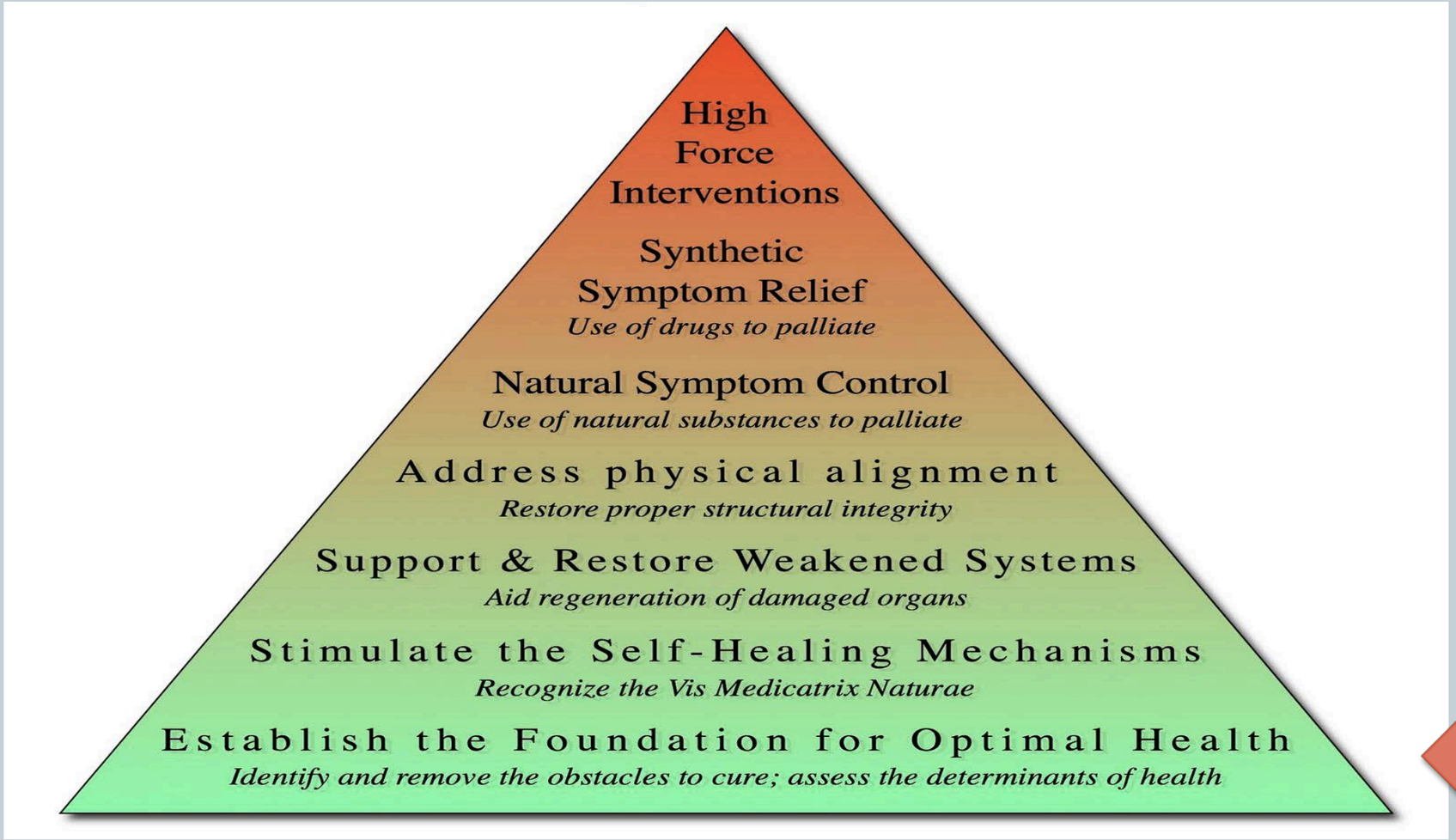
The Role of Nutrition in Naturopathic Medicine: A Historical and Practical Perspective

DR. JACLYN CHASSE, ND

Nutrition on the Therapeutic Order

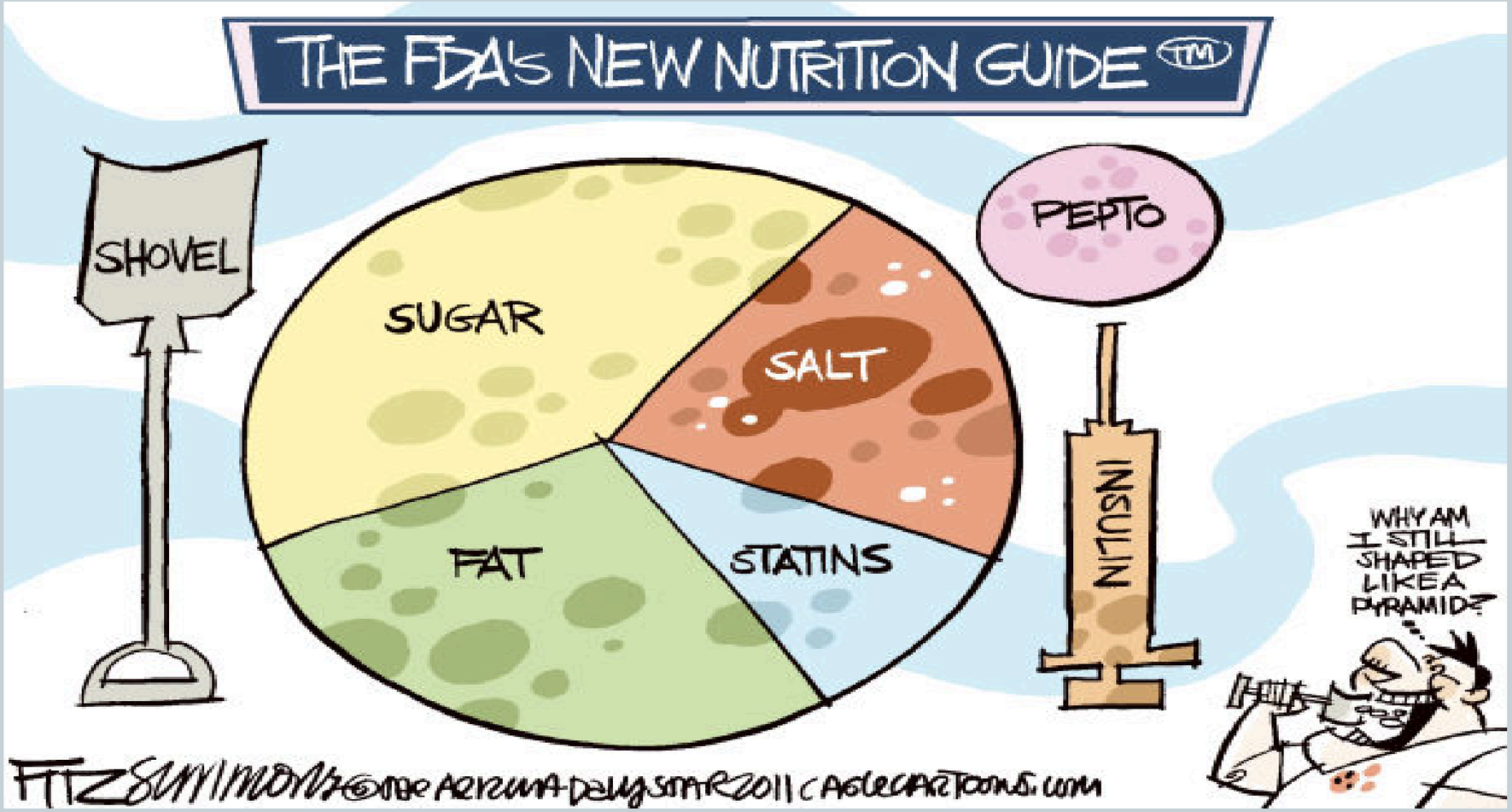


DETERMINANTS OF HEALTH

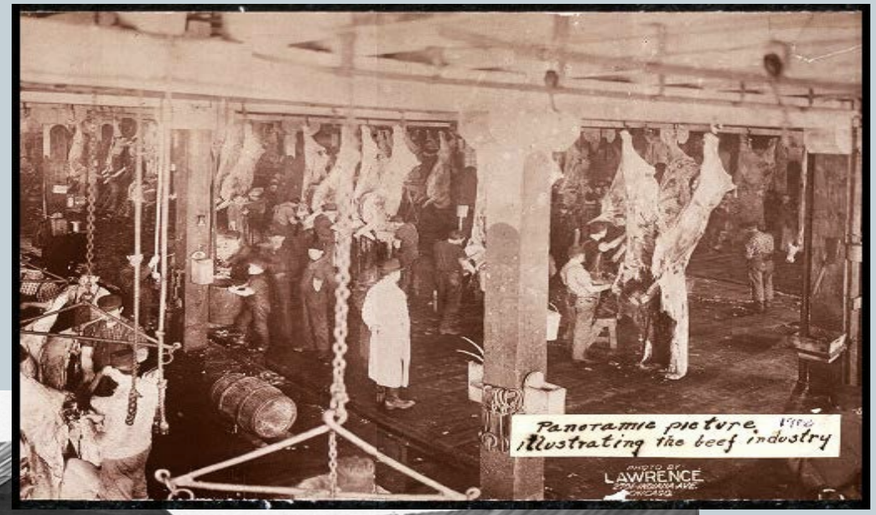
SPIRITUAL LIFE
FRESH AIR
EXPOSURE TO NATURE
CLEAN WATER
NATURAL LIGHT
CULTURE AND
COMMUNITY
REST

DIET, NUTRITION
UNADULTERATED FOOD
DIGESTION, TOXEMIA
SLEEP
EXERCISE
SOCIOECONOMIC FACTS
LOVING AND BEING
LOVED
MEANINGFUL WORK

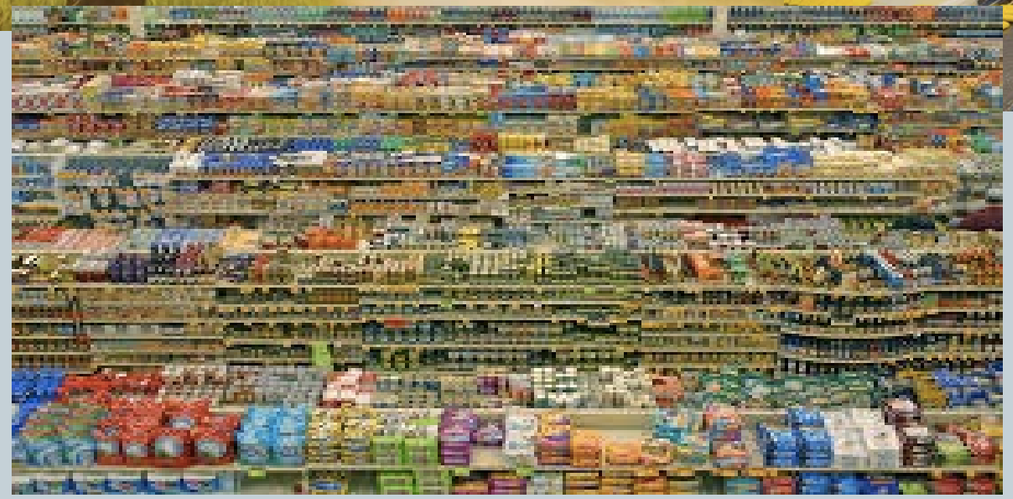
Standard American Nutrition



Foundational Nutrition Used to be Easy!



Today, things are different!



Our Diet Favorites

- Anti-estrogenic diet
- Blood Type Diet
- Low glycemic diet
- Mediterranean diet
- Paleo diet
- FODMAPS
- SCD
- Ketogenic Diet
- Elimination Diet
- Anti-inflammatory diet

NDs were ahead of their time, and still are!

Leaky Gut Syndrome → Intestinal Hyperpermeability

Fermented foods → Power of Probiotics

Detox for health → Impact of heavy metals on chronic disease

Current Preventive Medicine practice

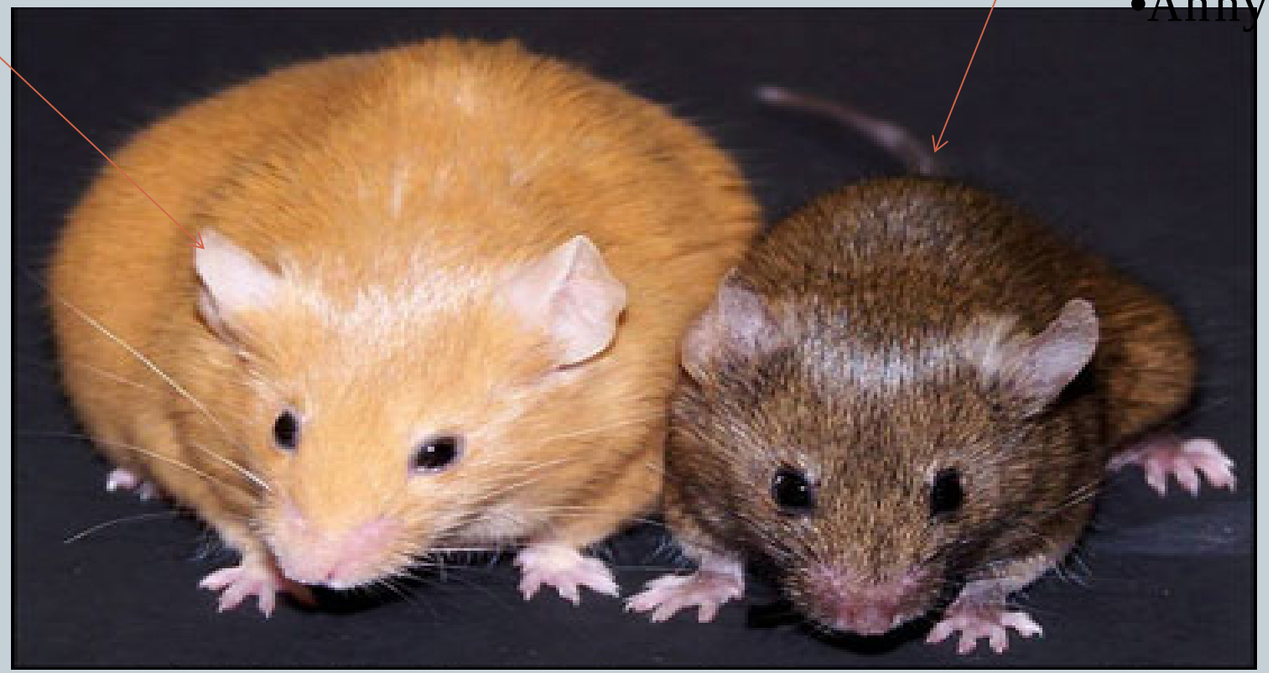
- Focus on patients' own behavior in a one-dimensional way
  - Stress management
  - Diet
  - Environmental exposures
  - Exercise
- We are missing out on the opportunity to make a greater epigenetic impact!

Is food a calorie? Or is it more?

The Agouti mouse

No supplementation

Supplementation with
- Folic acid
- Choline
- Anhydrous betaine



Mothers fed the same chow during pregnancy.

Agouti Mice

Mother of brown mouse was supplemented 2 weeks before mating through pregnancy and lactation.

After weaning, mice fed the same chow for 21 days, when the picture was taken

Methylators given to mother changed genetic expression of offspring

Key periods of life to focus on nutrition: Pubertal

Pubertal

- Slow growth period (Ages 8-12)
- Some effects seem to be sex-specific
  - Avon Longitudinal Study
    - Fathers who started smoking before age 11 years had sons (but not daughters) with greater BMI
    - Paternal grandfather's food supply associated with mortality of grandsons only, grandmothers' food supply associated with mortality of granddaughters

Eur J Hum Genetics 2006;14:159-66.

Pre-Pubertal Behaviors

Pubertal Nutrition

- Several Studies with similar results
  - Males had increased risk of mortality if their fathers had good nutrition during their slow growth period (SGP)
  - When a father experienced poor food availability or famine during the SGP, their sons were protected against cardiovascular death
  - Similar trends found in grandsons and granddaughters of grandfathers and grandmothers (respectively) who had plentiful food supply during their SGP, although not as pronounced.
  - With mothers, protection was conferred to female offspring when mother had plentiful food during her SGP

Eur J Hum Genetics 2007;15:784-90.
Eur J Hum Genetics 2002;10:682-88.

Pubertal Food Supply

During slow growth period, food availability has an impact on transgenerational response

European Journal of Human Genetics (2007) 15, 784–790

www.nature.com/ejhg

ARTICLE

Transgenerational response to nutrition, early life circumstances and longevity

Gunnar Kaati*,[1,2], Lars Olov Bygren[2,3], Marcus Pembrey[4] and Michael S

[1]Department of Public Health and Clinical Medicine, Umeå University, Umeå, Sweden; [2]Depa
Nutrition, Karolinska Institutet, Stockholm, Sweden; [3]Department of Community Medicine a
University, Umeå, Sweden; [4]Clinical and Molecular Genetics Unit, Institute of Child Health,
London, UK

Nutrition might induce, at some loci, epigenetic or other changes that could be tr
generation impacting on health. The slow growth period (SGP) before the prepub
velocity has emerged as a sensitive period where different food availability is followed by different transgenerational response (TGR). The aim of this study is to investigate to what extent the probands own childhood circumstances are in fact the determinants of the findings. In the analysis, data from three random samples, comprising 271 probands and their 1626 parents and grandparents, left after exclusions because of missing data, were utilized. The availability of food during any given year was classified based on regional statistics. The ancestors' SGP was set at the ages of 8–12 years and the availability of food during these years classified as good, intermediate or poor. The probands' childhood circumstances were defined by the father's ownership of land, the number of siblings and order in the sibship, the death of parents and the parents' level of literacy. An earlier finding of a sex-specific influence from the ancestors' nutrition during the SGP, going from the paternal grandmother to the female proband and from the paternal grandfather to the male proband, was confirmed. In addition, a response from father to son emerged when childhood social circumstances of the son were accounted for. Early social circumstances influenced longevity for the male proband. TGRs to ancestors' nutrition prevailed as the main influence on longevity.
European Journal of Human Genetics (2007) 15, 784–790; doi:10.1038/sj.ejhg.5201832; published online 25 April 2007

"Transgenerational responses to ancestors' nutrition prevailed as the main influence on longevity."

Eur J Hum Genetics 2006;14:159-66.

Pubertal Nutrition

Interventions during Puberty

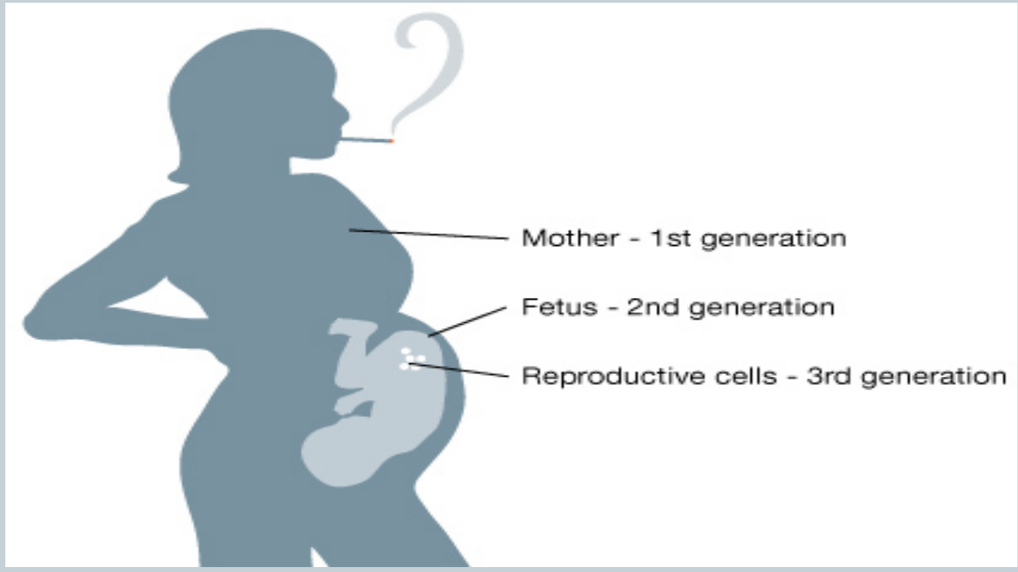
- Focus on nutrition during this time, especially among boys ages 8-12
- Education about impact of lifestyle habits such smoking and poor diet on self and future generations
- Consider supplementation with basic nutrients such as multivitamin and omega 3 to support healthy gamete development.

Key periods of life to focus on nutrition: Prenatal

The Prenatal Period

Perinatal influences

- Nutritional factors
  - Maternal food supply: feast and famine
  - Maternal macronutrient intake
  - Gestational blood sugar
  - Nutrient-specific interactions
- Environmental factors
  - PACs and birth outcomes
  - Phthalates
  - Xenoestrogens
- Emotional factors
  - Stress and anxiety



Maternal Low Protein Diet and Blood Sugar

- Maternal low protein diet correlated with
  - Increased glucocorticoid receptor (GR) expression
    - Leads to increased capacity for gluconeogenesis, which may contribute to insulin resistance
  - Decreased expression of enzyme that inactivates glucocorticoid receptor (11B-hydroxysteroid dehydrogenase type II)
  - Upregulates glucokinase (GK) expression in liver
    - Increased capacity for glucose uptake

Endocrinol 2001;142:2841-53.
J Clin Invest 1997;100:1768-74.
Life Sci 2004;74:1407-15.

Maternal Low Protein Diet and Blood Sugar

- Promoter genes imprinted for glucocorticoid metabolism
  - Increased gene transcription leads to increased susceptibility of metabolic syndrome phenotypes.

Am. J. Clin. Nutr 1999;69:179-197.

Maternal Low Protein Diet and Lipid Balance

- Maternal low protein diet correlated with
  - Increased expression of Acetyl Co-A carboxylase and fatty acid synthase in liver.
  - Increased blood triacylglycerol (TAG) and fatty acid concentrations.
  - Impaired lipid metabolism.
  - Lower concentrations of DHA in liver and brain
    - In non-supplemented diet, so dependant on conversion from a-linolenic acid

Br J Nutr 2003;90:345-52

Maternal Low Protein Diet
Epigenetic effects

- Vascular dysfunction
- Impaired immunity
- Increased susceptibility to oxidative stress
- Increased fat deposition
- Altered feeding behavior
- These effects can be decreased/prevented with maternal supplementation of folic acid!!

Nutr Res 2000;20:995-1005
Mech Ageing Dev 2005;126:804-12
Hypertension 2005;47:982-87.

Maternal High Protein Diet

- Motherwell, Scotland study
- Mothers instructed to consume 0.45 kg meat daily and to avoid carbohydrates during pregnancy
- Adult offspring had
  - Increased cholesterol
  - Increased blood cortisol levels

J Clin Endocrinol Metab 2003;88:3554-60.
Reprod Toxicol 2008;25:2-6.

Potential nutrient intervention

- Folate (5 mg/kg or 150 mg dose for adult)
- Glycine (5 mg/kg or 150 mg dose)
- Butyrate
- Sulforaphane
- Garlic organosulfur compounds
- Zinc
- Iron
- Vitamin D
- Niacinamide
- Riboflavin
- Vitamin B12
- Vitamin A

Annu Rev Nutr. 2008;28:347-66.

Prenatal imprinting

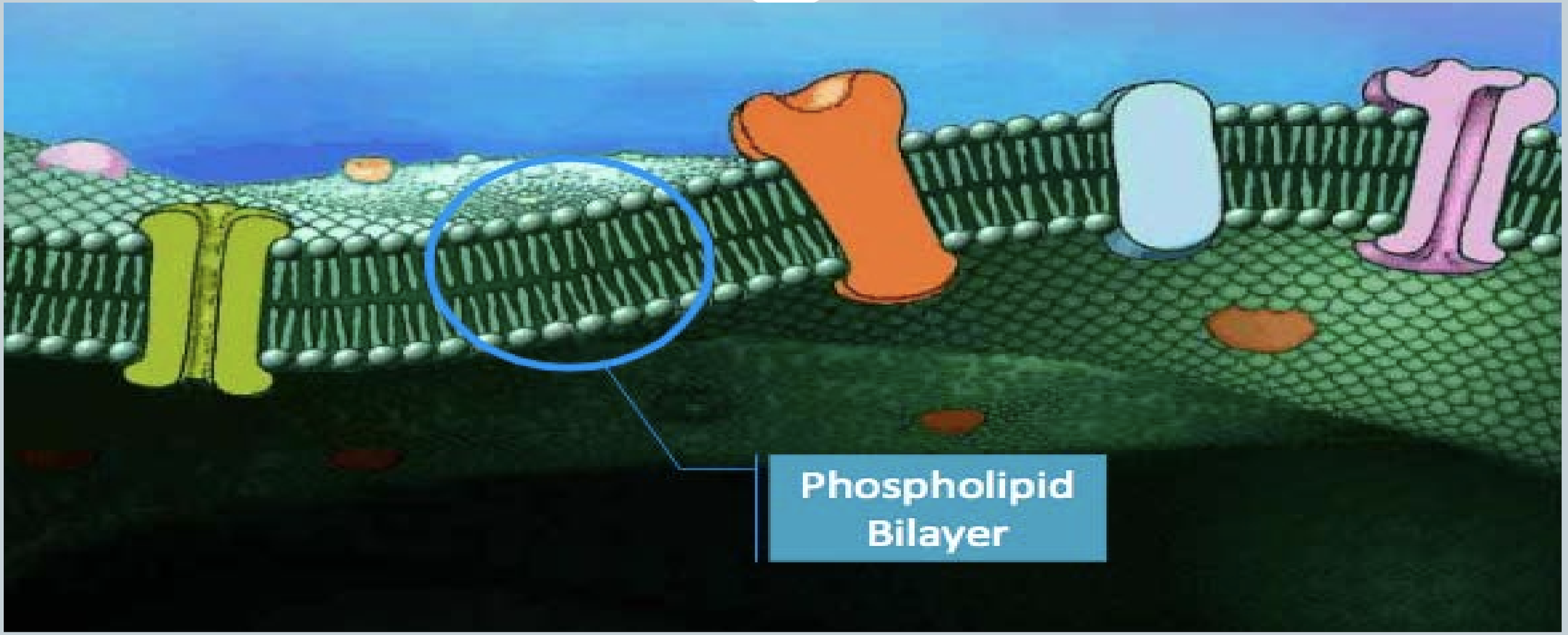
- Maternal dietary exposure to methyl donors (folic acid, SAM) may be a determinant in modulating the susceptibility to diseases in adult life
  - Diabetes
  - Metabolic syndrome
  - Glucocorticoid excess
  - Obesity
  - Hypertension
  - Insulin resistance
  - Hyperlipidemia
  - hyperglycemia

Am. J. Clin. Nutr 1999;69:179-197.

Core Needs through Nutrition Today

- Consider epigenetics and the importance of phytonutrients for optimum genetic expression
- Avoid food as a cause of disease
- Manage Inflammation
- Balance insulin and blood glucose
- Enhance toxin biotransformation
- Provide antioxidants to mitigate cellular damage
- Ensure healthy fat
- INDIVIDUALIZE & PERSONALIZE!

The Importance of Healthy Fats



The Importance of Healthy Fats

The importance of Phytonutrients

Phytonutrients play a key role in most of these desirable effects from food!

- Produced by plants as part of their normal metabolism
- Preparation can affect phytonutrient status
- There are 10,000 phytonutrients in our food supply (that have been identified!)
- Phytonutrients affect cellular messaging through multiple biochemical communication pathways

Walsh et al. Am J Clin Nutr. 2007 Dec;86(6):1667-93.

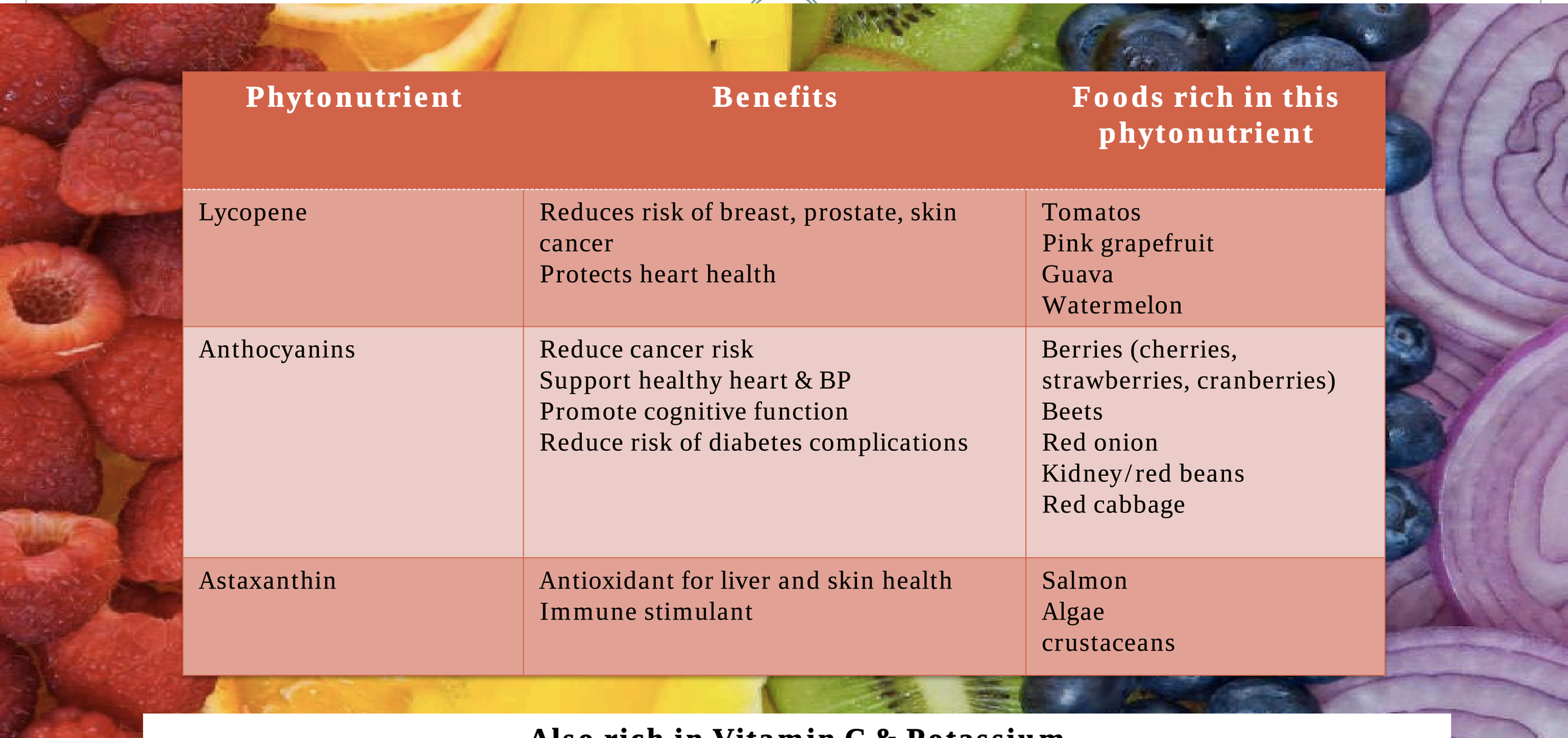
Most people don't get enough!

From America's Phytonutrient Report, 2009, using data from NHANES and conducted by Nutrilite.

Phytonutrients influence other major nutrition needs

- Metabolic balance and insulin/glucose regulation
- Inflammation
- Detoxification
- Cellular protection

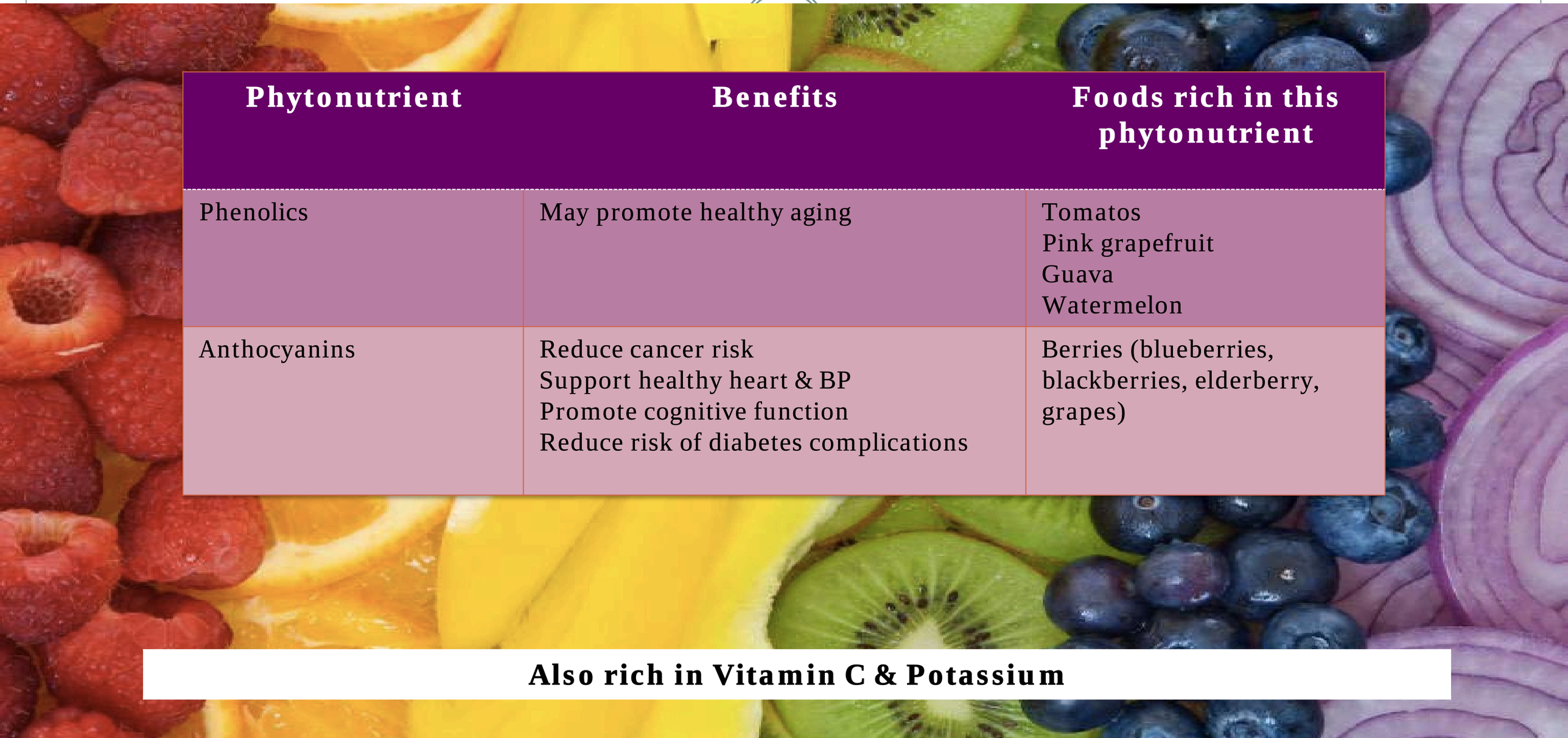
Phytonutrient Benefits: Red Foods



Phytonutrient	Benefits	Foods rich in this phytonutrient
Lycopene	Reduces risk of breast, prostate, skin cancer Protects heart health	Tomatos Pink grapefruit Guava Watermelon
Anthocyanins	Reduce cancer risk Support healthy heart & BP Promote cognitive function Reduce risk of diabetes complications	Berries (cherries, strawberries, cranberries) Beets Red onion Kidney/red beans Red cabbage
Astaxanthin	Antioxidant for liver and skin health Immune stimulant	Salmon Algae crustaceans

Also rich in Vitamin C & Potassium

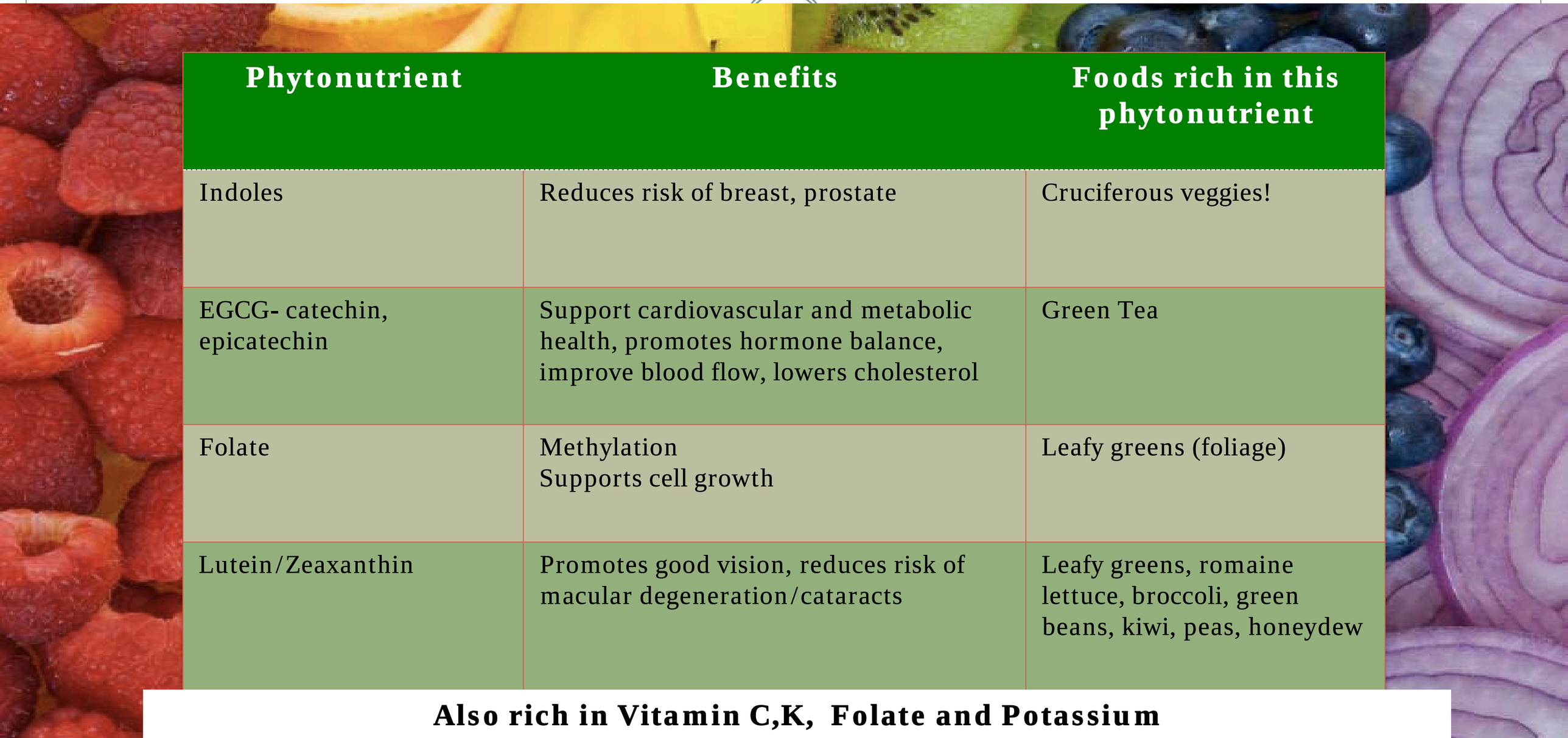
Phytonutrient Benefits: Purple Foods



Phytonutrient	Benefits	Foods rich in this phytonutrient
Phenolics	May promote healthy aging	Tomatos Pink grapefruit Guava Watermelon
Anthocyanins	Reduce cancer risk Support healthy heart & BP Promote cognitive function Reduce risk of diabetes complications	Berries (blueberries, blackberries, elderberry, grapes)

Also rich in Vitamin C & Potassium

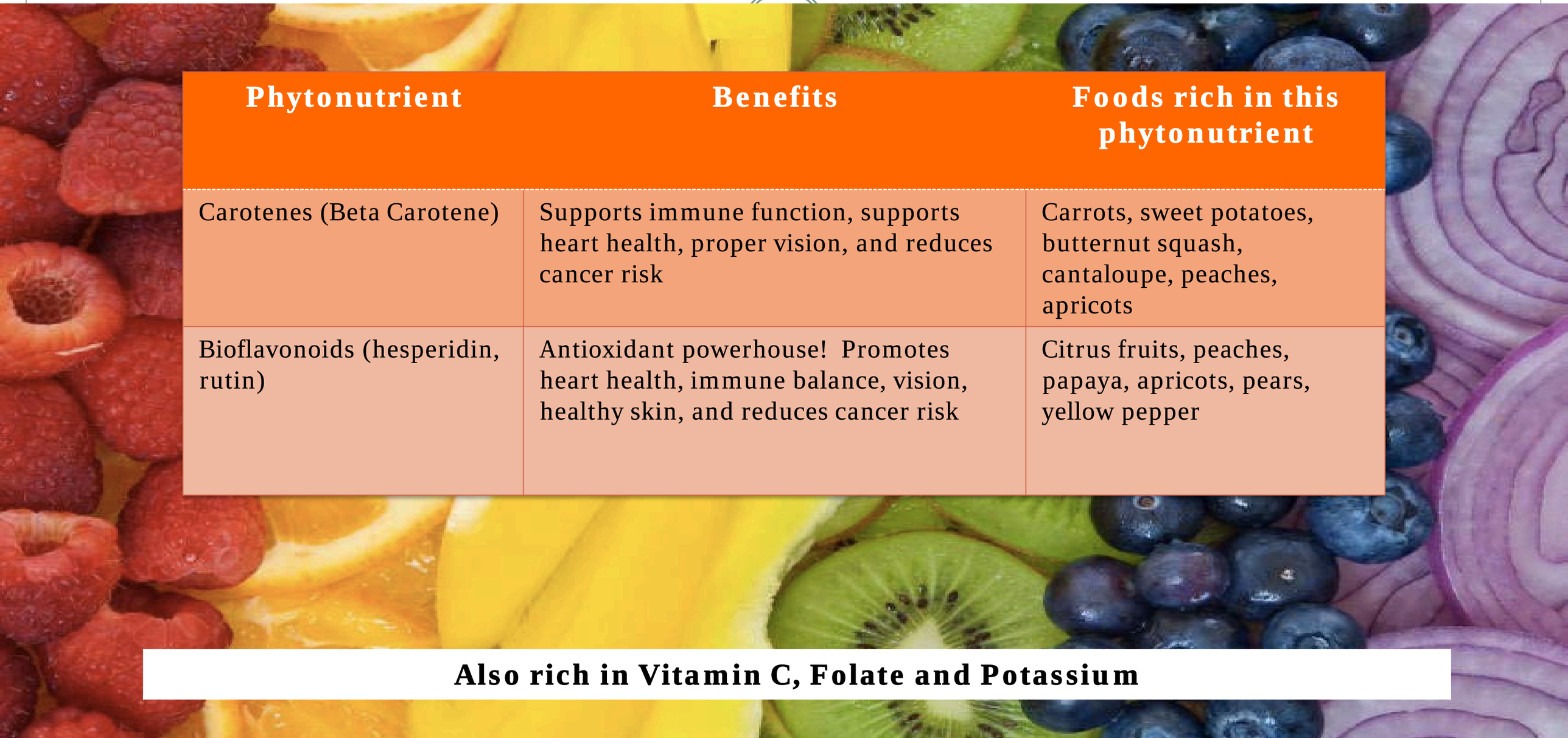
Phytonutrient Benefits: Green Foods



Phytonutrient	Benefits	Foods rich in this phytonutrient
Indoles	Reduces risk of breast, prostate	Cruciferous veggies!
EGCG- catechin, epicatechin	Support cardiovascular and metabolic health, promotes hormone balance, improve blood flow, lowers cholesterol	Green Tea
Folate	Methylation Supports cell growth	Leafy greens (foliage)
Lutein/Zeaxanthin	Promotes good vision, reduces risk of macular degeneration/cataracts	Leafy greens, romaine lettuce, broccoli, green beans, kiwi, peas, honeydew

Also rich in Vitamin C,K, Folate and Potassium

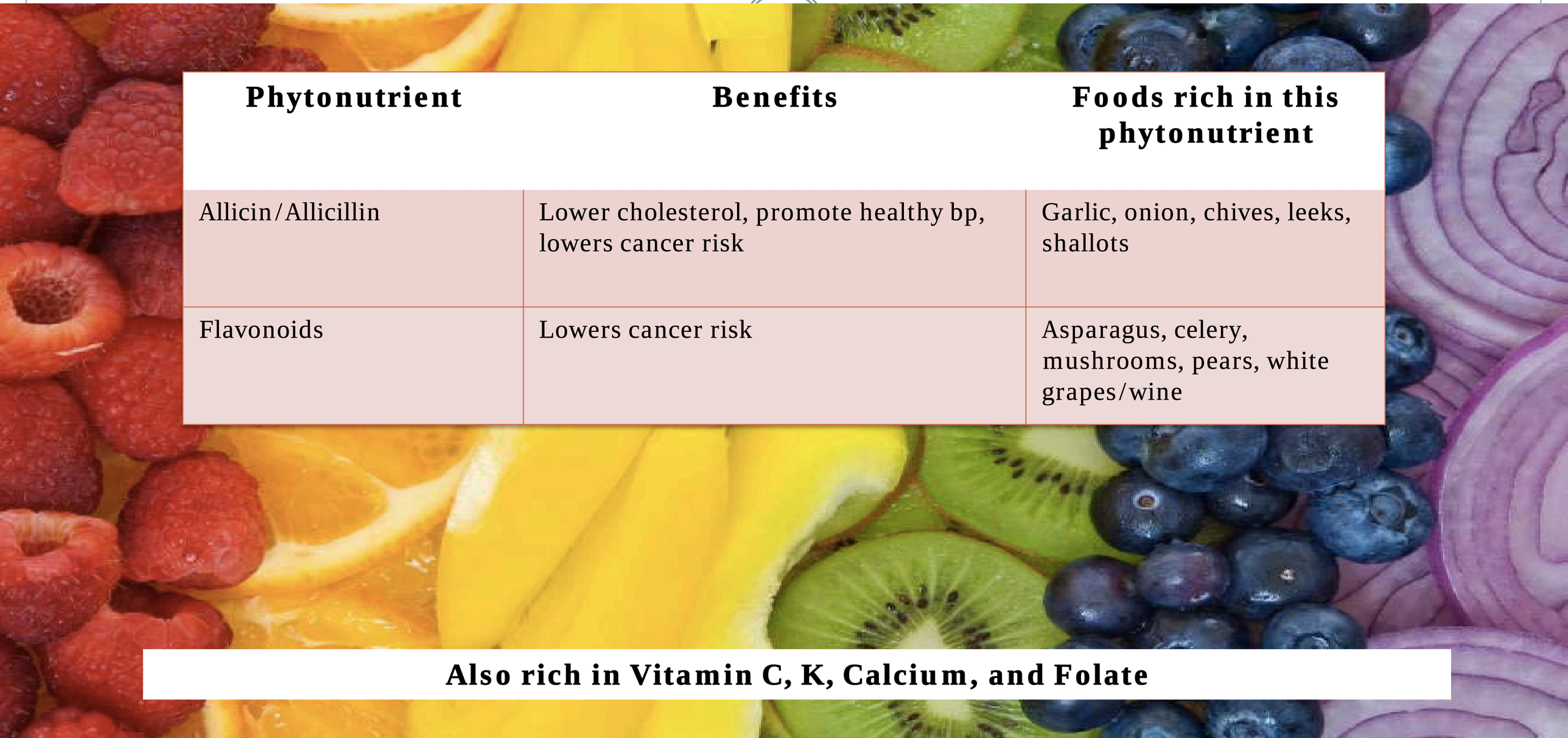
Phytonutrient Benefits: Orange/Yellow Foods



Phytonutrient	Benefits	Foods rich in this phytonutrient
Carotenes (Beta Carotene)	Supports immune function, supports heart health, proper vision, and reduces cancer risk	Carrots, sweet potatoes, butternut squash, cantaloupe, peaches, apricots
Bioflavonoids (hesperidin, rutin)	Antioxidant powerhouse! Promotes heart health, immune balance, vision, healthy skin, and reduces cancer risk	Citrus fruits, peaches, papaya, apricots, pears, yellow pepper

Also rich in Vitamin C, Folate and Potassium

Phytonutrient Benefits: White Foods



Phytonutrient	Benefits	Foods rich in this phytonutrient
Allicin/Allicillin	Lower cholesterol, promote healthy bp, lowers cancer risk	Garlic, onion, chives, leeks, shallots
Flavonoids	Lowers cancer risk	Asparagus, celery, mushrooms, pears, white grapes/wine

Also rich in Vitamin C, K, Calcium, and Folate

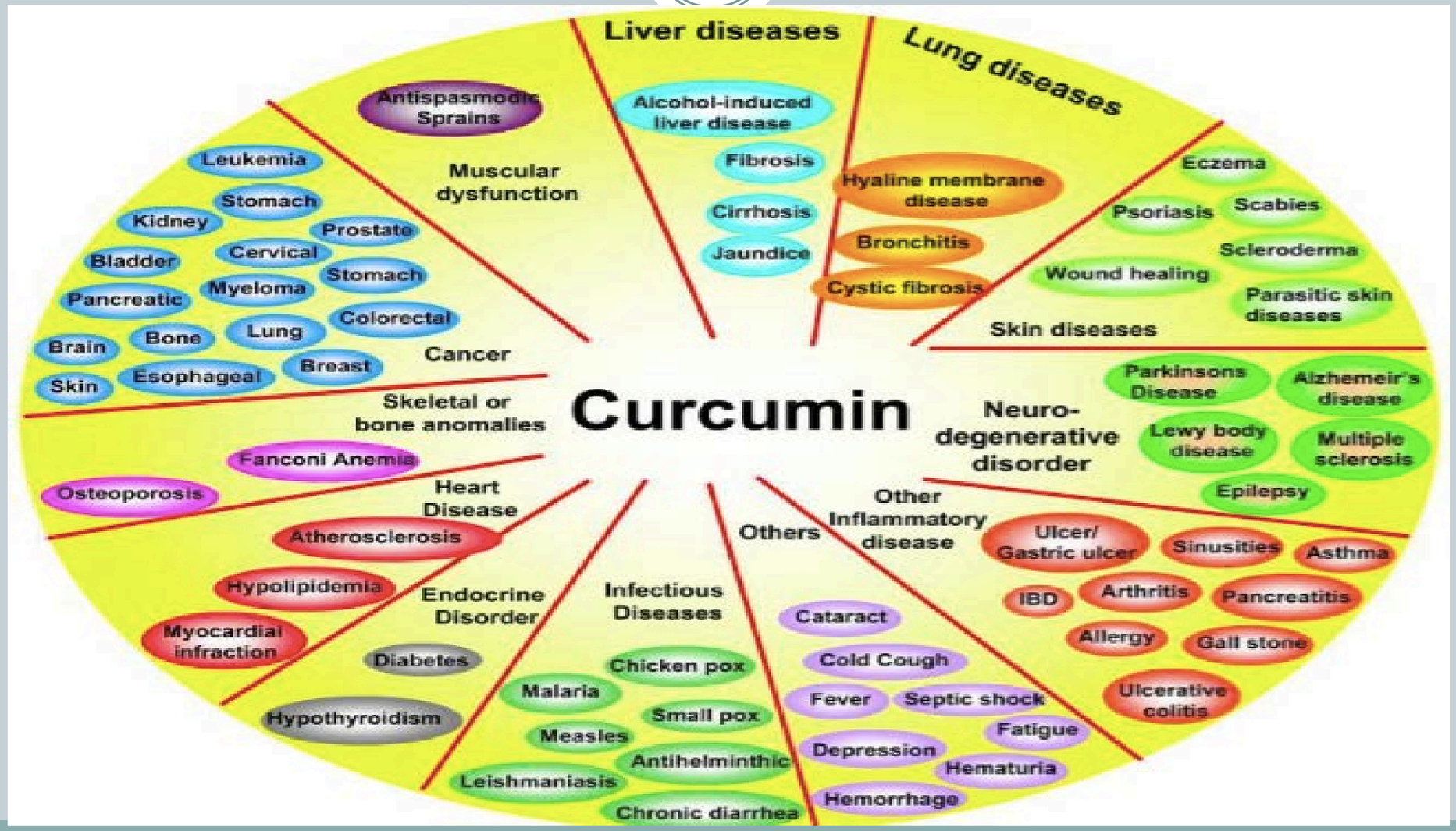
Phytonutrients can change the story!

Phytonutrients carry information to optimize epigenetic expression to favor

- Healthy metabolism
- Healthy inflammatory balance

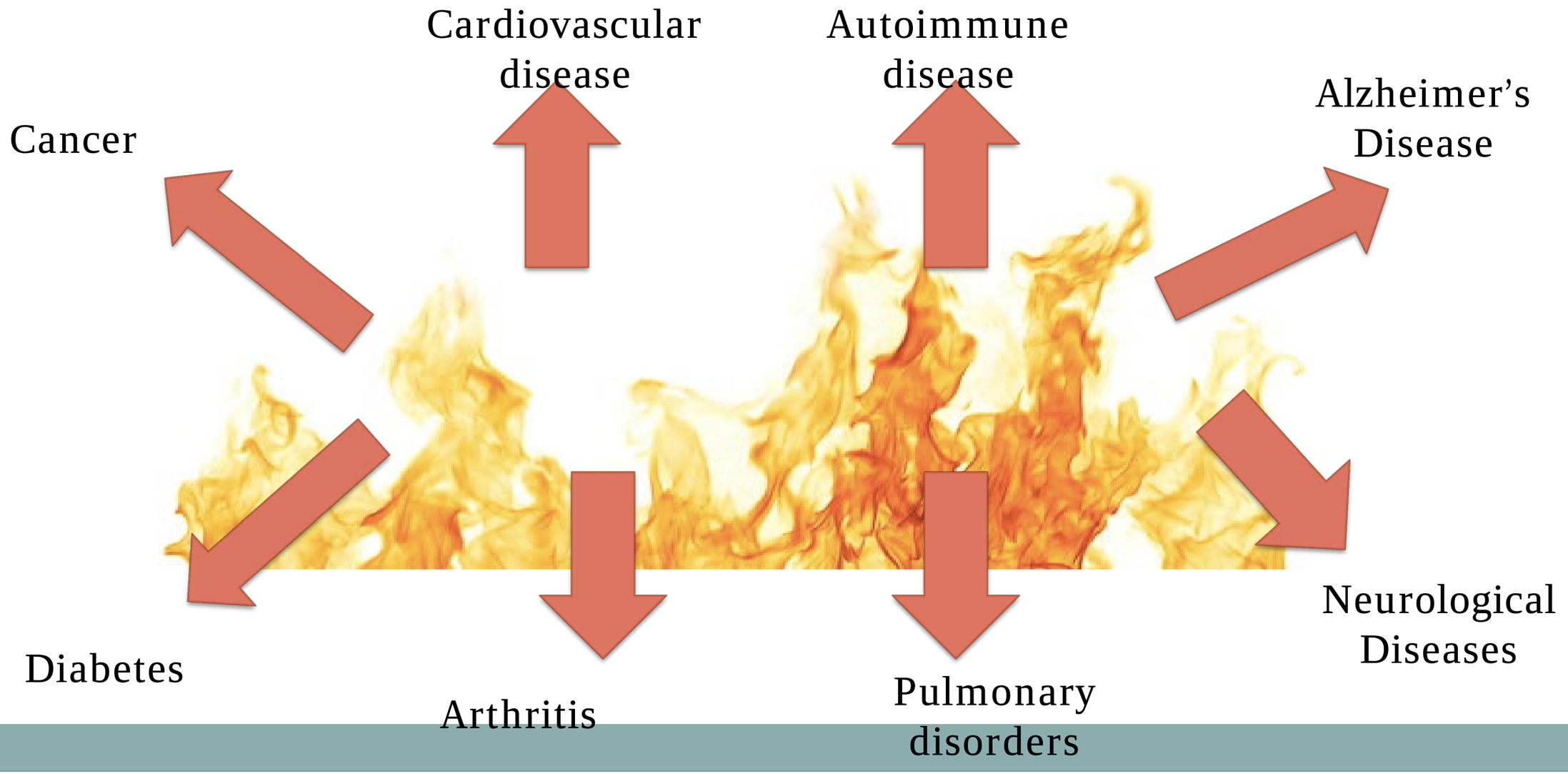
And more!

Potent Therapeutic Phytonutrients




MARCH 1, 2004
TIME
ROUGH JUSTICE IN CHINA
MEL GIBSON'S SEARCH FOR JESUS
THE SECRET KILLER
The surprising link between INFLAMMATION and HEART ATTACKS, CANCER, ALZHEIMER'S and other diseases
What you can do to fight it

Role of Inflammation in human disease



Inflammation and Nutrition

- Essential fatty acids play an essential role in managing inflammation
  - Omega 6:3 ratio should be 1:1
  - For most Americans, it is about 20:1
- Data shows efficacy in the use of n-3 fats for inflammatory conditions like Crohn's and UC
- Omega 3 FA reduces cardiac risk factors

Beluzzi et al. NEJM 1996 June 13;334(24):1557-60.

Inflammation and Nutrition

- Phytonutrients play an essential role in managing inflammation, especially some targeted phytonutrients such as curcumin, cocoa, polyphenols

Where do we go from here?

- We are learning, with the input of phenotypic markers, disease states, and genetics, how to better target nutrition to the individual!

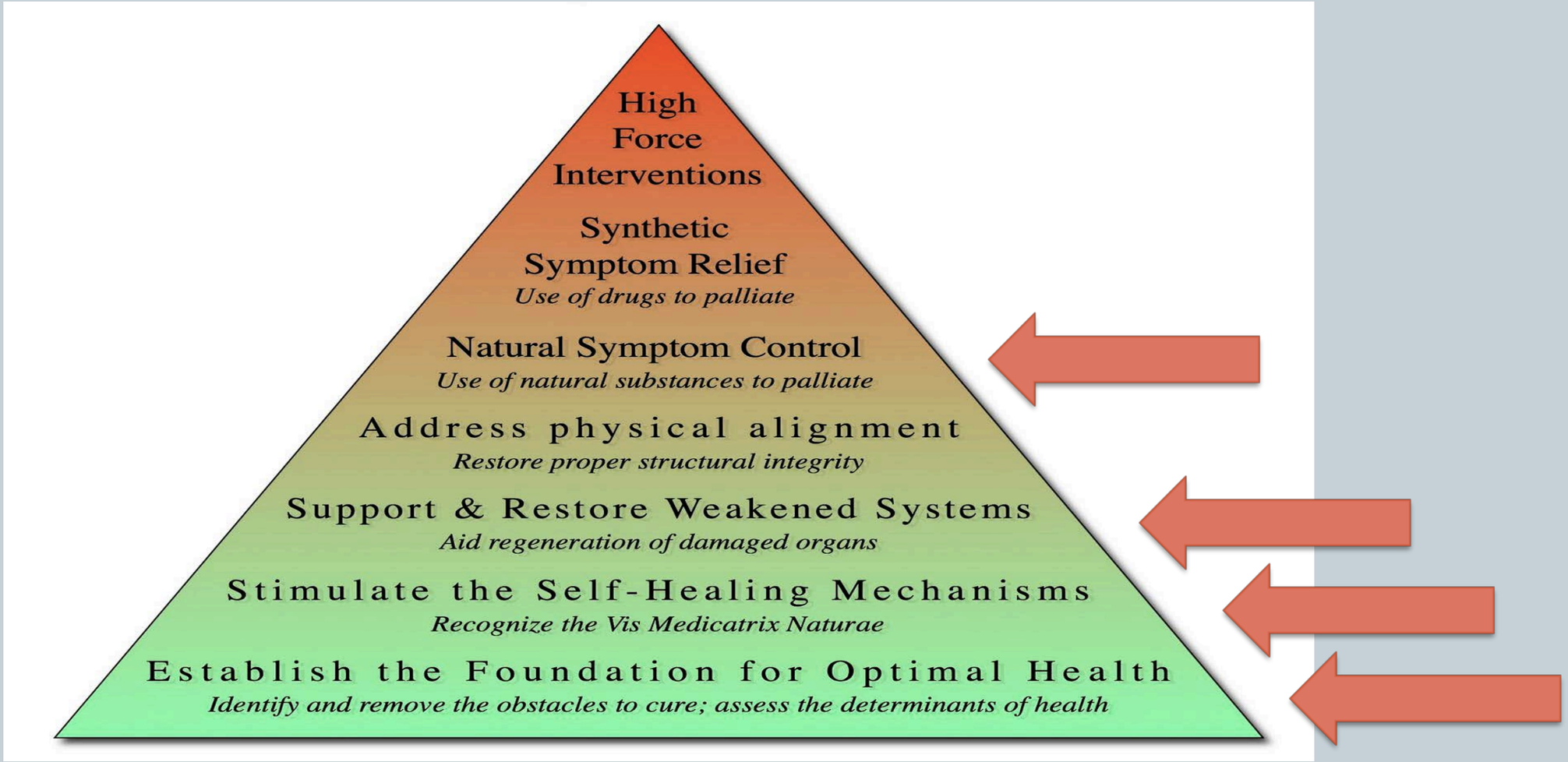
The age of PERSONALIZATION

DETERMINANTS OF HEALTH

SPIRITUAL LIFE
FRESH AIR
EXPOSURE TO NATURE
CLEAN WATER
NATURAL LIGHT
CULTURE AND
COMMUNITY
REST

DIET, NUTRITION
UNADULTERATED FOOD
DIGESTION, TOXEMIA
SLEEP
EXERCISE
SOCIOECONOMIC FACTS
LOVING AND BEING
LOVED
MEANINGFUL WORK

Nutrition on the Therapeutic Order



Join the Conversation with MHICN on Social Media

Like us on Facebook!
https://www.facebook.com/mhicn

Tweet during the symposium
and conference

#AANP2016
#StartTheResolution

Metagenics
Genetic Potential Through Nutrition