person's overall health, and more also play equal role in success with Cancer

Cancer Treatments

- ▶ Standard therapy-Chemotherapy
- ▶ Radiation
- ▶ Immunotherapy
- ▶ Targeted therapy
- ▶ Clinical trials

Immunotherapy

- ▶ **Immunotherapy:** (biologic therapy) is a type of *cancer* treatment that boosts the body's natural defenses to fight *cancer*
- ▶ help the immune system attack the cancer directly or stimulate the immune system in a more general way
- ▶ B cells and T cells

Immunotherapy

- ▶ **Checkpoint inhibitors:** which are drugs that help the immune system respond more strongly to a tumor
- ▶ **Adoptive cell transfer,** which is a treatment that attempts to boost the natural ability of your T cells to fight cancer
- ▶ **Monoclonal antibodies:** immune system proteins created in the lab designed to attach to specific targets found on cancer cells
 - ▶ monoclonal antibodies mark cancer cells so that they will be better seen and destroyed by the immune system
 - ▶ stop cancer cells from growing or cause them to self-destruct
 - ▶ carry toxins to cancer cells

Immunotherapy

- ▶ **Treatment vaccines:** work against cancer by boosting your immune system's response to cancer cells
- ▶ **Cytokines:** which are proteins made by your body's cells
- ▶ **BCG:** (Bacillus Calmette-Guérin) is an immunotherapy that is used to treat bladder cancer. BCG causes an immune response against cancer cells
- ▶

Immunotherapy/Biological therapy

MYTHS

- ▶ Safe
- ▶ Minimal toxicity
- ▶ Helps all cancers
- ▶ Less expensive

Facts about immunotherapy

- ▶ **No magic bullet**
- ▶ Immunotherapy and targeted therapy are not magic bullets
- ▶ Side effects do occur and sometime fatal
- ▶ Safe but need close monitoring
- ▶ Many immune mediated side effects are common
- ▶ Potential for long term cure
- ▶ Optimum choice depends on sequence or combination and type of cancer and the stage of the cancer
- ▶ Very expensive treatments



Choices cancer patients make ..

Complementary and alternative therapy (CAM)

▶ Complementary Medicine :

- ▶ different kinds of herbs, botanicals, and dietary supplements
- ▶ treatment that is used along with standard treatments but is not considered standard.

▶ Alternative medicine is treatment that is used instead of standard treatments

▶ Integrative therapy is medical care that combines standard care with CAM practices

CAM/ALTERNATIVE THERAPY FOR CANCER

1. Multiple studies have found that up to 90 percent of patients with cancer used a CAM approach for at least a part of their therapy
2. Increased psychosocial stress (eg, anxiety, depression)
3. Being given a less hopeful prognosis
4. Having the feeling of "nothing to lose"
5. Attending support group

SAFETY ISSUES WITH COMPLEMENTARY AND ALTERNATIVE TREATMENTS

- Herbal medications may produce serious side effects
- Quality control of these preparations can be a major concern

Common alternative therapies and side effects

Medication

St. John's wort

Saw palmetto

Ginseng Sedative

Green tea

Shark cartilage

Indication

Depression

Benign prostatic hypertrophy

Sedative

Prostate cancer

Cancer

Side effects

Nausea, hypersensitivity reactions

Diarrhea, constipation, headache, hypertension, nausea, urinary retention

Diarrhea, headache, hypertension, insomnia, nausea

Emesis, insomnia, diarrhea, confusion

Emesis, constipation, hepatitis

Cytochrome P 450 system

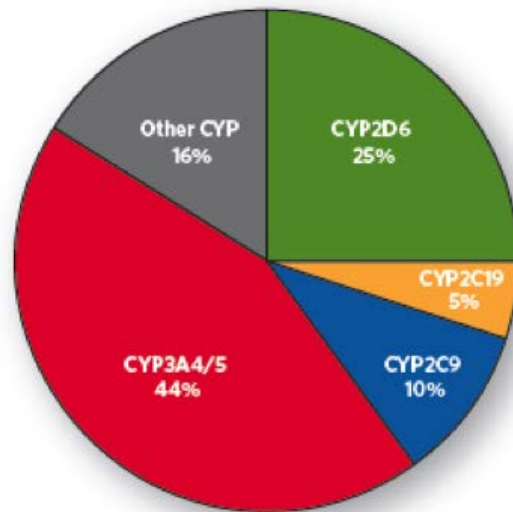
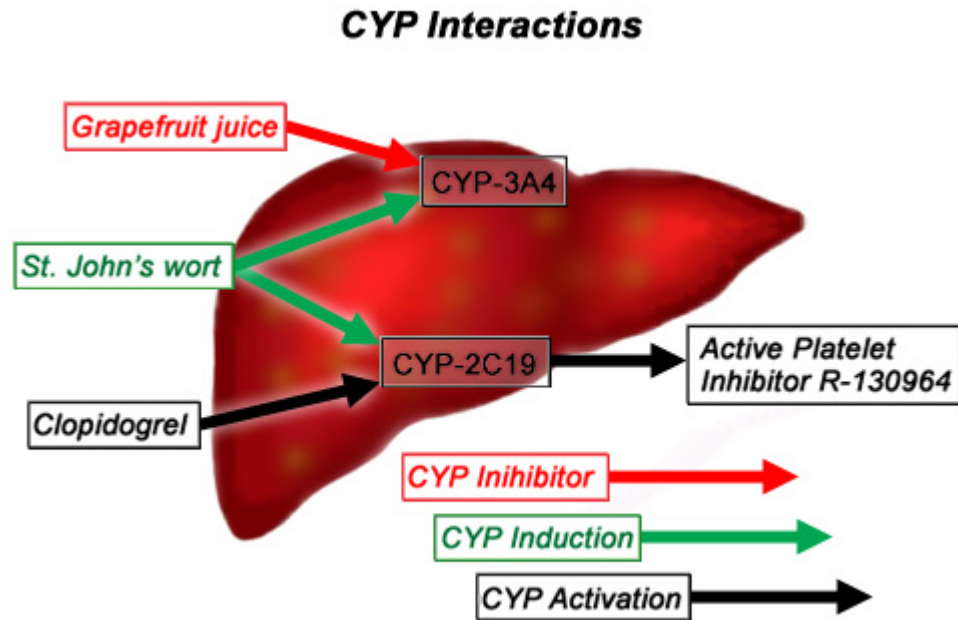


Figure 3: Relative importance of polymorphisms in human cytochrome P450 enzymes involved in drug metabolism

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Cytochrome P 450 system



Interactions of CAM with conventional treatment

- ▶ **St John's wort** induces CYP3A4 which can lead to subtherapeutic levels of chemotherapeutic agents that are metabolized by CYP3A4
- ▶ **Polyphenols in green tea** inhibit multiple cytochrome p450 enzymes, which are important in drug metabolism
- ▶ **milk thistle** has the potential to decrease the metabolism of some cytotoxic agents such as taxanes
- ▶ **Panax ginseng and ginkgo biloba** increase the functional activity of several drug-metabolizing enzymes of the CYP family
- ▶ **Botanical agents (eg, berberine)** reduces the sensitivity of these cells to chemotherapy-induced apoptosis

Can delay or avoidance of conventional therapy of known benefit improve survival?

- ▶ FACTS:
- ▶ Not many large studies
- ▶ National Cancer Database between 2004 and 2013 retrospective report
- ▶ About 258 patients diagnosed with non metastatic breast, prostate, lung, and colorectal cancer
- ▶ Compared alternative medicine treatment as the sole therapy
- ▶ matched cohort of 1032 patients who received conventional cancer therapy

Can delay or avoidance of conventional therapy of known benefit improve survival?

▶ **FACTS:**

▶ Patients who chose alternative therapy:

- ▶ had higher refusal rates for surgery
- ▶ radiation therapy (53 versus 22 percent)
- ▶ chemotherapy (34 versus 3 percent)
- ▶ hormone therapy (34 versus 3 percent)

▶ Alternative medicine use was associated with worse five-year overall survival

▶ greater risk of death (hazard ratio [HR] 2.08, 95% CI 1.50-2.90)

▶ High mortality risk associated with use of alternative treatments was mediated by the refusal of conventional cancer therapy

Myth: Alternative therapy does not impact survival in Cancer patients

- ▶ **FACTS:** Alternative therapy used as primary treatment for breast cancer **negatively** impacts outcomes. **Ann Surg Oncol. 2011;18(4):912.**
- ▶ **RESULTS** A total of 61 patients was identified; median age was 53. Median follow-up was 54 months
- ▶ The mean 10-year survival calculated for those omitting surgery was **69.5%**; observed survival for this group was **36.4%** at a median follow-up of 33 months.



Does it really matter.....

What we eat in Cancer ?

DIETS and risk of Cancer

Macrobiotic diets –

- a high-complex carbohydrate, low fat vegetarian diet in cancer
- patients is limited
- two methodologically flawed retrospective studies
- no controlled trials are available
- one-third of cancer patients on a macrobiotic diet experience problems due to weight Loss

DIETS and risk of Cancer

Kelley-Gonzalez regimen — dietary restriction, intake of digestive aids (eg, pepsin and pancreatic enzymes), and a "detoxification" regimen that includes frequent coffee enemas

Pancreatic cancer study at Columbia University

compares outcome in Gonzalez regimen with an externally matched group who receive standard gemcitabine-based combination chemotherapy

DIETS and risk of Cancer

Selected vegetables and herb mix (SV) is a blended, boiled, and freeze-dried product containing ingredients with purported immune-stimulatory and anticancer properties

- soybeans, mushrooms, mung beans, red dates, scallion, garlic, lentils, leek, hawthorn fruit, onion, ginseng, angelica, dandelion, senega root, licorice, ginger, olives, sesame seeds, and parsley

DIETS and risk of Cancer

- In a matched-control study: stage III/IV non-small cell lung cancer (NSCLC)
- median survival duration among the **11 patients** who ingested SV daily was three-fold longer than that of 13 patients who did not receive the supplement (15 versus 4 months)
- **Second study:** median survival was 33.5 months for the **12 patients** who used SV for two months or longer, and at five years, 50 percent of the patients remained alive.

SV by Cancer Advisory Panel for Complementary and Alternative Medicine judged worthy of further definitive research.

DIETS and risk of Cancer

Myth:

Proponents of "alternative" diets claim that prolongation of life through adherence to a specific diet is an achievable goal for cancer patients

Facts: systematic review of the evidence found that none of the many dietary regimens has been convincingly shown to cure cancer or significantly prolong the life of cancer patients

Green Tea / anti tumor activity???

Green tea — biologically active polyphenols

- Green tea is the most widely used herbal product- 24 to 30 percent of all cancer patients
- **polyphenols** in green tea have limited data on possible clinical efficacy
- A **single case control study** from China suggested that consumption of large amounts of green tea may have a protective effect against the development of prostate cancer
- **case-control and cohort studies** have **not found a link between** green tea intake and prostate cancer risk among Japanese men or Japanese-Americans living in Hawaii
- phase I study in lung cancer, phase II study in prostate cancer patients showed no antitumor activity

Green Tea / anti tumor activity???

Green tea — biologically **active polyphenols**

- **polyphenols in green tea inhibit multiple cytochrome p450 enzymes**
- green tea could increase the plasma concentrations of a variety of chemotherapeutic agents (eg, anthracyclines and taxanes)
- drug-metabolizing enzymes are induced
- resistance to other chemotherapeutic agents



Google image

Green Tea / anti tumor activity???

Dr Lee study of Green tea —
biologically active
**Epigallocatechin
gallate (EGCG)** is the most
frequently cited beneficial
agent in green tea.

EGCG works to change the
metabolism of the cancer cells
by suppressing the expression of
LDHA (lactate dehydrogenase
A), an enzyme critical for
cancer metabolism and survival

Work in Progress.....



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Myth: Traditional Chinese medicine reduce risk of chemo toxicity

- Efficacy in chemotherapy-related toxicity is unclear
- **Double-blind, placebo-controlled trial**, in which 120 patients receiving adjuvant chemotherapy for breast or colon cancer
- active herbs or a matched control were dispensed in a blinded fashion
- No difference between the two groups in hematologic toxicity, which was the primary end point
- some statistically significant difference was a reduction in the severity of nausea with active treatment

Myth: Traditional Chinese medicine reduce risk of chemo toxicity

- Efficacy in chemotherapy-related toxicity is unclear
- four trials in which 270 patients with advanced or late stage gastric cancer
- traditional Chinese medicinal herb **Huachansu** (wild toad extract) plus chemotherapy compared with the same chemotherapy alone
- relatively weak evidence that Huachansu improved leukopenia when used together with chemotherapy
- **Did not improve short-term efficacy** of chemotherapy
- meta-analysis that pooled results from four trials of systemic chemotherapy with and without injectable traditional Chinese herbs (Huachansu, Aidi, Fufangkushen, or Shenqifuzheng showed **no benefit**)

Myth: Traditional medicines have anti cancer efficacy

Mistletoe — Mistletoe extracts (Isador, Helixor) contain various lectins and viscotoxins (including viscum fraxini-2)

- In vitro experiments and animal models suggests that these components have some anticancer activity
- dozens of matched pair cohort studies
- randomized trials with **conflicting results**
- meta-analysis suggested a **modest survival benefit** for cancer patients who received the mistletoe preparation
- was a high probability of **publication bias**
- Numerous adverse effects are on record; the most serious is **anaphylactic shock**

Myth: Traditional medicines have anti cancer efficacy

Shiitake and Reishi mushrooms — polysaccharide components exhibit antitumor activity

- open-label study in which 62 men with advanced prostate cancer received oral extracts of shiitake mushroom daily for six months
- clinical endpoint was the tumor marker, serum prostate specific antigen (PSA)
- By six months, 23 patients had a rising PSA, while 38 remained stable
- shiitake mushroom extract **alone was an ineffective treatment for men with clinical advanced prostate cancer**
- five randomized trials (373 subjects) comparing the antitumor efficacy of *G. lucidum* against an active or placebo control concluded that there were **marginal benefits**

Myth: Vitamin C has anti cancer properties

- Vitamin C — many patients who have cancer take supplemental vitamin C, often at high doses
- Double-blind trials of oral vitamin C have **failed to demonstrate any benefit** in terms of cancer outcomes
- High-dose intravenous (IV) vitamin C is widely used by practitioners of CAM
- **Four phase I trials** have been conducted to evaluate high dose IV vitamin C in patients with advanced cancer
- no trial has adequately addressed antitumor efficacy
- While high-dose vitamin C is relatively nontoxic as it is excreted in the urine
- Patients **taking bortezomib** should refrain from taking supplemental doses of vitamin C

Myth: People with cancer shouldn't eat sugar, since it can cause cancer to grow faster

- ▶ **Fact:** Sugar doesn't make cancer grow faster
- ▶ All cells, including cancer cells, depend on blood sugar (glucose) for energy
- ▶ depriving cancer cells of sugar doesn't slow their growth
- ▶ some evidence that consuming large amounts of sugar is associated with an increased risk of certain cancers, including esophageal cancer
- ▶ weight gain and increase the risk of obesity and diabetes

Does high intake of Sugar cause Cancer?

- ▶ modest association between diabetes and risk for Gall bladder cancer (GBC)
- ▶ obesity and a higher risk of gallstones
- ▶ An association between consumption of sweetened beverages and GBC was suggested in a prospective analysis of 70,832 Swedish adults enrolled in the **Swedish Mammography Cohort and the Cohort of Swedish Men**
- ▶ **Swedish Cancer Register** : women and men in the highest category of combined sugar-sweetened and artificially sweetened beverage consumption had a significantly higher risk of GBC

Red meat and Cancer

- ▶ Red meat — High intake of red meat has been associated with increased risk of colon cancer
- ▶ A meta-analysis found a dose-response relationship based on 10 cohort studies, with risk increased by 17 percent (CI 1.05-1.31) per 100 g/day of red meat
- ▶ The working group concluded that evidence was sufficient to identify carcinogenicity for processed meat

Vitamins and Cancer

Vitamin A

- ▶ Increased risk for Lung cancer
- ▶ Decreased incidence of non cardia stomach cancer

B complex Vitamins

- ▶ Decreased intake of folate with higher risk of colon polyps.
- ▶ Dietary folate with reduced risk of pancreatic cancer, esophageal squamous cell cancer
- ▶ Reduced risk of colon cancer

Cancer and Vitamins

- ▶ Vitamin E and Cancer;
- ▶ Previously protective for Prostrate cancer
- ▶ Study of 35,000 men
- ▶ Randomized to either vitamin E, selenium, both, or a placebo.
- ▶ Compared to those who had taken a placebo, the men who had taken vitamin E had a 17 percent **increased** risk of developing prostate cancer.
- ▶ No link was found with selenium

Cancer and Vitamins

- ▶ **Circulating Vitamin D and Colorectal Cancer Risk: An International Pooling Project of 17 Cohorts**
- ▶ *JNCI: Journal of the National Cancer Institute*
- ▶ **Published:** 14 June 2018

Cancer and Vitamin D

- ▶ data from 17 cohorts
- ▶ Nearly 5706 colorectal cancer case participants and 7107 control participants with a wide range of circulating 25(OH)D concentrations
- ▶ **Results**
- ▶ deficient 25(OH)D (<30 nmol/L) was associated with **31% higher colorectal** cancer risk (RR = 1.31, 95% confidence interval [CI] = 1.05 to 1.62)

Complementary and alternative therapy (CAM)

- ▶ Complementary and alternative medicine (CAM) **are not part** of standard medical care
- ▶ CAM for cancer care involves the patient's mind, body, and spirit, and includes multidisciplinary approaches
- ▶ **Evidence-based complementary medicine** modalities may be integrated as part of standard cancer care for all patients across the cancer continuum.
- ▶ Standard treatments are based on scientific evidence from research studies
- ▶ Despite claims many CAM treatments lack good scientific evidence of their safety and effectiveness
- ▶ Studies are under way to determine the safety and efficacy of many CAM agents and practices for cancer patients.



How worried are we about

Radiation from scans/imaging?

Myth: Imaging increases risk of cancer

Classification of Medical Imaging Modalities:

- **X-Ray Imaging** (Imaging techniques *utilizing ionizing radiation*).
 - Conventional Radiography.
 - Tomography.
 - Computed Tomography.
 - Cone Beam Computed Tomography
- **Magnetic Resonance Imaging**
- **Ultrasound Imaging**
- **Nuclear Imaging** (Molecular imaging)

Facts: Potential carcinogenesis from imaging

- ▶ Lancet. 2004;363(9406):345 International Study
- ▶ Risk of cancer from diagnostic X-rays
- ▶ FINDINGS: in the UK about 0.6% of the cumulative risk of cancer to age 75 years could be attributable to diagnostic X-rays = to about 700 cases of cancer per year
- ▶ In 13 other developed countries, estimates of the attributable risk ranged from **0.6% to 1.8%**
- ▶ In Japan, the highest estimated annual exposure frequency in the world was **more than 3%**.

CT scans and Cancer risks

- ▶ The potential lifetime-attributable risk (LAR) of cancer for coronary computed tomography angiography (CCTA) varies markedly with age and sex
- ▶ The LAR of cancer is much greater for women, younger age
- ▶ a single helical 64-slice CCTA with a lifetime cancer risk estimate of 1 in 143 (0.7 percent) in a 20-year-old woman and 1 in 466 (0.2 percent) in a 60-year-old woman
- ▶ Lower risk with contemporary scanning protocols

CT scans and Cancer risks

- ▶ Estimating risk of cancer associated with radiation exposure from 64-slice computed tomography coronary angiography: **JAMA. 2007;298(3):317**
- ▶ RESULTS: Organ doses ranged from 42 to 91 mSv for the lungs and 50 to 80 mSv for the female breast.
- ▶ Estimated cancer risks using ECTCM for a 60-year-old woman and a 60-year-old man were 1 in 715 and 1 in 1911, respectively
- ▶ A combined scan of the heart and aorta had higher LARs, up to 1 in 114 for a 20-year-old woman.
- ▶ The highest organ LARs were for lung cancer and, in younger women, breast cancer

How can we minimize risk?

- ▶ Guidance documents for minimizing radiation exposure
- ▶ Appropriateness guidelines and/or decision support tools for imaging exam ordering
- ▶ Mechanisms to avoid duplication imaging
- ▶ Individualized image acquisition
- ▶ Utilization of evolving scanning technologies
- ▶ Longitudinal and systematic exam dose monitoring and tracking by the imaging facility

Myth: hair dye use can increase the risk of cancer?

Why is there concern that hair dyes may cause cancer?

- ▶ **Permanent hair dyes**, which make up about 80% of “intermediates” (chemicals called aromatic amines) and dye “couplers
- ▶ Over 5,000 different chemicals are used in hair dye
- ▶ **epidemiologic (population) studies** have found an increased risk of bladder cancer in hairdressers and barbers
- ▶ chemicals hair dye workers are exposed to occupationally are “**probably carcinogenic** to humans-IARC
- ▶ Relatively **few studies**

Facts

- ▶ IARC Working Group concluded that personal use of hair dyes is “**not classifiable as to its carcinogenicity to humans**”

Leukemia and Hair dye

Myths

- ▶ Does hair dye use increase the risk of Leukemia?
- ▶ **one case-control study:** hair dye use among 769 patients with adult acute leukemia and 623 people without leukemia in the United States and Canada
- ▶ **No risk increases** were seen among users of more recent dye formulations.
- ▶ Risk was greatest among those who had used permanent dyes for longer durations (**15 or more years**)

Facts

- ▶ Some evidence to suggest that the older dyes can be associated with Leukemia

Myth: antiperspirants increase risk of Breast cancer

- ▶ **Antiperspirants/Deodorants and Breast Cancer**
- ▶ Study published in 2002, 2006 :**no increase in risk for breast cancer** among women who reported using an underarm antiperspirant or deodorant
- ▶ Retrospective Cohort Study: frequency of underarm shaving and antiperspirant/deodorant use among 437 breast cancer survivors
- ▶ Antiperspirants do not increase risk of Breast cancer
- ▶ Small inconclusive studies
- ▶ Not validated
- ▶ Retrospective studies
- ▶ additional research would be needed

Myth: Cancer treatments cause irreversible Hair loss

- ▶ Hair loss is a transient and usually (not always) completely reversible
- ▶ Psychologically devastating
- ▶ Chemotherapy agents can affect the growing cells of the hair follicle
- ▶ The frequency and severity of alopecia varies depending upon the specific chemotherapy agent or combination regimen
- ▶ The majority of chemotherapy-induced alopecia is **reversible**
- ▶ Permanent alopecia seen with **Radiation therapy, Docetaxol based chemo**

Can we prevent Hair loss during cancer treatments?

- ▶ **Scalp hypothermia** (scalp cooling)
- ▶ Digni Cap and Paxman scalp hypothermia systems/ FDA approved
- ▶ several older randomized trials reported significantly less hair loss with scalp hypothermia
- ▶ About 50 and 80 percent of patients are reported to have a good to excellent
- ▶ **meta-analysis in 2015** concluded that scalp hypothermia was the **only intervention that significantly reduced** the risk of chemotherapy-induced alopecia (10 studies, including three randomized trials, relative risk 0.38, 95% CI 0.32-0.45)
- ▶ No significant adverse effects
- ▶ cost range between USD \$1500 and \$3000 per patient depending on the number of treatment cycles
- ▶ costs associated with extra time in the chemotherapy infusion center and additional personnel costs
- ▶ not yet covered by health insurance

Cancer treatments and Hair loss

- ▶ Topical Bimatoprost
- ▶ Topical Cyclosporine a potent immunosuppressant hair growth in murine models
- ▶ Alpha tocopherol
- ▶ Use of immunotherapy/targeted therapy
- ▶ combined use of EGFR inhibitors with cytotoxic agents results in less alopecia
- ▶ keratinocyte growth factor

Caffeine and Cancer

Breast Cancer Risk

- ▶ relationship between caffeine consumption and breast cancer is **uncertain**
- ▶ **Women's Health Study:** no association between breast cancer and intakes of coffee or caffeinated beverages
- ▶ **case-control study of 1932 cases** of incident breast cancer to hospital-based controls, 40 percent lower risk for breast cancer in coffee consumers
- ▶ **matched case-control study of 1690 women** with a BRCA1 or BRCA2 mutation, coffee intake was associated with 69 percent lower risk for breast cancer

Gastrointestinal cancer

- ▶ **Meta-analysis** of one cohort and eight case-control studies found that coffee consumption was associated with a **lower risk** of cancers of the **oral cavity and pharynx**
- ▶ **a protective factor** against **liver cancer**, including hepatocellular carcinoma
- ▶ **Colorectal cancer** – Observational studies have found **conflicting evidence** on the relationship between coffee consumption and risk of colorectal cancer (CRC)

Caffeine and Cancer

Cancer Risk

- ▶ **Ovarian cancer** — meta-analysis of 11 prospective cohort studies (five of coffee drinking, six of tea drinking) found **no association** between coffee or tea drinking
- ▶ **Bladder cancer** — Previous studies examining caffeine consumption and urinary tract cancers found a **small increase in bladder cancer risk** among coffee drinkers

Lung cancer

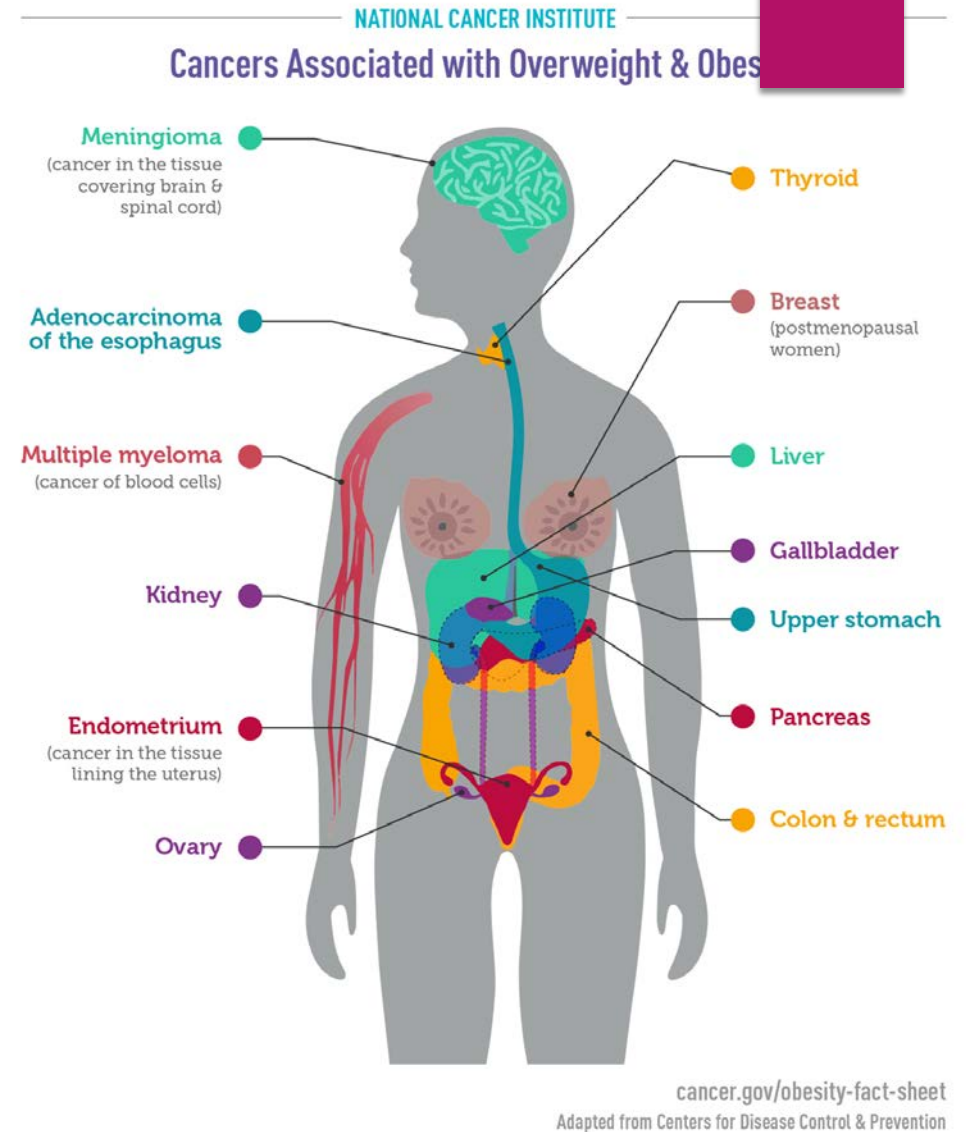
- ▶ **Lung cancer** — Meta-analyses suggest that caffeinated coffee is associated with an **increased risk** for lung cancer

Myth: Tumor Biopsy or Surgery Cause Cancer to Spread

- Biopsies are incredibly valuable:
 - definitive cancer diagnosis and planning the correct treatment for the patient
- Study of more than 2,000 patients carried out by Mayo Clinic scientists dispelled the myth that cancer biopsies cause disease to spread
- patients who have biopsy had a better outcome
- longer survival than patients who did not have a biopsy

What is known about the relationship between obesity and cancer?

- ▶ Large cohort studies/ observational studies
- ▶ observational studies can be difficult to interpret and cannot definitively establish that obesity causes cancer



What is known about the relationship between obesity and cancer?

- **Endometrial cancer:** **two to about four times** as likely as normal-weight women to develop endometrial cancer (cancer of the lining of the uterus)
- **Esophageal adenocarcinoma:** **twice** as likely as normal-weight people to develop a type of esophageal cancer called esophageal adenocarcinoma
- **Gastric cardia cancer:** **twice** as likely as normal-weight people to develop cancer in the upper part of the stomach
- **Liver cancer:** **twice** as likely as normal-weight people to develop liver cancer. The association between overweight/obesity and liver cancer is stronger in men than women
- **Pancreatic cancer:** about **1.5 times** as likely to develop pancreatic cancer as normal-weight people

What is known about the relationship between obesity and cancer?

Gallbladder cancer: about **20% increase in risk of gallbladder cancer**, extreme obese have a 60% increase in risk of gallbladder cancer

Breast cancer: Among postmenopausal women, those who are obese have **a 20% to 40%** increase in risk of developing breast cancer compared with normal-weight women

In premenopausal women with a 20% decreased risk of breast tumors that express hormone receptor

Ovarian cancer: Higher BMI is associated with a slight increase in the risk of ovarian cancer, particularly in women who have never used menopausal hormone therapy

Thyroid cancer: Higher BMI (specifically, a 5-unit increase in BMI) is associated with a slight (10%) increase in the risk of thyroid cancer

How might obesity increase the risk of cancer?

Obesity:

- Fat tissue (also called adipose tissue) produces excess amounts of estrogen
- increased blood levels of insulin and IGF-1
- High levels of insulin and IGF-1 may promote the development of colon, kidney, prostate, and endometrial cancers
- Fat cells produce adipokines, hormones that may stimulate or inhibit cell growth
- Fat cells may also have direct and indirect effects on other cell growth regulators, including mammalian target of rapamycin (mTOR) and AMP-activated protein kinase.

How might obesity increase the risk of cancer?

Obesity:

- chronic low-level inflammation
- DNA damage from inflammation that leads to cancer
- chronic local inflammation induced by gastritis, Barrett esophagitis with esophageal adenocarcinoma
- Gallstones/inflammation/gall bladder cancer
- chronic inflammatory bowel disease/hepatitis with colon and liver cancer

Is Weight gain after a breast cancer diagnosis associated with an increased risk of recurrence?

- Nurses' Health Study (NHS), nonsmoking women previously treated for breast cancer who gained more than 2 kg/m² had an **increased risk** of breast cancer death
- Analysis of 3215 women from the Life After Cancer Epidemiology (**LACE**) cohort and the **WHEL study** control group, weight gain after diagnosis was **not associated** with an increased risk of recurrence
- CONFLICTING REPORTS

Does Weight loss during cancer treatments improve outcome?

Lifestyle Intervention Study for Adjuvant Treatment of Early Breast Cancer (LISA)

- 338 postmenopausal women with hormone receptor-positive breast cancer to a two-year telephone-based weight loss intervention or to usual care
- Patients in the intervention group also reported significant improvements in physical functioning scores

Exercise and Nutrition to Enhance Recovery and Good Health for You (ENERGY) Trial

randomized 692 women with a history of breast cancer to a group-based weight loss program ... ONGOING STUDIES

breast cancer-specific and overall mortality **NOT YET DETERMINED**

Does avoiding weight gain or losing weight decrease the risk of cancer?

Obesity:

- evidence from multiple observational studies is consistent
- people who have lower weight gain during adulthood have lower risks of colon cancer, kidney cancer, and—for postmenopausal women—breast, endometrial, and ovarian cancers
- Obese people who have bariatric surgery appear to have lower risks of obesity-related cancers than obese people who do not have bariatric surgery
- women gaining more than 5% of body weight was associated with increased breast cancer risk

Summary

- Less research has been done for CAM than for standard treatments
- Quality control of Herbal or alternative preparations can be a major concern
- Despite claims many CAM treatments lack good scientific evidence of their safety and effectiveness
- Studies are under way to determine the safety and efficacy of many CAM agents and practices for cancer patients

Summary

- Oncologists are concerned about the high level of acceptance of alternative therapies
- Outright rejection of these treatments might be counter-productive
- An open mind toward plausible CAM options might therefore be a good general policy
- Outright rejection alienates patients and negatively affects the therapeutic relationship

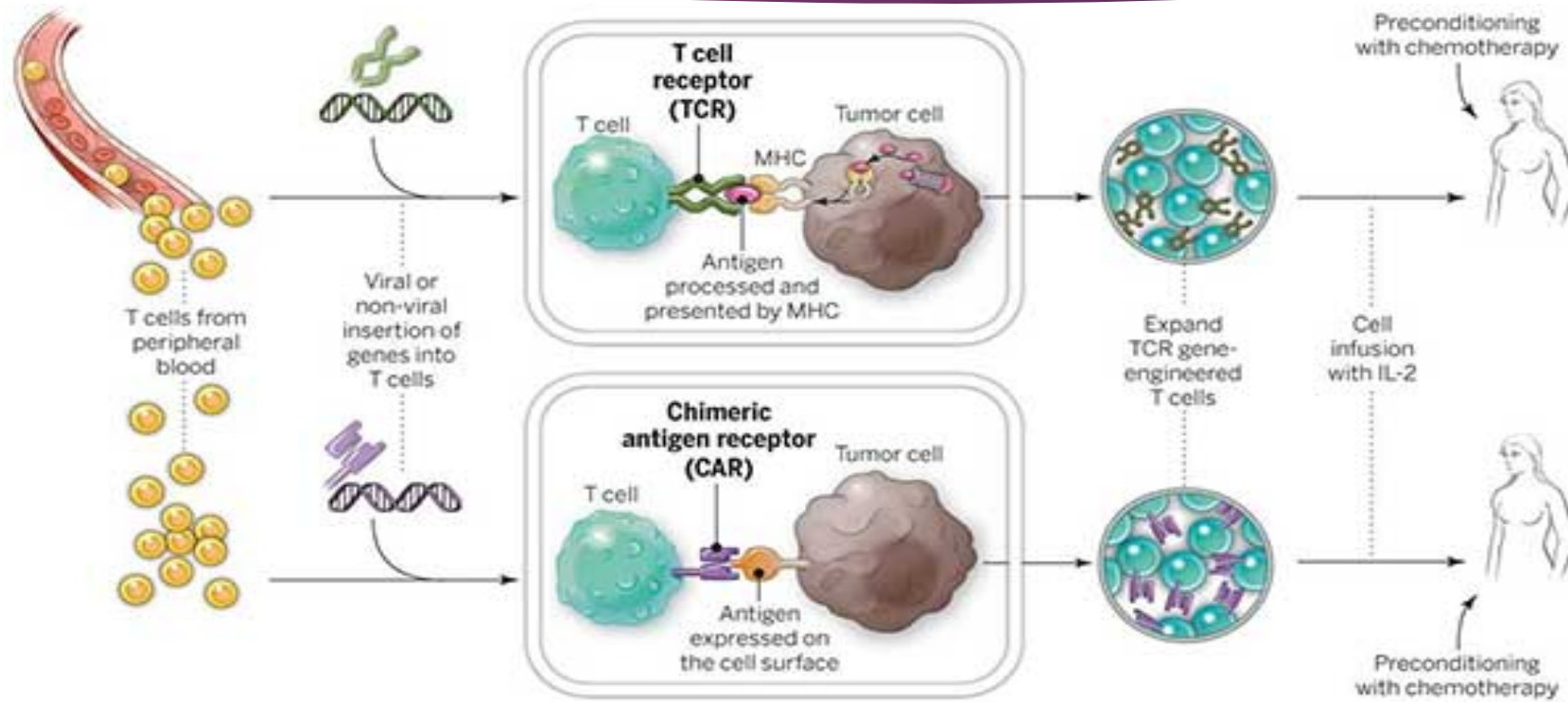


Thank You

If someone in my family has cancer, am I likely to get cancer, too?

- **Not necessarily**
- Cancer is caused by harmful changes (mutations) in genes
- about 5 to 10 percent of cancers are caused by harmful mutations that are inherited from a person's parents.
- In families with an inherited cancer-causing mutation, multiple family members will often develop "familial" or "hereditary" cancers
- About 90 to 95 percent of cancers are caused by mutations that happen during a person's lifetime : "non-hereditary" or "spontaneous" cancers

Immunotherapy



CAR T cells and TCR T cells are engineered to produce special receptors on their surfaces. They are then expanded in the laboratory and returned to the patient.

Credit: National Cancer Institute

Immunotherapy

- ▶ **CAR T Cells:** Engineering Patients' Immune Cells to Treat Their Cancers
- ▶ **Adoptive cell transfer (ACT):** collecting and using patients' own immune cells to treat their cancer
- ▶ draw blood from patients and separate T cells
- ▶ Using a disarmed virus, the T cells are genetically engineered to produce receptors on their surface called chimeric antigen receptors, or CARs
- ▶ CAR's injected back to patient after chemotherapy to fight cancer
- ▶ special receptors allow the T cells to recognize and attach to a specific protein, or antigen on tumor cells.

Immunotherapy

- ▶ Once the collected T cells have been engineered to express the antigen-specific CAR, they are “expanded” in the laboratory into the hundreds of millions
- ▶ “lymphodepleting” chemotherapy regimen
- ▶ The final step is the infusion of the CAR T cells into the patient
- ▶ Engineered cells further multiply in the patient’s body
- ▶ engineered receptor, recognize and kill cancer cells that harbor the antigen on their surfaces

Battling Cancer Fatigue

Medication

- ▶ Ginseng and guarana
- ▶ Glucocorticoids
- ▶ Antidepressants
- ▶ Methylphenidate and dexamethylphenidate

Other

- ▶ Exercise
- ▶ Sleep disturbance
- ▶ Transfusions
- ▶ Epogen
- ▶ Cognitive-behavioral and psychosocial interventions