“Eat Food, Not Too Much, Mostly Plants”
--Michael Pollen, author of The Omnivore’s Dilemma
From: https://www.genome.gov/10001763/about-nhgri-a-brief-history-and-timeline/
Genes: a unique code
The epigenome: the software that runs your DNA

The epigenome: determines whether genes are expressed (open) or turned off (closed).
Epigenetics: A New Bridge between Nutrition and Health¹²

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ABSTRACT

Nutrients can reverse or change epigenetic phenomena such as DNA methylation and histone modifications of critical genes associated with physiologic and pathologic processes, including embryonic development, that nutrients and bioactive food components can influence epigenetic phenomena either by direct methylation or histone modifications, or by altering the availability of substrates necessary for those nutritional epigenetics has been viewed as an attractive tool to prevent pediatric developmental disorders and aging-associated processes. In recent years, epigenetics has become an emerging issue in a broad range of fields, including obesity, inflammation, and neurocognitive disorders. Although the possibility of developing a treatment or discovering preventative measures of these diseases is exciting, current knowledge in nutritional epigenetics is limited, and further studies are needed to expand the available resources and better understand the use of nutrients or bioactive food components for maintaining our health and preventing diseases through modifiable epigenetic mechanisms. Adv. Nutr. 1: 8-16, 2010.

Introduction

Epigenetics can be defined as somatically heritable states of gene expression resulting from changes in chromatin structure without alterations in the DNA sequence, including DNA methylation, histone modifications, and chromatin remodeling. Over the past decades, epigenetic studies have primarily been focused on embryonic development, aging, and cancer. Presently, epigenetics is highlighted in many other fields, such as inflammation, obesity, insulin phenomena and alter the expression of genes at the transcriptional level. Folate, vitamin B-12, methionine, choline, and betaine can affect DNA methylation and histone modifications through altering 1-carbon metabolism. Two metabolites of 1-carbon metabolism can affect methylation of DNA and histones: S-adenosylmethionine (AdoMet), which is a methyl donor for methylation reactions, and S-adenosylhomocysteine (AdoHcy), which is a product inhibitor of methytransferases. Thus, theoretically, any nutrient, bioactive

“Nutrients and bioactive food components can influence epigenetic phenomena either by directly inhibiting enzymes that catalyze DNA methylation or histone modifications, or by altering the availability of substrates necessary for those enzymatic reactions.”
Epigenetic diet: impact on the epigenome and cancer

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Abstract

A number of bioactive dietary components are of particular interest in the field of epigenetics. Many of these compounds display anticancer properties and may play a role in cancer prevention. Numerous studies suggest that a number of nutritional compounds have epigenetic targets in cancer cells. Importantly, emerging evidence strongly suggests that consumption of dietary agents can alter normal epigenetic states as well as reverse abnormal gene activation or silencing. Epigenetic modifications induced by bioactive dietary compounds are thought to be beneficial. Substantial evidence is mounting proclaiming that commonly consumed bioactive dietary factors act to modify the epigenome and may be incorporated into an ‘epigenetic diet’. Bioactive
In an effort to develop anticancer agents which cause minimal harm to normal cells while effectively killing cancer cells, a number of naturally occurring phytochemicals in food and medicinal plants have been investigated.
“Eat Food, Not Too Much, Mostly Plants”
--Michael Pollen, author of *The Omnivore’s Dilemma*
Green Tea
Turmeric
Cruciferous Vegetables
Allium Vegetables
Soy Foods
So many bioactive compounds!
Other micronutrients for epigenetic health

• **Folate**
  - Folate = major methyl donor to DNA
  - Folate deficiency = inadequate methylation of DNA, damage and replication errors occur
  - I.e. neural tube defects
  - *Found in citrus, dark leafy greens, beans, and whole grains*
  - Alcohol depletes folate levels!
  - Folate deficiency = increased risk of colorectal, breast, ovarian, lung, pancreatic, brain, and cervical cancer
  - **Vitamin B12** needed to support function

• **Selenium**
  - Also methyl donor
  - Some studies show decreased risk of prostate cancer
  - *Found in brazil nuts, whole grains, onions, broccoli*
Strategy: Plan for a rainbow in the kitchen

Directions: Place a check in the appropriate box each time you eat a fruit or vegetable.

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Strategy: Spice up your life!
Strategy: Keep a salad bar in the fridge
Strategy: Keep a smoothie bar in the freezer
Strategy: Focus on simple whole foods, and some really tasty sauces
Strategy: Start a collection of phytochemical-rich recipes
Strategy: Find support from a registered dietitian nutritionist

- Academy of Nutrition: http://www.eatright.org/find-an-expert
- Find a Bastyr Practitioner: http://bastyr.edu/practitioner
- Check your insurance company website (search: “Nutrition,” or “Dietetics”)
- Seattle Cancer Care Alliance: https://www.seattlecca.org/emotional-and-spiritual-support/medical-support-services/nutrition
Questions?

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