



The Science of Beer

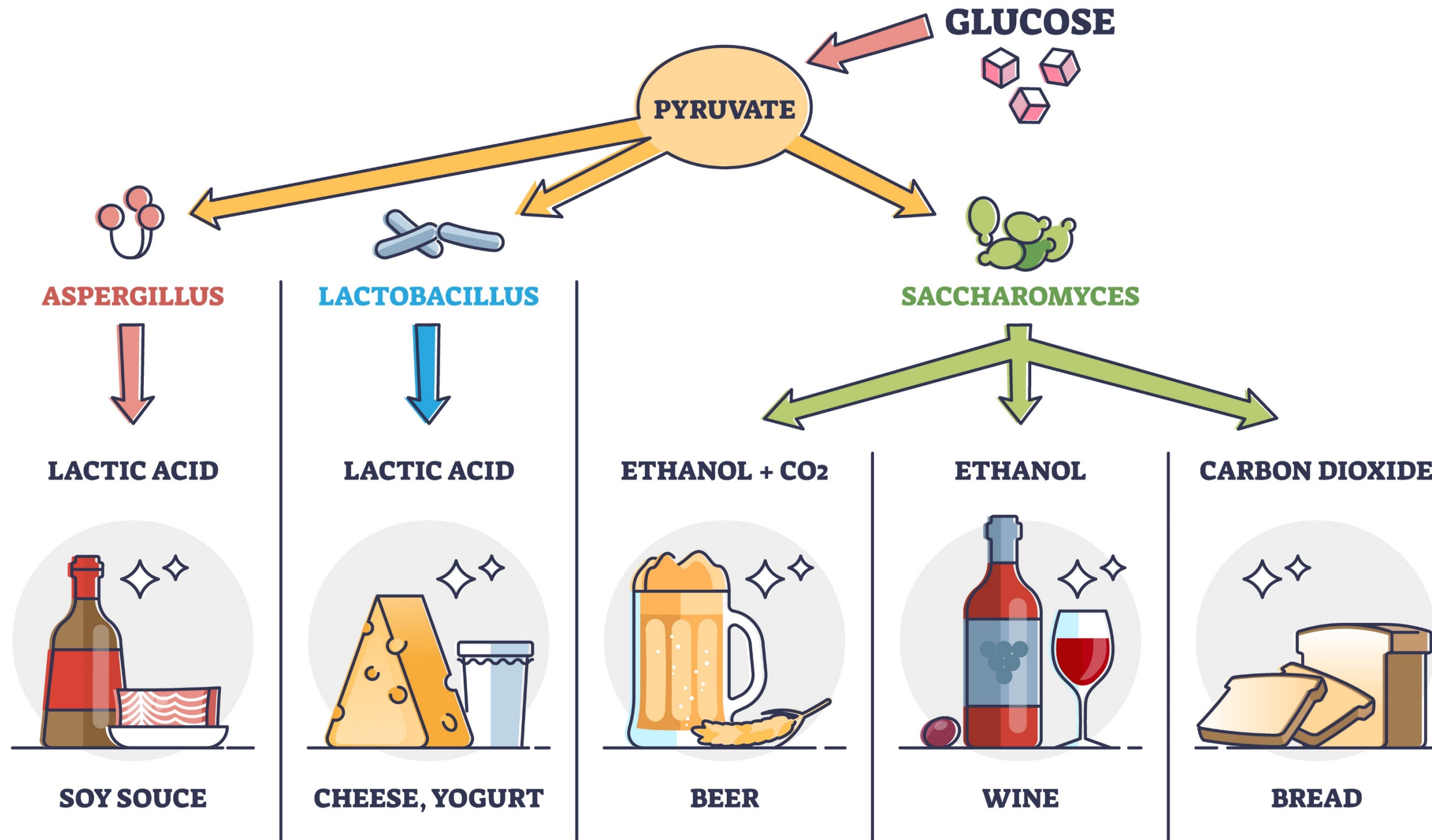
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Sandra Mooney, PhD

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



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



NRI Research: Dr. Sandra Mooney

- What mom eats and drinks is delivered to baby after digestion
- The gut microbiome is altered by alcohol
- Gut microbiome may contribute to disorders



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