

Gut Health and Diabetes

What to eat for optimal gut health

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| Objectives

- Provide specific food ideas to help diversify the microbiome
- Discuss foods that may help increase insulin sensitivity

What is the microbiota?

- Normal bacteria found in the human body
- There are 10-100 trillion bacteria and other microscopic organisms living in our gut, with each person hosting at least 160 different species
- Decreased gut microbial diversity has been shown in adults with type 2 diabetes mellitus, with decreased *Bifidobacterium*, *Firmicutes*, and *Clostridia*, and increased *Betaproteobacteria*
- Preference for an increased and diversified microbiota as data shows the greater likelihood that you can process glucose well

What foods help diversify the microbiome?

- Good bacteria can be added to the gut through consumption of **probiotics**

Incretin secretion

- Studies have shown probiotics can increase the level of incretin secretion of intestinal GLP-1.
- Incretin is a hormone that stimulates insulin release
- This helps with postprandial blood glucose and insulin resistance.
- Incretin secretion is *impaired* in individuals with obesity and T2DM when compared with healthy individuals.

Probiotics

“live micro-organisms which, when administered in adequate amounts, confer a health benefit on the host.”

(The Food & Agriculture Organization and the World Health Organization)

Probiotic foods include:

- Fermented vegetables (sauerkraut, kimchi, pickles, beets, carrots)
- Fermented fruits (chutneys, jams, green papaya, pickled jackfruit)
- Yogurt, kefir, sour cream, buttermilk (plain, no added sugar, with live and active cultures)
- Kombucha, a fermented beverage
- Fermented condiments (homemade ketchup, relishes, salsas, pickled ginger)
- Natto, miso, tempeh, and tamari sauce



True or False?
All pickles, sauerkraut, and kimchi contain probiotics.

False!

Looking at food label for probiotics

- What to look for:
 - Visually seeing cloudy/bubbling brine
 - “contains live active cultures”, “probiotic”, “raw”, “live”, “unpasteurized”
 - The only ingredients needed: filtered/spring water, Kosher/unrefined sea salt, vegetable of choice
- Ingredients that should not be included (as it can interfere with and inhibit the process of lacto-fermentation):
 - Vinegar
 - Sugar
 - Certain chemical preservatives (“sodium benzoate”, “sodium bisulfate”, “lactic acid”)
 - Food dyes

| Is this a probiotic?



**INGREDIENTS: CUCUMBERS,
WATER, SALT, GARLIC, DILL,
SPICES, MUSTARD SEED,
CALCIUM CHLORIDE.**

| Is this a probiotic?



YES!

INGREDIENTS: CUCUMBERS,
WATER, SALT, GARLIC, DILL,
SPICES, MUSTARD SEED,
CALCIUM CHLORIDE.

| Is this a probiotic?



INGREDIENTS: FRESH CUCUMBERS, WATER, SALT, DISTILLED VINEGAR, CONTAINS LESS THAN 2% OF DRIED GARLIC, CALCIUM CHLORIDE, SODIUM BENZOATE (TO PRESERVE FLAVOR), SPICE, MUSTARD SEED, NATURAL FLAVOR, DRIED RED BELL PEPPERS, POLYSORBATE 80, OLEORESIN TURMERIC.

| Is this a probiotic?



NO!

INGREDIENTS: FRESH CUCUMBERS, WATER, SALT, DISTILLED VINEGAR, CONTAINS LESS THAN 2% OF DRIED GARLIC, CALCIUM CHLORIDE, SODIUM BENZOATE (TO PRESERVE FLAVOR), SPICE, MUSTARD SEED, NATURAL FLAVOR, DRIED RED BELL PEPPERS, POLYSORBATE 80, OLEORESIN TURMERIC.

Is this a probiotic?



INGREDIENTS: Green Cabbage, Garlic, Kosher Salt, Black Pepper.

| Is this a probiotic?



YES!

INGREDIENTS: Green Cabbage, Garlic, Kosher Salt, Black Pepper.

| Is this a probiotic?



Ingredients

Cabbage; Water; Salt; Sodium Benzoate and Sodium Bisulfite (preservatives);

| Is this a probiotic?



NO!

Ingredients

Cabbage; Water; Salt; Sodium Benzoate and Sodium Bisulfite (preservatives);

True or False?

Pickling vegetables is the same as fermenting vegetables.

False!

- **Pickled vegetables** are made with vinegar and/or sugar, and they are boiled which sterilizes the pickled vegetable
- **Fermented vegetables** are made with spices in a salt brine at room temperature

Miso



- Use miso paste in soups, in salad dressing, and as a spread for sandwiches
- Avoid adding miso to boiling water/soup as it can kill off the good bacteria.
- Tip: add miso to soups and stews at the end of the cooking process once the heat has been turned off.

Prebiotics

- Prebiotics are what you feed the probiotics to help them thrive.
- Can stimulate a natural *increase* in good bacteria in the gut.
- They are non-digestible food ingredients, typically plant fibers, that are easily fermentable by beneficial gut bacteria to increase production of SCFAs

What are Short Chain Fatty Acids (SCFAs) and why are they important with diabetes management?

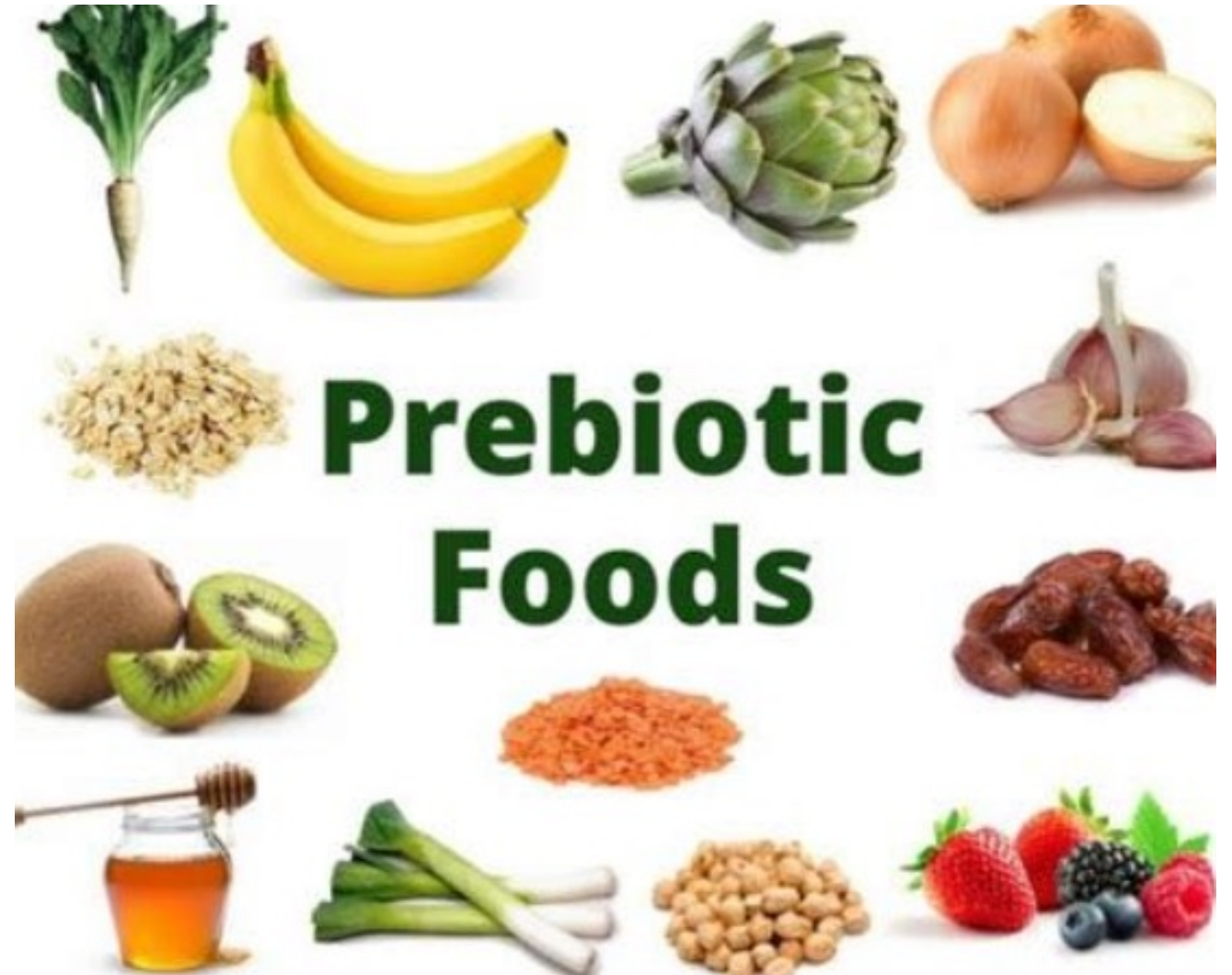
What are Short Chain Fatty Acids?

- SCFAs are the end products of fermentation of dietary fibers by the anaerobic intestinal microbiota
- They help stimulate the secretion of insulin (through incretin peptides), controlling the level of glucose in the body
- Increase insulin sensitivity
- Increase glucose homeostasis (balance of insulin and glucagon)

Prebiotics

“A substrate that is selectively utilized by host microorganisms conferring a health benefit”

(The International Scientific Association for Probiotics and Prebiotics)



How much prebiotic should I eat?

At present, there are no official dietary recommendations for 'adequate intake' or 'recommended daily allowance' for prebiotics in healthy individuals.

Include a diet that incorporates a diverse variety of high-fiber foods such as vegetables, whole grains and fruits for the potential of obtaining a sufficient amount

The recommended daily amount of fiber is 25-38 grams per day, or 14 grams per 1000 calorie.

Tip: If you eat 3 meals a day + 2 snacks
Aim for 5 grams fiber at each meal/snack

Fiber

Food	Amount	Total Fiber (grams)
Bran cereal	1/3 cup	8.6
Cooked kidney beans	1/2 cup	7.9
Cooked lentils	1/2 cup	7.8
Cooked black beans	1/2 cup	7.6
Canned chickpeas	1/2 cup	5.3
Baked beans	1/2 cup	5.2
Pear	1	5.1
Soybeans	1/2 cup	5.1
Quinoa	1/2 cup	5
Baked sweet potato, with skin	1 medium	4.8
Baked potato, with skin	1 medium	4.4
Cooked frozen green peas	1/2 cup	4.4
Bulgur	1/2 cup	4.1
Cooked frozen mixed vegetables	1/2 cup	4
Raspberries	1/2 cup	4
Blackberries	1/2 cup	3.8
Almonds	1 ounce	3.5
Cooked frozen spinach	1/2 cup	3.5
Vegetable or soy patty	1 each	3.4
Apple	1 medium	3.3
Dried dates	5 pieces	3.3

| Synbiotics

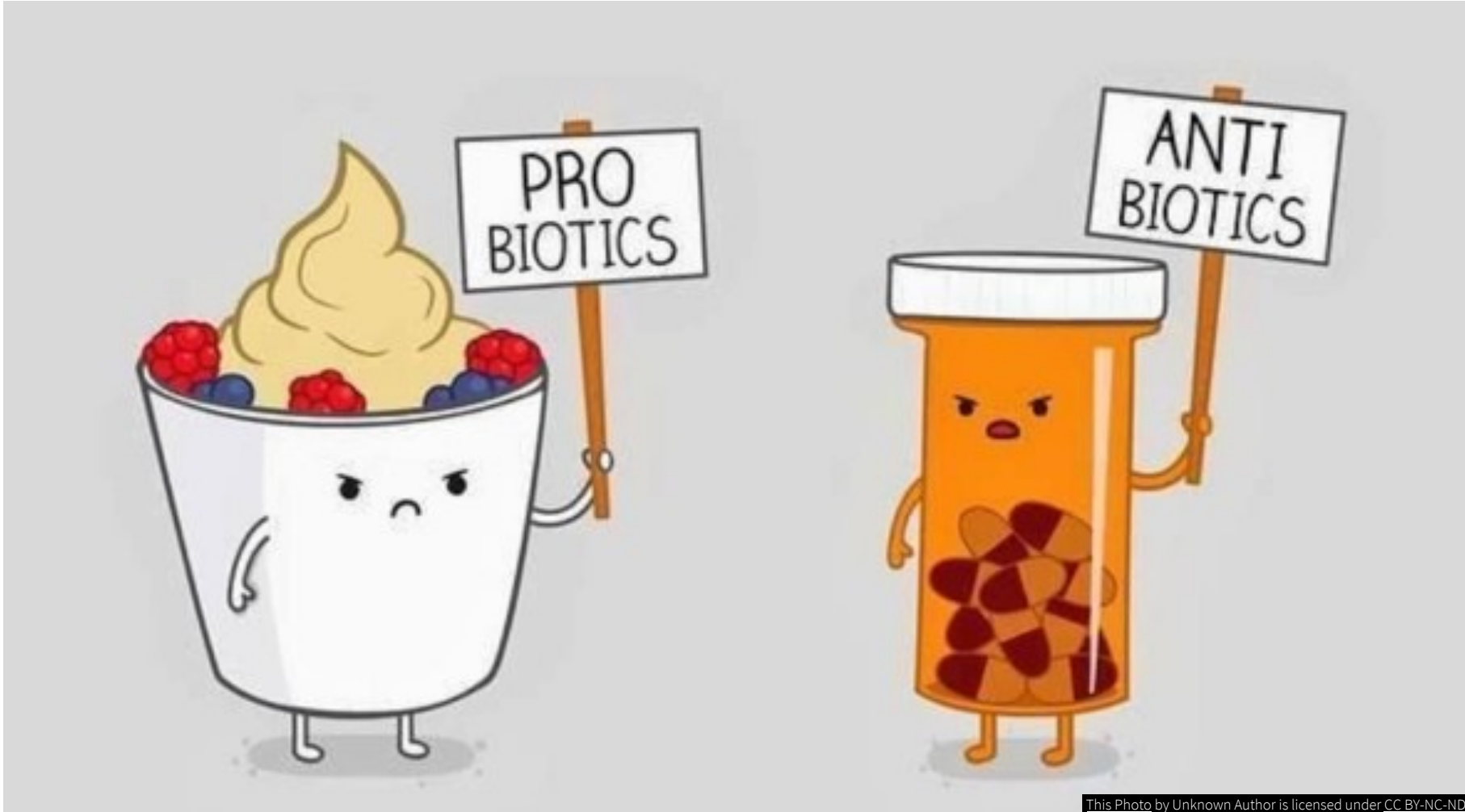
- Significant benefit is seen when consuming both probiotic and prebiotic at the same time, which is referred to as **synbiotics**
- Shown to provide more significant benefits than when used separately

Ways to include prebiotics and probiotics

- Yogurt with berries and/or almonds/walnuts
- Kefir smoothie with berries
- Vegetables with a cup of kombucha
- Salad with fermented vegetables
- Sandwich topped with raw sauerkraut



Should I take a probiotic supplement?



What to look for in supplements

- **Colony-forming units (CFU)**
 - This is the number of bacteria per dose
 - General recommendation is to choose a probiotic product with at least 1 billion CFU
 - You may see it written on the label as 1×10^9 for 1 billion CFU or 1×10^{10} for 10 billion CFU.
 - *Higher CFU counts do not necessarily improve the product's health effects.*
 - Because probiotics must be consumed alive to have health benefits and they can die during their shelf life, users should look for products labeled with the number of CFU at the end of the product's shelf life, not at the time of manufacture.

What to look for in supplements

- Types of bacterial strains that are used
 - Some of the most researched strains include *Lactobacillus*, *Bifidobacterium*, or *Saccharomyces boulardii*
- How your probiotics need to be stored
 - Check product labels for the expiration or use by date and follow the storage instructions (refrigerated or room temperature)
- Cost isn't necessarily an indicator of quality

Who should not take a probiotic supplement?

- For individuals with a compromised immune function, or those who are critically ill, the World Gastroenterology Organization (WGO) advises restricting probiotic use to the strains and indications that have proven efficacy

Summary

- Eat more probiotic foods to diversify your gut microbiota
- Eat more prebiotic foods to help with insulin resistance
- Choose food first when it comes to probiotics and prebiotics. If using a supplement take a careful look at the label
- *Taking care of your gut and your blood sugar levels go hand in hand – the same foods that promote gut health actually help regulate blood sugars too!*

Thank you!