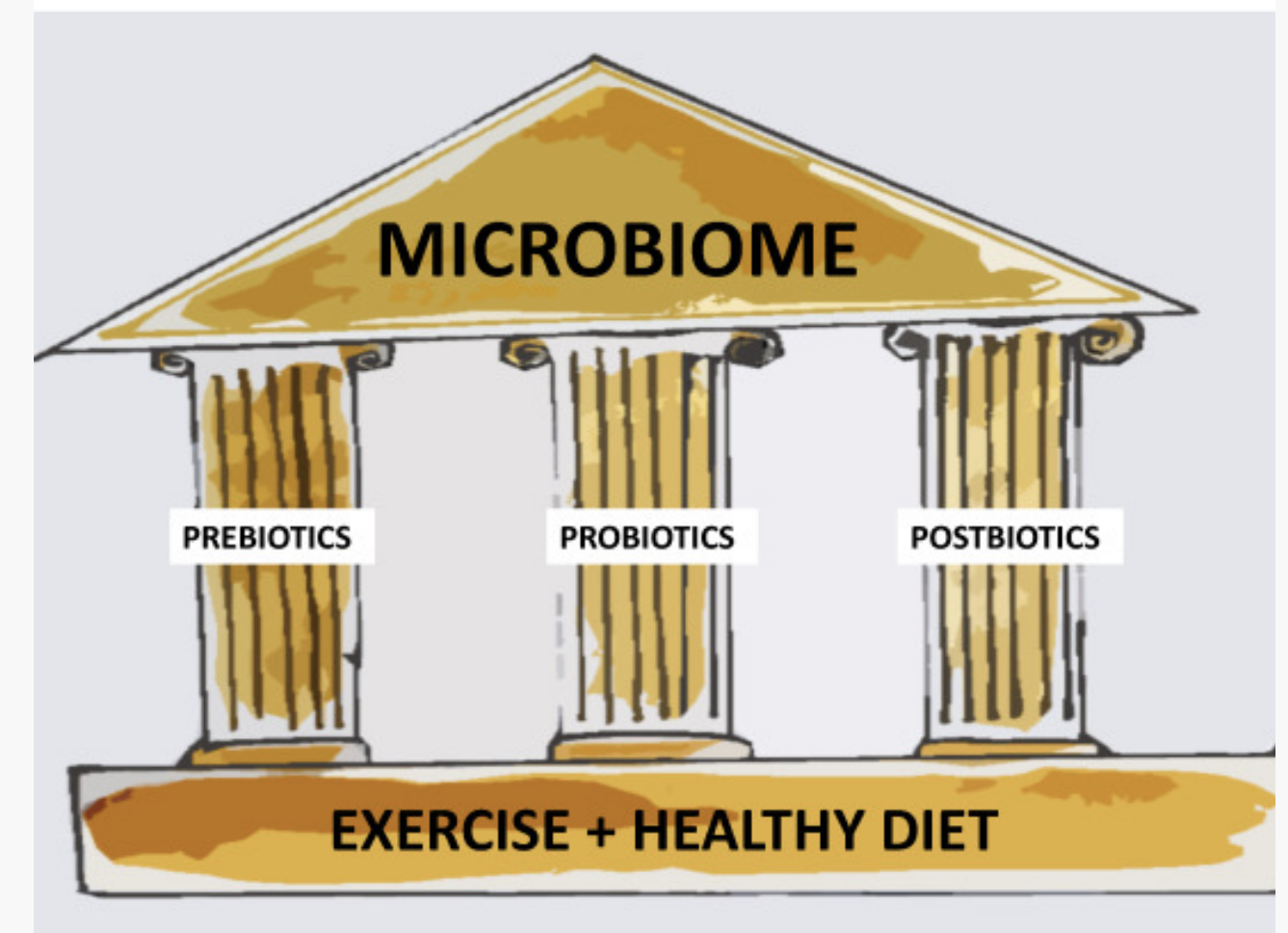


Postbiotics—A Step Beyond Pre- and Probiotics

OVERVIEW

As an imbalance in the intestinal microbiota can lead to the development of several diseases (e.g., type 1 diabetes, cancer, among others), the use of prebiotics, probiotics, and postbiotics to alter the gut microbiome has attracted recent interest. Postbiotics include any substance released by or produced through the metabolic activity of the microorganism, which exerts a beneficial effect on the host, directly or indirectly

There are currently three main ways in which the microbiota can be modulated with use of prebiotics, probiotics, synbiotics, or postbiotics. Prebiotics are used by microorganisms as food, and, at the same time, can exert a beneficial effect on the health of the host these include human milk oligosaccharides (HMO), lactulose, and inulin derivatives. Probiotics directly impact the gut microbiome through the selective delivery of beneficial microorganisms to the gastrointestinal tract. The concept of postbiotics is based on the observation that the beneficial effects of the microbiota are mediated by the secretion of various metabolites

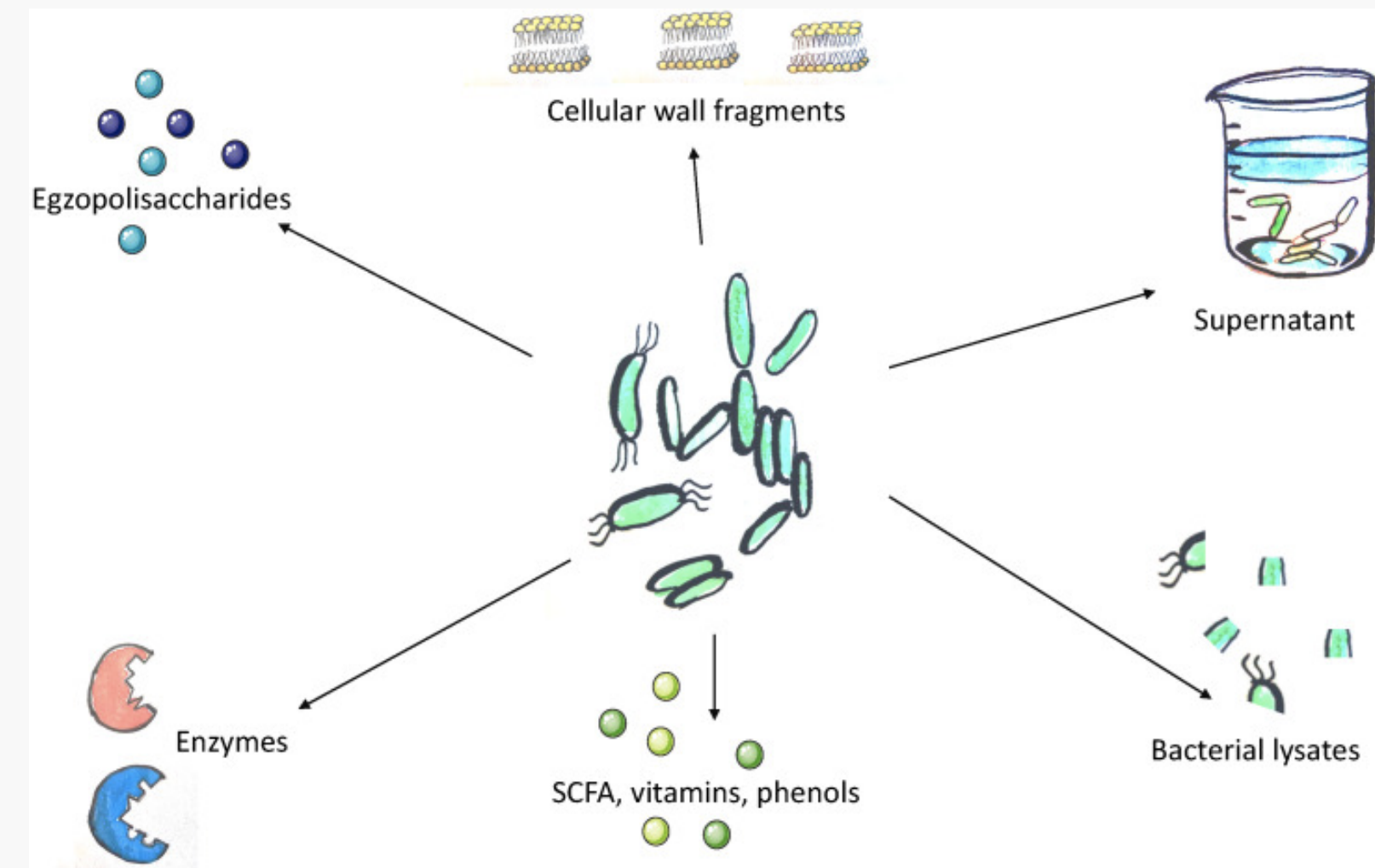


PROPERTIES

Postbiotics include any substance released by or produced through the metabolic activity of the microorganism, which exerts a beneficial effect on the host, directly or indirectly. It is observed that Postbiotics may also strengthen the intestinal microbiome

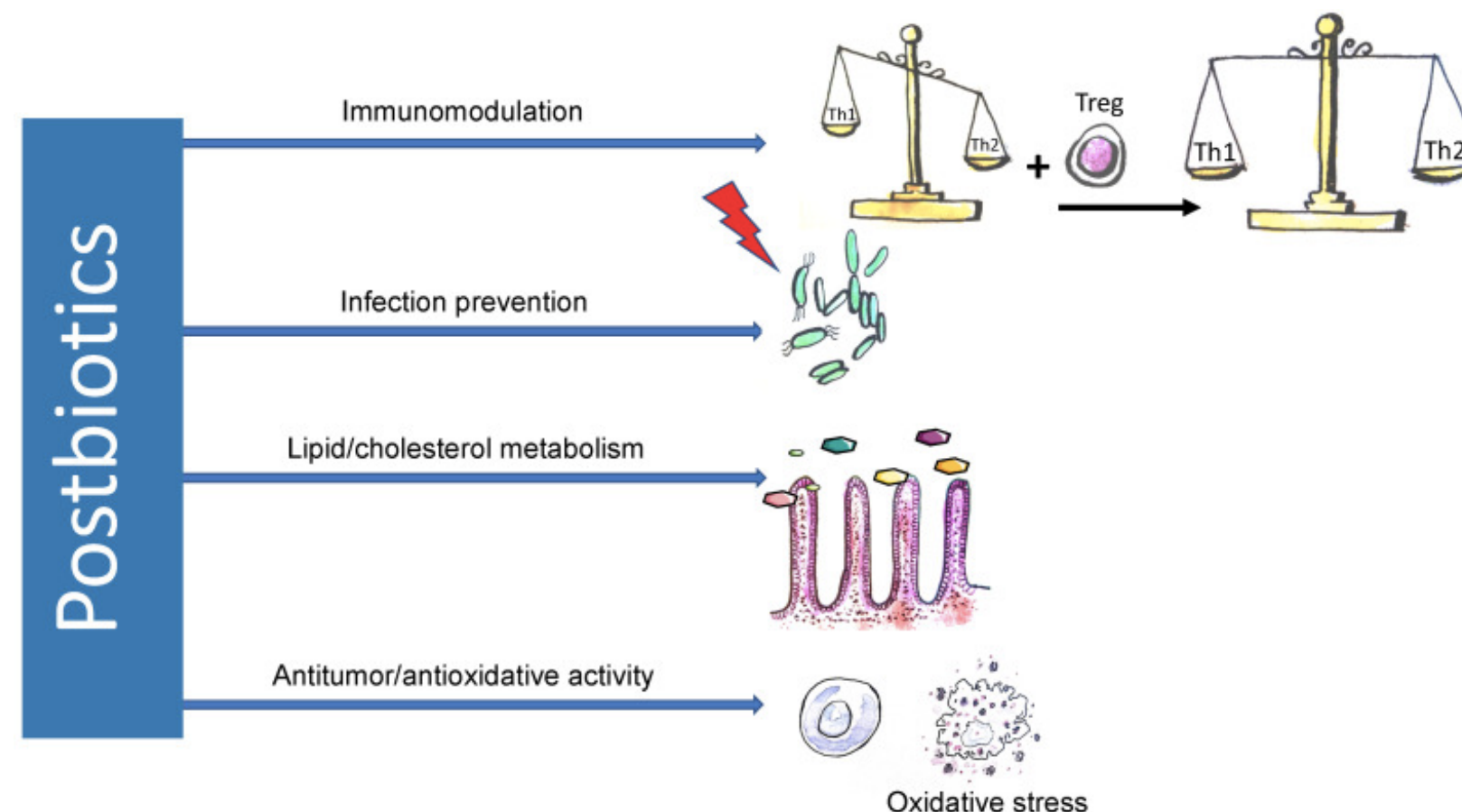
Supernatants produced from cultures of different microorganisms show differing activities.

Lactobacillus acidophilus and *Lactobacillus casei* supernatants have anti-inflammatory and antioxidant effects on intestinal epithelial cells, macrophages, and neutrophils by reducing the secretion of the pro-inflammatory tumor necrosis factor α (TNF- α) cytokine and increasing secretion of the anti-inflammatory cytokine interleukin 10 (IL-10)



POTENTIAL MECHANISMS OF POSTBIOTIC ACTION

Mechanisms of action of postbiotics. Postbiotics display pleiotropic properties. Due to the induction of differentiation of T regulatory lymphocytes and synthesis of anti-inflammatory cytokines, postbiotics restore the imbalance between two major arms of immune system represented by Th1 and Th2 lymphocytes. The balance between Th1 and Th2 lymphocytes is vital for immunoregulation, and its disturbance causes various immune diseases, including atopic disorders. Antibacterial activity is probably mediated by postbiotics' impact on the molecular structure of enterocytes, which results in sealing the intestinal barrier. "Statin-like" activity of postbiotics and its future therapeutic application in metabolic and related diseases is highly anticipated.



SUMMARY

The use of metabolites or fragments derived from microorganisms (i.e., “postbiotics”) is an attractive therapeutic and preventive strategy in modern medicine. According to current data, such postbiotics have pleiotropic effects, including immunomodulatory, anti-inflammatory, antioxidant, and anti-cancer properties. Some of these properties are even in clinical use. As such, postbiotics are useful in treating or preventing many disease entities, including those for eg, inflammatory bowel disease and improve metabolism