



the  
*art* of type

Let food be thy  
**MEDICINE**  
AND  
medicine be thy  
**FOOD.**  
HIPPOCRATES



“In today’s world of rising health costs and the increase burden of chronic diseases and mental illnesses, each one of us must take the responsibility of personal wellbeing by actively engaging in health promotion and preventive health activities

# Shifting Illness to Wellness.



- The idea that we can influence and control our health destiny far beyond what we were taught to believe possible has become the undeniable principle for our time.
- It is important to know that our health depends more on what we are willing to do for ourselves rather than what others are willing to do for us and how well we are willing to take care of our body.



# Food as Medicine

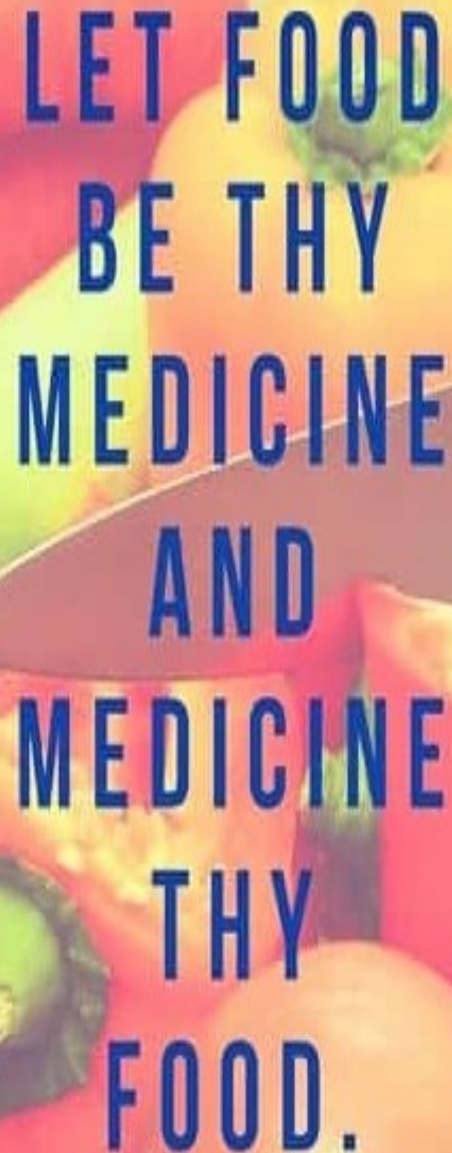
**Diet is a major focus of public health strategy aimed at:**

Maintaining optimum health throughout life

Preventing early onset of chronic diseases

Promoting healthier ageing





LET FOOD  
BE THY  
MEDICINE  
AND  
MEDICINE  
THY  
FOOD.

## Why Use Food for Healing?

- Cheaper than pharmaceutical drugs
- Low incidence of side effects
- Offers variety
- Completely able to be personalized



# Food as Medicine

**People want to know  
the relationship  
between diet and health**

Demand for information  
about

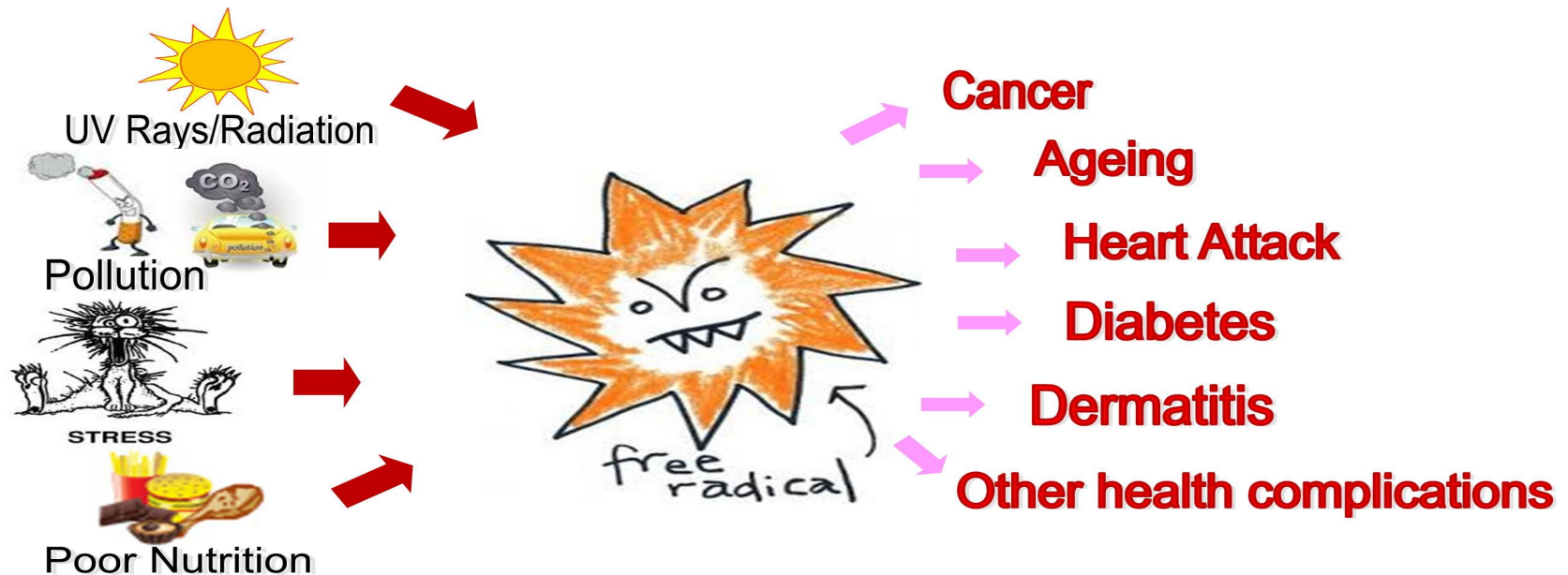
- Antioxidants
- Phytochemicals
- Nutraceuticals
- Nutrigenomics
- Super foods

**Why?**

- Aging population along with rise in Chronic diseases
- Health & wellness approaches to good life
- Rapid advances in science & technology.
- Increasing health care costs.
- Changes in food laws for labeling and health claims.

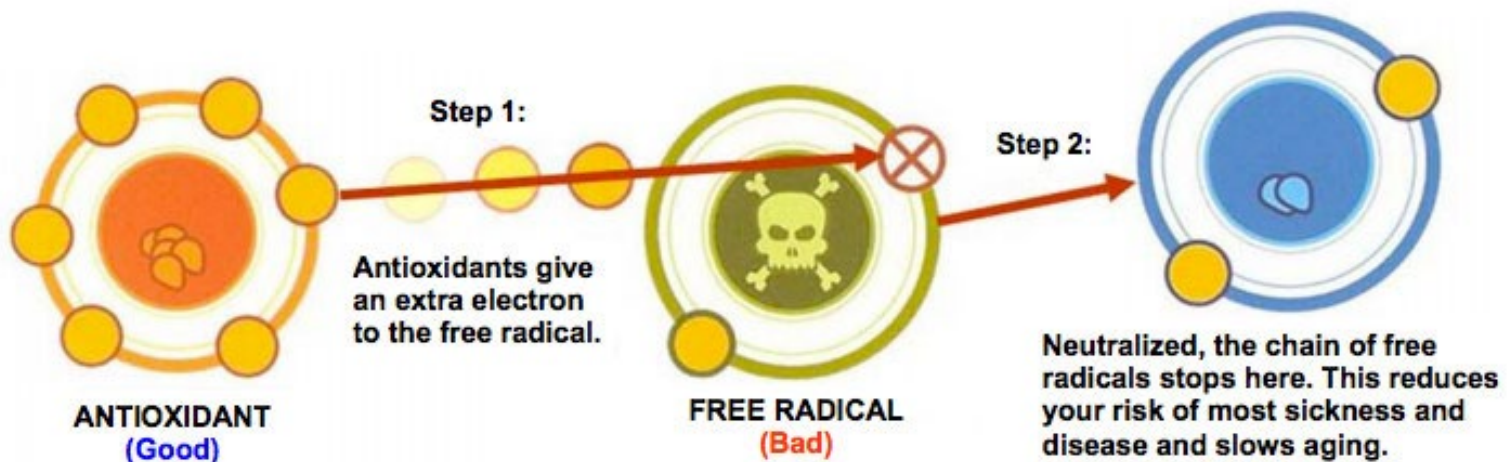
# Oxidation

- Natural process in the body
- Produces reactive substances known as free radicals that cause damage to cells
- Causes degenerative diseases associated with aging and cancer



# Antioxidants

- Natural components present in fruits and vegetables
- Stabilizes free radicals before they cause harm
- we must have a balance of antioxidants to maintain health
- Present in vitamins, minerals, carotenoids, and polyphenols





# Phytochemicals

- Non-nutritive plant chemicals that have protective or disease preventive properties.
- Promote optimal health by lowering risk for chronic diseases
- Only found in plant foods
- Fruits , vegetables, and tea are best sources



**Everything the plants have that you want.**

# How do phytochemicals work?

- Antioxidants
- Hormonal action
- Stimulation of enzymes
- Interfere with cancer cell proliferation
- Antibacterial
- Antidepressant



# ***Nutraceuticals***

- Nutrition and Pharmaceutical
- Supplements made of isolated dietary compounds
- Functional foods' ingredients
- Whole foods
- Fortified processed foods



# Nutrigenomic

- Nutrition + Genomics
- Gene- Nutrition interaction
  - Genes load the gun, but environment pulls the trigger
- Study of how different foods may interact with specific genes to prevent chronic diseases such as type 2 diabetes, obesity, heart disease, stroke and certain cancers





# Super Foods

- Nutritional Powerhouse Foods
- Loaded with phytochemicals
- Help prevent and reverse aging, cardiovascular disease, type II diabetes, hypertension, certain cancers, dementia, and extend our health span.

# Super Foods

Beans

Berries

Citrus fruits

Cocoa / Chocolate

Cruciferous vegetables

Pumpkin

Fish

- Spinach
- Sweet Potatoes
- Tea
- Tomatoes
- Nuts
- Whole grains
- Yogurt



# Citrus Fruits

- Primary source of vitamin C for most Americans
- Good source of folacin, calcium, potassium, thiamin, niacin, and magnesium.
- Rich in phytochemicals
- The **flavonoid hesperidin** was first described about two centuries ago.
- Research throughout past years has confirmed that hesperidin is **an anti-inflammatory** agent used to treat many conditions.





# Citrus Flavonoids & Cancer

Research has shown that citrus flavonoids and their metabolites are potent antioxidants. It is believed that they are able to suppress many of the events of cancer and inflammation which involve reactive oxygen species.

Some of the flavonoids in citrus fruits such as tangerine and orange are the most potent cancer fighting compounds, particularly against lung and prostate cancer cells.



# D-limonene content of citrus peel oil

Lemon: 75%  
( $\gamma$ -terpinene: 7.5%)



Orange: 95%



Kumquat: 97%



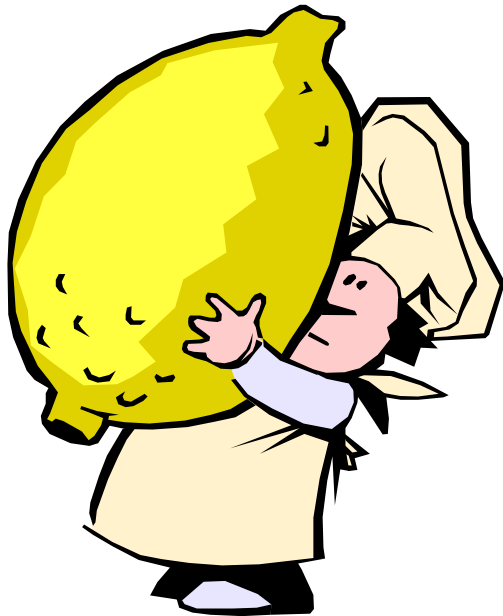
Mandarin: 87%  
( $\gamma$ -terpinene: 7.5%)

# *Citrus Peel, d-Limonene and Cancer Prevention*



## **D-Limonene: Mechanism of action**

- Immune-enhancing
- Anti-inflammatory
- Antioxidant
- Cancer Cell death
- Anti-Hormone





# TEA

- Green, Oolong and Black Teas all come from the upper leaves of *Camellia Sinensis*
- White Tea consists only of leaves from the branch tips-- particularly the leaf bud and possibly the first two leaves under the bud.



# Tea (*Camellia sinensis*)

Dried  
Tea Leaves



Crushed tea leaves

Polyphenol oxidase

Oxidation,  
Polymerization

## Green Tea

~310 mg polyphenols  
per 6 ounces

30-40% Catechins

3-6% Caffeine

## Black Tea

~340 mg polyphenols  
per 6 ounces

3-10% Catechins

2-6% Theaflavins

> 20% Thearubigens

3-6% Caffeine

A vertical photograph on the left side of the slide shows a tea plantation. The tea bushes are lush green, with several young tea buds (shoots) visible at the top of the stems. The background is slightly blurred, showing more of the plantation and a hint of a misty or overcast sky.

# Potential Health Benefits of Tea

- Cancer prevention
- Decreased risk of stroke
- Reduced blood Pressure
- Anti-inflammatory
- Antiviral properties
- Anti-cariogenic effects (Teeth Protection)
- Ultraviolet skin protection
- Strengthen the body's immune system
- Potentially fight free radicals produced during strenuous exercise
- Possibly increase calories burned during everyday activities.
- Possibly improve cognitive functions



# Tomatoes

Excellent source of **lycopene**, that helps prevent cancer, raises the SPF factor of your skin, helps prevent blindness



The consumption of tomatoes and tomato products containing lycopene have been shown to be associated with decreased risk of chronic diseases like **cancer** and **cardiovascular diseases** in several recent studies

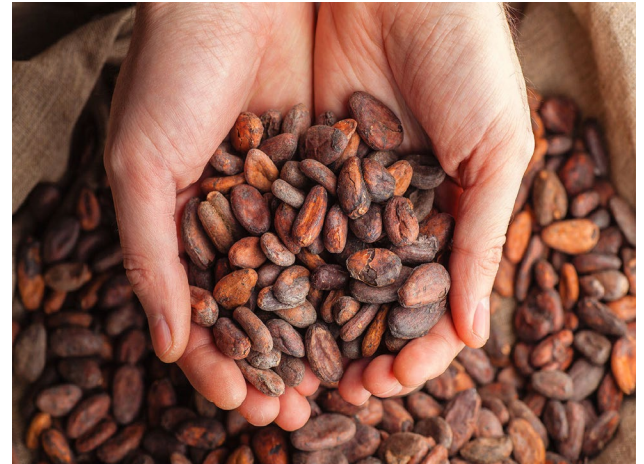


# Dark Chocolate

Cocoa and chocolate are food products made from cacao beans

Dark Chocolate has more flavonols than apples, cherries, red wine, and tea

Several studies showed that the consumption of flavanol-rich foods, such cocoa powders and dark chocolates, may be associated with **a reduced risk for vascular disease.**



# Pomegranates

Strong antioxidants

They have 2 to 3 times  
the antioxidant power  
of equal amounts of red  
wine or green tea





# Berries



- Berries include blueberries, strawberries, raspberries, blackberries, cranberries, boysenberries and gooseberries .
- Berries are loaded with: vitamin C, potassium, and fiber.
- All berries with strong red and blue colors have phytochemicals that can potentially reduce cancer rates, cardiovascular and other chronic diseases.
- Studies have shown that strawberries reduce the inflammatory response that is involved in the etiology of many diseases

# Cruciferous Vegetables

- Cabbage, broccoli and Brussels sprouts are in the family of cruciferous vegetables.
- The health benefits associated with cruciferous vegetables has been attributed to their high concentration of **glucosinolates**.
- They are rich in antioxidants vitamins A and C and a good source of fiber
- The consumption of cruciferous vegetables has been associated with a reduced risk of cancer of the lung, stomach, colon, and rectum.



# Nuts



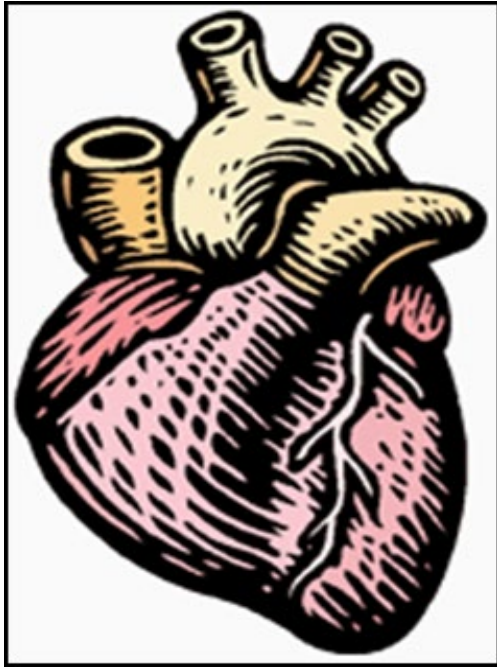
- Nuts includes almonds, hazelnuts, peanuts, pecans, pine nuts, pistachio nuts and walnuts
- Nuts are mostly high in heart-healthy unsaturated fats, the fats that lower your bad cholesterol.
- Nuts do not contain cholesterol.
- Walnuts : Rich in omega-3 FA.
- Almonds : One ounce provides 35% of the daily value for vitamin E.
- Peanuts: One ounce provides about 10% of the daily value for folate.

# Spinach

- Spinach is an important antioxidative vegetables and is consumed either fresh or cooked.
- Spinach is composed of various active compounds, such as **flavonoids and other polyphenolic active ingredients**. These compounds are believed to act in combination with one another as:
  - **Anti-inflammatory agents**
  - **Antioxidative agents**
  - **Anticancer agents**



# Fish



- Fish oil is the most significant source of dietary omega-3 fatty acid
- Numerous observational studies have shown that omega-3 FA enriched diets are associated with a reduction of cardiovascular mortality, heart attack, and sudden death



The following types of fish are especially good sources of omega-3 fatty acids:

- Mackerel                      Lake trout
- Herring                        Sardines
- Albacore tuna                Salmon

# Significance

Our goal is to undertake leading edge research focused on modulating oxidative DNA and lipid damage, tackling obesity, improving glycemic control and reducing chronic inflammation, thereby helping to improve the health and well-being of the global population and to reduce the risk chronic diseases such as diabetes, cancer, cardiovascular and neurodegenerative diseases.



# PLAN

Conduct a series of feeding intervention studies to evaluate the protective effects of different foods rich in bioactive food compounds on the levels of **glucose, insulin, chronic inflammation, lipid peroxidation by-products and antioxidant defense systems** in the blood and urine of high risk populations such as obese & diabetic children, smokers, and high risk adults.

**Metabolomic biomarkers** will be also measured (the quantitative measurement of the dynamic metabolic response of our body to pathophysiological stimuli or genetic modification).



## GREEN TEA

**Antioxidant**  
**Antibacterial**  
**Boosts Metabolism**  
**Aids in Weight Loss**  
**Can Lower Cholesterol**  
**Can Prevent Diabetes**  
**& Heart Disease**

Dietary Feeding Interventions  
Different designs (amount and duration)  
Biomarkers of different chronic disease (Diabetes, Cancer, CVD)

