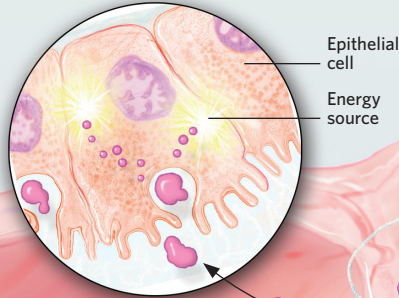


HELPFUL BACTERIAL METABOLITES

While gut microbiota appear to have both positive and negative impacts on our health, in the guts of healthy, lean individuals, the good outweighs the bad. Gut bacteria, most of which reside in the large intestine, process many otherwise indigestible components of foods, converting them into an estimated 10 percent of our daily energy supply. But in addition to eking out additional nutrients from our food, gut bacteria also produce a number of metabolic by-products that improve our immune systems, strengthen the lining of the gut—our best barrier to infection—and confer anticancer benefits.



Large intestine

A BUTYRATE

Butyrate is made from the bacterial digestion of starches. It is an important energy source for certain epithelial cell types.

B ACETATE

Microbe-generated acetate has a number of physiological functions. It binds to a G-protein-coupled receptor expressed on immune cells, helping to quell an overactive immune system. Acetate also appears to protect the host against infection by deadly strains of *E. coli*.

C PROPIONIC ACID

Propionic acid may influence immune system responses by acting on adaptive immune cells called T cells.

D POLYPHENOLS

Though not produced by bacteria, polyphenols, found in coffee, tea, wine, fruits and vegetables, are metabolized in the colon into antioxidants and anticancer agents. One type of plant phenol, ellagic acid—found in berries and nuts—is metabolized by gut bacteria into urolithin, which is linked to anti-inflammatory and anticancer effects.

