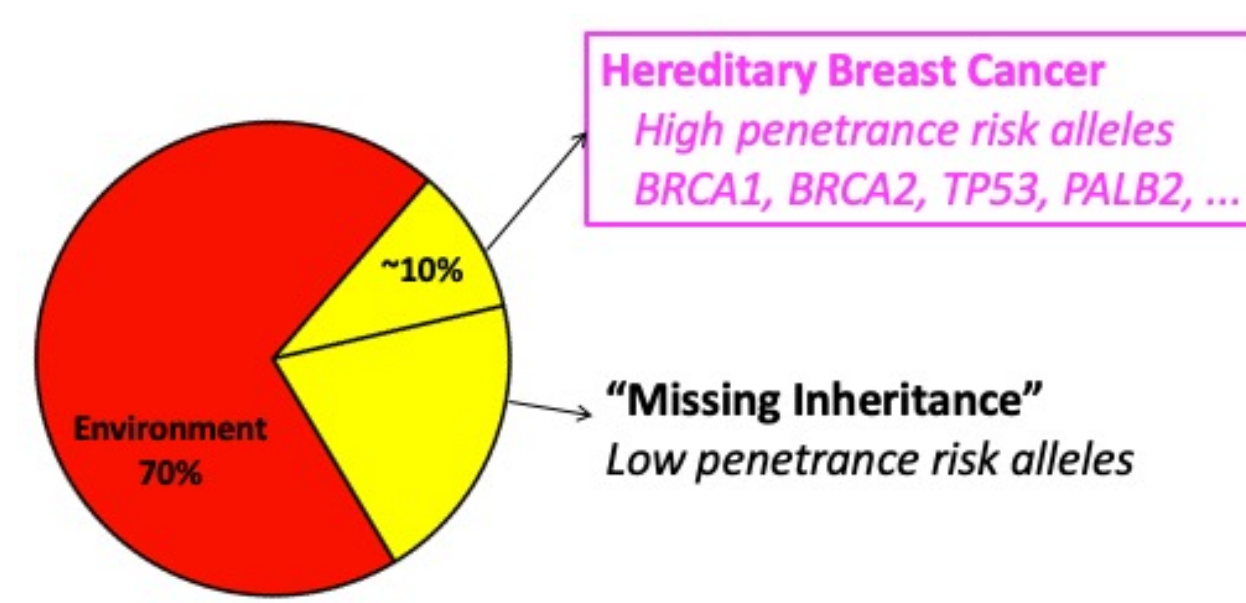


Overview

Breast cancer is around 30% heritable, which means about 70% of breast cancers are due to environmental factors (Mucci, 2016).

- Air quality
- Diet
- Exposure to chemicals
- Temperature/ climate
- Weight
- Exercise



Lichtenstein et al., 2000; Mucci et al., 2016

Estimate: One-third of cancer deaths preventable through dietary modification (Brennan, 2010).

Compounds in fruits and vegetables have anti-inflammatory and anti-carcinogenic properties that can reduce breast cancer risk (Hayes, 2005).



This study aims to associate the two.

General Steps

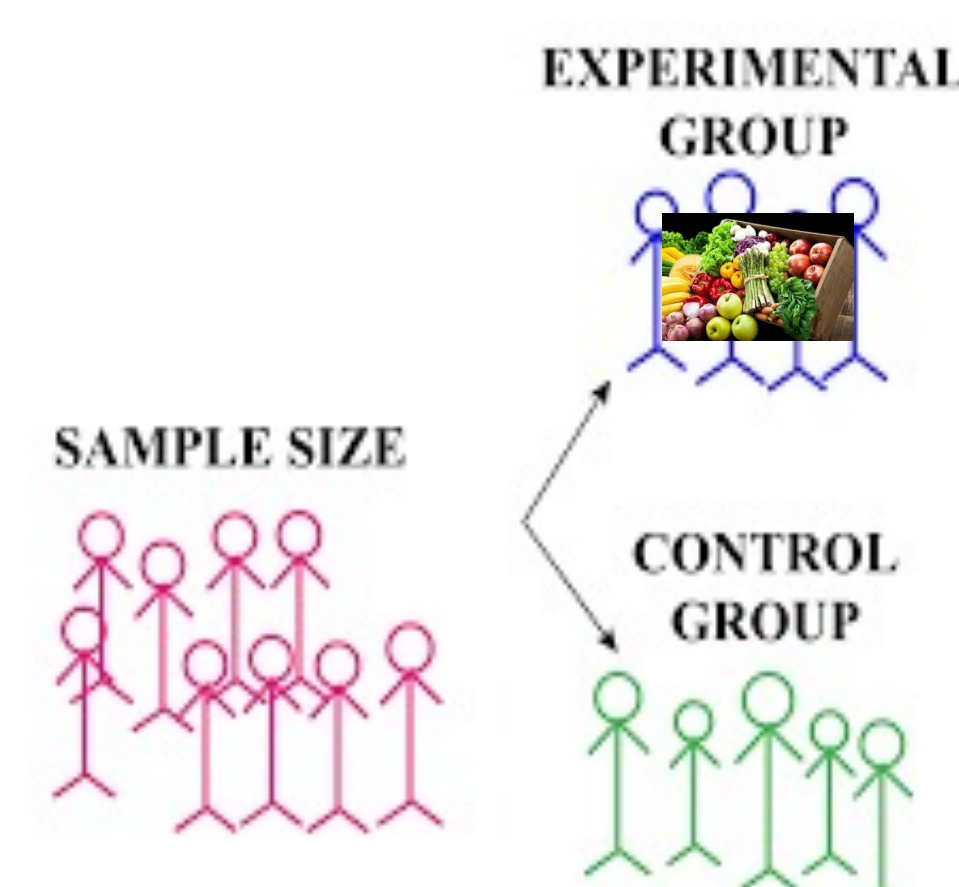
Lactating women will be asked to consume 8-10 serving of fruits and vegetables a day for 20 weeks (Intervention group)

- Collect milk at 5 different periods
- Record weight change and infant growth
- Analyze DNA methylation and cytokine profiles
 - Compare to control group
 - Associate with breast cancer risk

A Randomized Clinical Trial

A Randomized clinical trial is considered the gold standard when it comes to medical research (Hariton, 2018). It is a form of scientific experiment used to control factors not under direct experimental control.

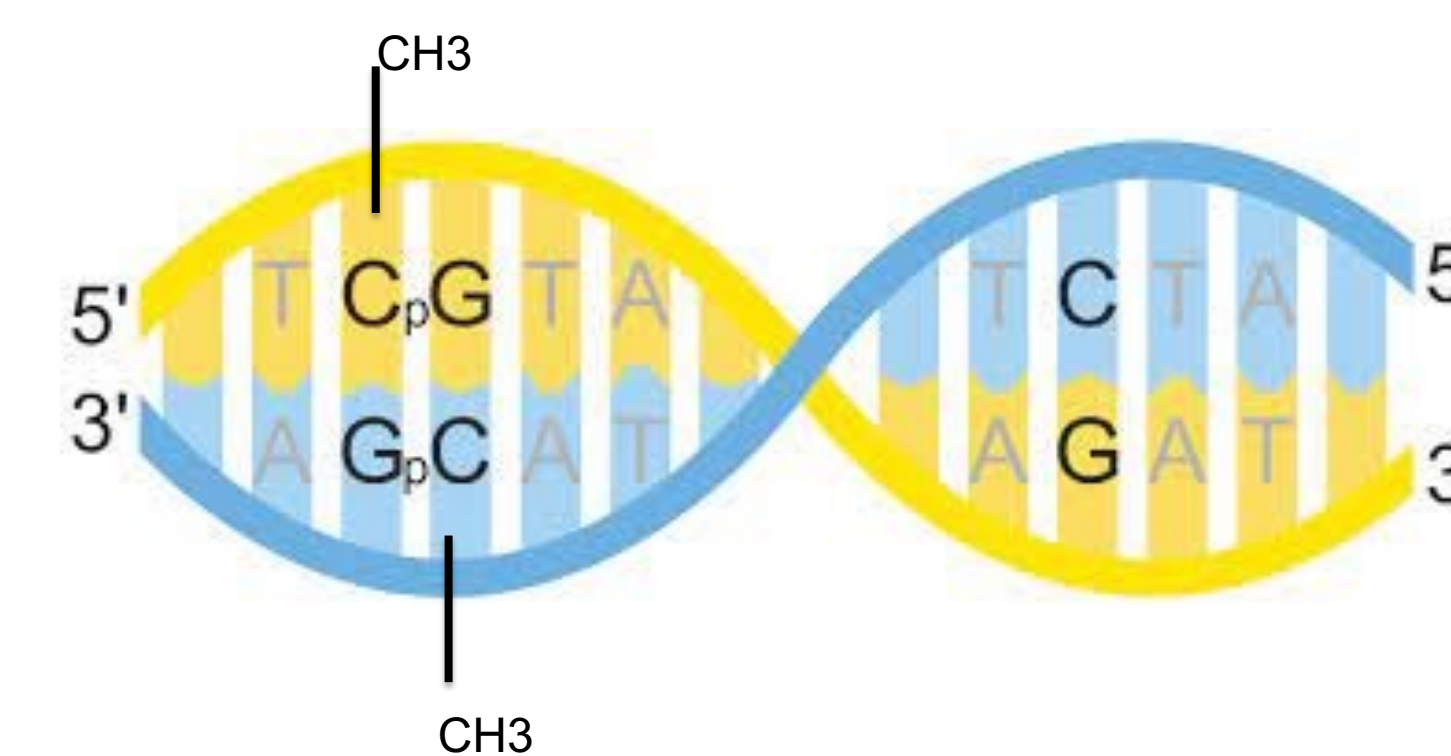
This study contains both an intervention group that will be consuming the vegetables, and a control group that will receive no dietary intervention or nutritional counseling.



DNA Methylation and Cytokines

DNA Methylation

- When a methyl group is added to DNA
- Regulates gene activation and gene inhibition
- Only cytosines that are followed by guanines are methylated in human DNA (CpG sites)
- DNA methylation regulates gene expression and plays a large and diverse role in many cancers



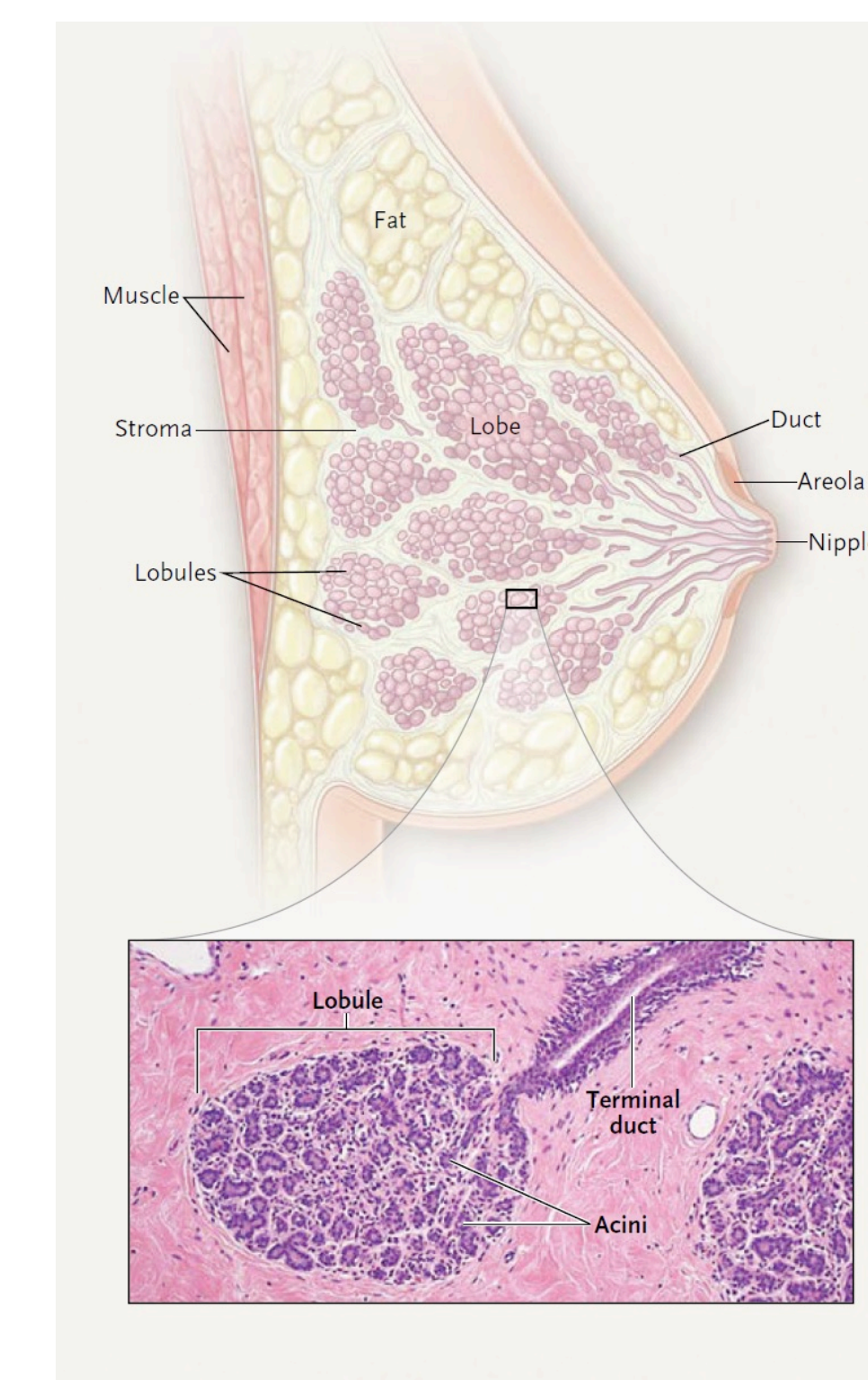
Cytokines

- Small secreted proteins released by cells
- Affect the interactions and communications between leukocytes and irritant
- Inflammatory cytokines in the breast are directly related to the growth and proliferation of early pre-malignant cells

Why Breastmilk?

Breastmilk offers a method of sample collection that is extremely convenient. It allows noninvasive access to the breast microenvironment & noninvasive access to breast epithelial cells

- The dietary intervention can be assessed directly in the breast.
- Having access to breast epithelial cells gives access to DNA.



Sample Processing

Milk and stool samples are processed immediately upon arrival to prevent sample spoilage. All liquid samples are aliquoted into 2mL cryovials.



Archival System

- Processed samples are stored in freezers that reach -80°C
- The location of each sample is recorded in Freezerworks; an online archival system



Current Progress

- Currently in the 2nd year of the study (2019-2023)
 - 130 women currently enrolled (goal: 400)
 - Over 1000 samples in storage

Future Directions

- Additional participant recruitment
- Sample collection and DNA extractions
- Analyze DNA methylation patterns with pyrosequencing
- Analyze cytokine profiles with pro-inflammatory panel cytokine assays

Goal of the Study

To determine if a diet rich in nutrient-dense fruits and vegetables can alter breast cell DNA methylation and cytokine levels in breastmilk in a manner consistent with reduced breast cancer risk, and help women achieve and maintain a healthy postpartum weight.

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