What is Fermentation?

• Sugars are broken down by the enzymes of microorganisms in the absence of oxygen
• Each type of fermented food hosts a distinct population of microorganisms
  ➢ Lactic acid fermentation
  ➢ Ethanol fermentation
  ➢ Acetic acid fermentation
YEAST FERMENTATION

PYRUVATE

GLUCOSE

ASPERGILLUS → LACTIC ACID

LACTOBACILLUS → LACTIC ACID

SACCHAROMYCES → ETHANOL + CO2

ETHANOL → CARBON DIOXIDE

SOY SAUCE

CHEESE, YOGURT

BEER

WINE

BREAD
Lactic Acid Fermentation

- Produces:
  - Yogurt
  - Kefir
  - Pickled Vegetables
  - Kimchi
  - Sauerkraut

Sugars are broken down into cellular energy and lactic acid is released
Acetic Acid Fermentation

• Secondary fermentation
• Produces:
  • Vinegar
  • Condiments such as ketchup and mustard

Sugars are broken down to ethanol, ethanol is broken down to acetic acid
Ethanol Fermentation

- Produces:
  - Beer
  - Wine
  - Mead
  - Rum
  - Vodka
  - Whiskey

Sugars are broken down into cellular energy and ethanol is produced.
Old Armor Beer Company
Brewing Process
Does beer have nutritional benefits?

As in all fermented foods, beer contains antioxidants and beneficial bacteria.

Beer also contains phosphorus, calcium, potassium, and manganese.

Some studies have linked moderate consumption to decreased cardiovascular and diabetes risk.
• What mom eats and drinks is delivered to baby after digestion
• The gut microbiome is altered by alcohol
• Gut microbiome may contribute to disorders
Precision Nutrition at the NRI

- Physical Activity and Gut Microbiome
  - Dr. Katie Meyer

- Breast Cancer Risks & New Treatment Options
  - Dr. Sumner & Dr. Rushing

- Pandemic Affects Eating Disorders
  - Dr. Rachel Goode