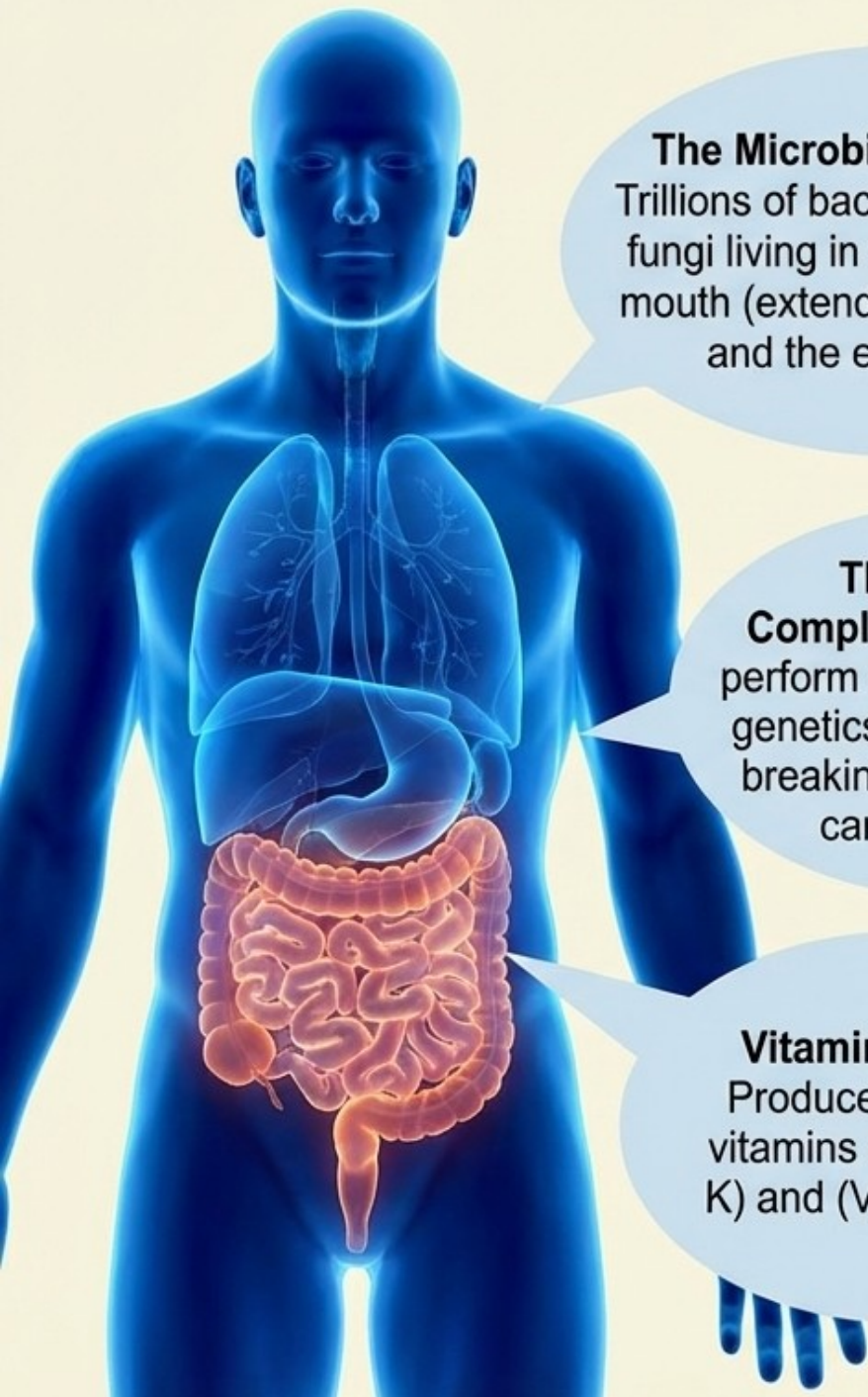


A microscopic view of various bacteria, primarily rod-shaped, with a textured, almost crystalline surface. They are scattered across the frame against a dark blue background. The lighting highlights the three-dimensional structure of the bacteria, giving them a sense of depth and volume. Some bacteria are in sharp focus, while others are blurred in the background, creating a sense of a vast, active microbial environment.

**What's the
Microbiome?**



The Microbial Community:

Trillions of bacteria, viruses, and fungi living in the gut, skin, and mouth (extending to include soil and the environment).



The Genetic Complement:

Bacteria perform functions our own genetics cannot, such as breaking down complex carbohydrates.



Vitamin Factory:

Produces essential vitamins like (Vitamin K) and (Vitamin B12).



2 KG

**An organ
weighing two
kilograms
acting as our
genetic
complement.**

The Microbial Balance and Immune System Link



Dysbiosis (Microbial Imbalance):

Dominance of harmful bacteria.
Increased risk of infection, obesity, and
chronic conditions like IBS.



Microbial Balance:

Bacterial diversity enhances digestion,
immune regulation, and metabolism.

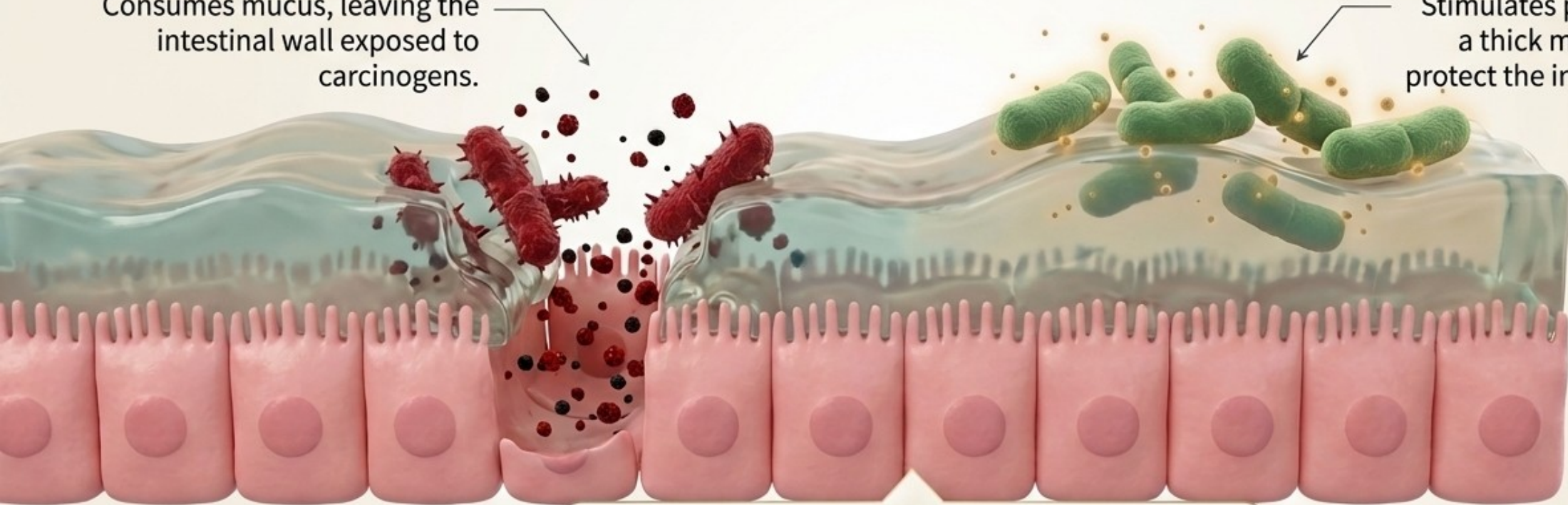
First Line of Defense Against Carcinogens

Harmful Bacteria:

Consumes mucus, leaving the intestinal wall exposed to carcinogens.

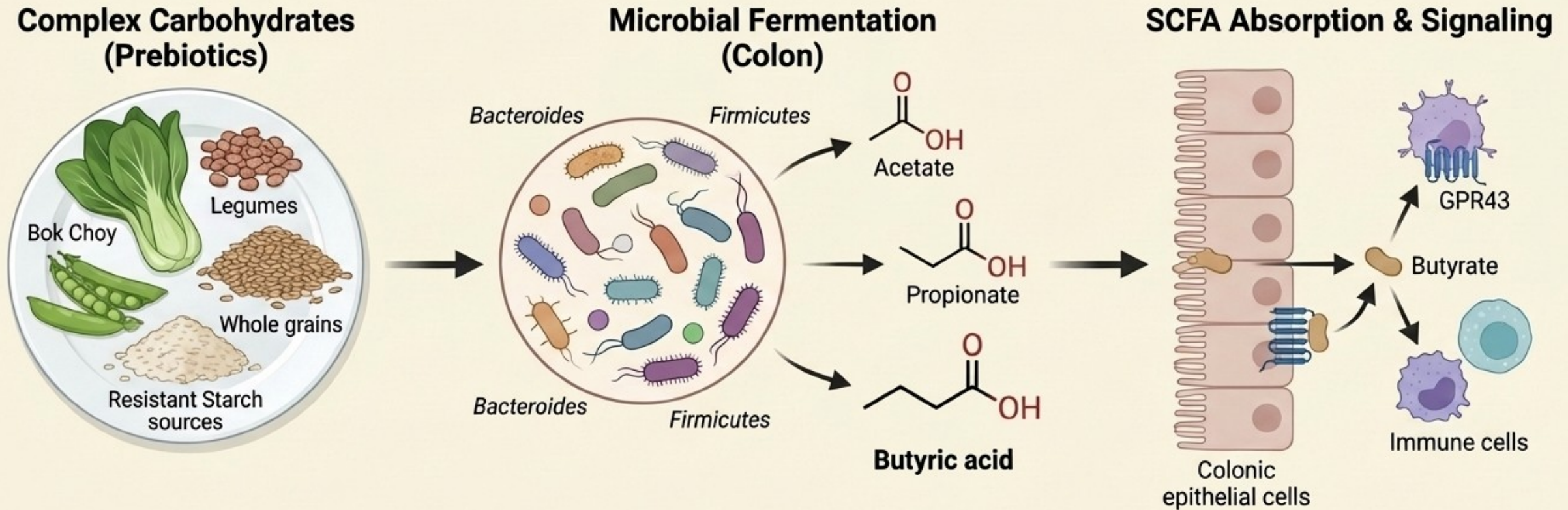
Beneficial Bacteria:

Stimulates production of a thick mucus layer to protect the intestinal wall.



Maintaining the mucus layer is the most important step in preventing colon cancer.

Dietary Fiber Fermentation and Butyrate Production in the Microbiome



Stage 1: Intake. Consumption of indigestible dietary fibers and resistant starches from plant sources.

Stage 2: Fermentation. Gut microbiota in the colon metabolize these complex carbohydrates, yielding SCFAs, primarily butyrate.

Stage 3: Absorption & Signaling. Butyrate serves as a primary energy source for colonocytes and acts as a signaling molecule (via GPR43) to modulate immune responses and maintain gut barrier integrity.

Converting Indigestible Fiber into Energy



1

Dietary Fiber

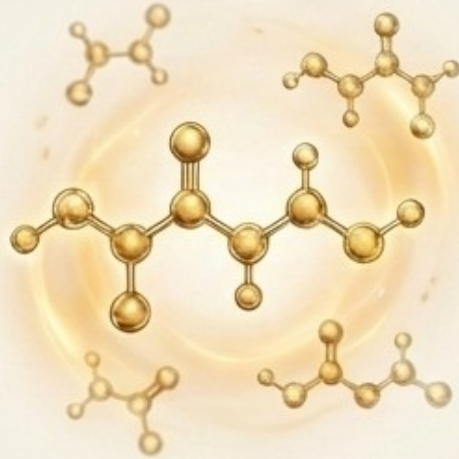
Found in vegetables and legumes, and cannot be digested by the human body.



2

Bacterial Fermentation

Beneficial bacteria break down these fibers.



3

Short-Chain Fatty Acids (SCFAs):

The result is the production of short-chain fatty acids, which are vital compounds.

Butyrate: The Most Important Biofuel for Colon Cells

70%

of colon cell energy

- **Direct Nutrition:** Butyrate is a fatty acid that directly nourishes colon cells.
- **Cancer Fighting:** Regulates gene functions, induces apoptosis (programmed cell death) in cancer cells, and prevents pre-cancerous inflammation.



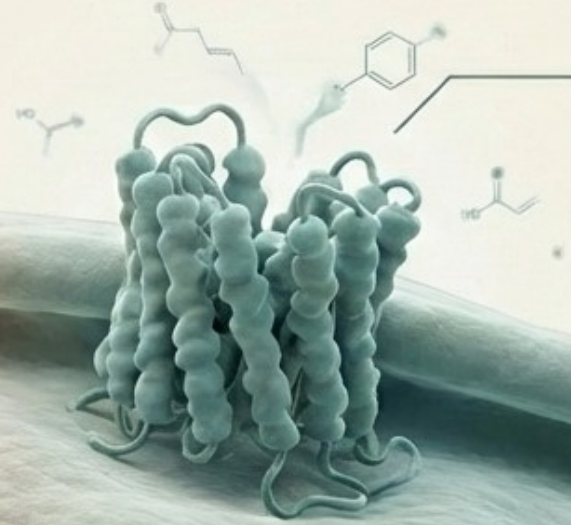
The Communication Interface Between Bacteria and Body Cells

Intestinal cells and the immune system possess protein receptors that capture chemical signals:

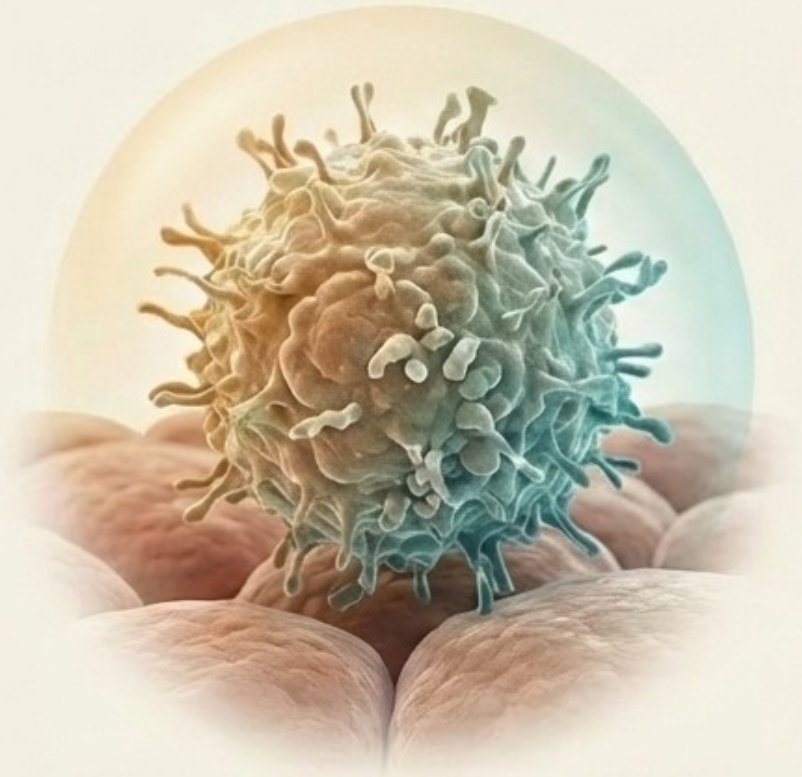
Found in the **GPR41**:
intestine and adipose
tissues.



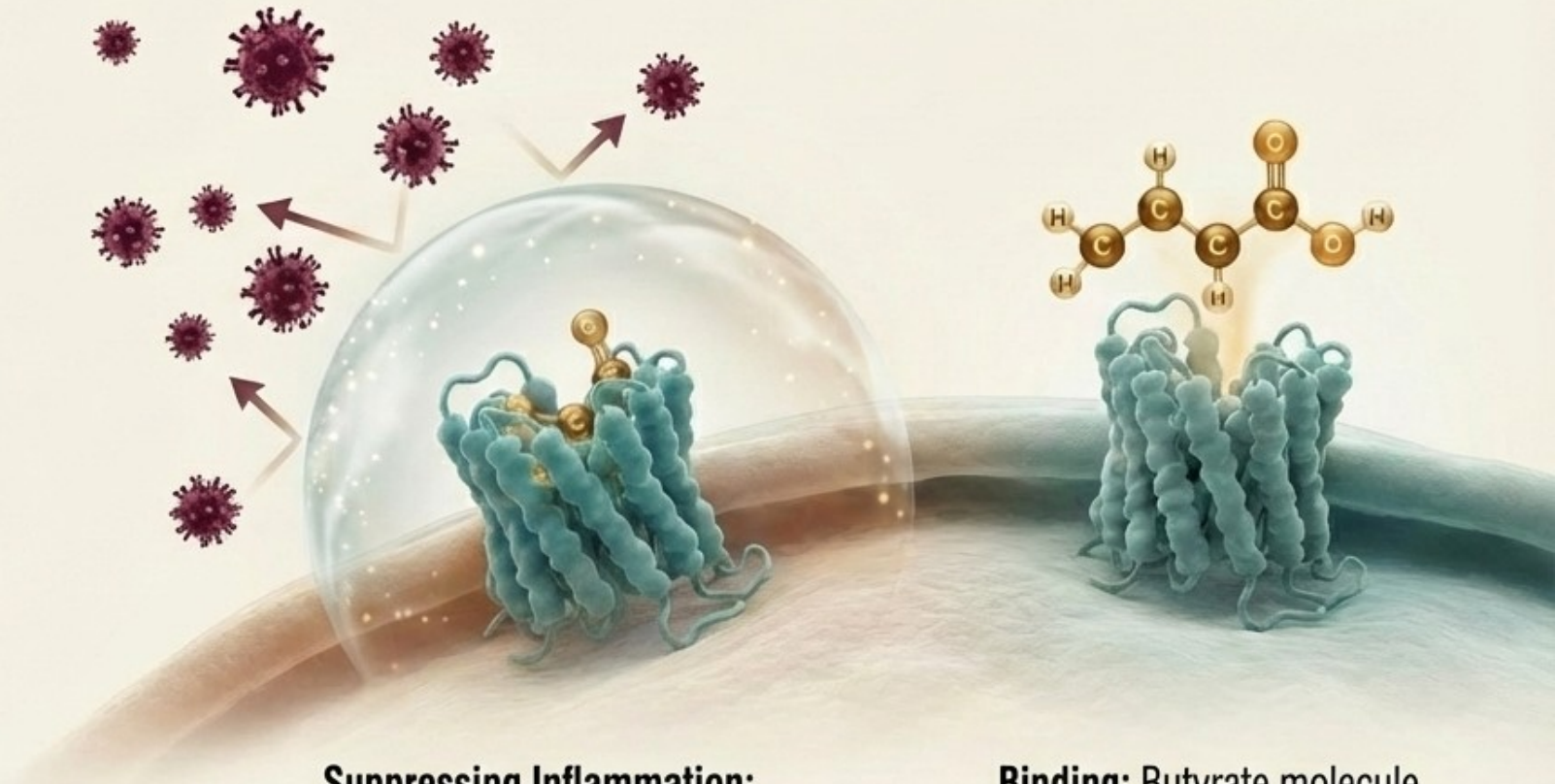
GPR43: Abundantly
present on the surface
of immune cells.



How Butyrate Stops Immune Attacks



Activating the Guards: Activating Regulatory T-cells (T-Regs). Their job is to prevent the immune system from attacking the body or causing chronic inflammation that could lead to cancer.



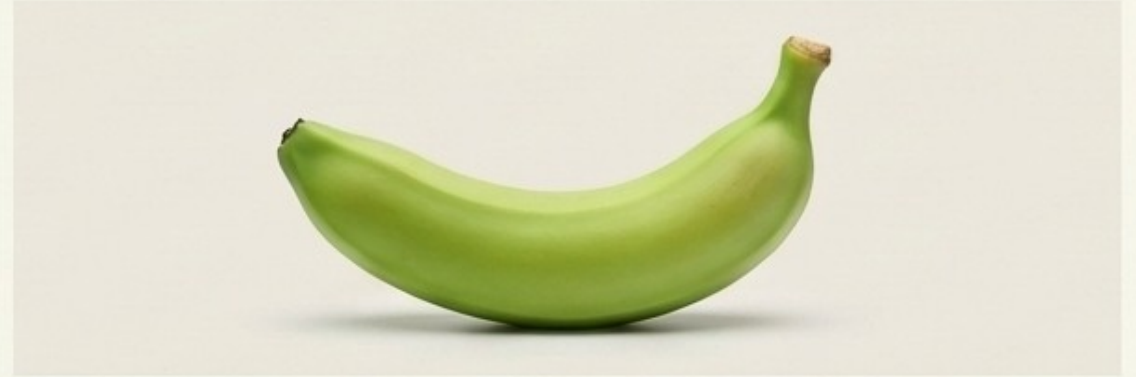
Suppressing Inflammation: Stopping the production of Cytokines, which are inflammation-causing proteins.

Binding: Butyrate molecule binds to GPR43 receptor.

Foods that stimulate butyrate production daily



Legumes (such as lentils and beans).



Green bananas (rich in resistant starch).



Potatoes and pasta (cooked and cooled beforehand).



Whole grains (such as oats and barley).