

Berry good news: New compound from blueberries could treat inflammatory disorders

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A polyphenolic compound derived from blueberry shows remarkable immunosuppressive effects and can be useful in treating Inflammatory bowel disease (IBD). Credit: Tokyo University of Science

Many plants contain bioactive ingredients that can alleviate human diseases. These phytochemicals often contain restorative biological properties such as anti-cancerous, antioxidant and anti-inflammatory effects. Thus, understanding how they interact with the body can lead to potential treatment strategies against major immune disorders.

A team of researchers at Tokyo University of Science, led by Prof Chiharu Nishiyama, has been working this direction for the past several years, to identify novel active components in functional foods and understand their effects on the body. Their efforts have now led to success: In their latest study, published in *The FASEB Journal*, the scientists identified a polyphenolic compound called pterostilbene (PSB) with strong immunosuppressive properties—making it a potential therapeutic option for chronic inflammatory diseases, including inflammatory bowel disease (IBD). This compound is very similar to another phytochemical known to have important medicinal effects, called resveratrol (RSV).

Dr. Takuya Yashiro, corresponding author of this report, says, "RSV, a polyphenol, was known to have pronounced immunomodulatory and anti-inflammatory effects on animal models of colitis ulcer. Therefore, we investigated the possibility of other compounds structurally similar to RSV as a new type of treatment for IBD."

In patients with IBD, the gastrointestinal tract lining contains long-lasting ulcers caused by chronic inflammation due to an elevated [immune response](#) in the body. This involves the excessive production of immune system-related molecules called cytokines. Moreover, two types of immune [cells](#), [dendritic cells](#) (DCs) and T cells, are also involved: At the onset of an immune response, DCs produce inflammatory cytokines and activate T cells to initiate a defense response. These processes together form a complex pathway that result in an elevated immune response. Thus, to find an effective compound that can suppress the immune

system, it was crucial to test it on this population of immune cells.

To begin with, the scientists studied the effects of a range of plant-derived compounds on DC-mediated T cell proliferation. Their initial research led them to PSB, which showed stronger immunosuppressive activity than the other candidates. When they dug deeper, they found that PSB treatment prevents T cells from differentiating into Th1 and Th17 (subtypes of T cells that elevate the immune response) while increasing their differentiation into regulatory T cells (another subtype known to inhibit inflammation). They also revealed that PSB treatment inhibits inflammatory cytokine production from DCs by attenuating the DNA-binding activity of a crucial transcription factor PU.1. When they further tested PSB in mice with IBD, they found that oral intake of PSB improved symptoms of IBD. Thus, the study confirmed that PSB is an extremely promising anti-inflammatory agent to fight IBD. Additionally, it is easily absorbed by the body, making it an ideal drug candidate.

Through these findings, the scientists have ushered in new possibilities for the treatment of not just IBD, but also other inflammatory disorders. Dr. Yashiro says, "For disease prevention, it is important to identify the beneficial components in foods and to understand the underlying mechanism by which immune responses and homeostasis are modulated in body. Our findings showed that PSB possesses a strong immunosuppressive property, paving the way for a new, natural treatment for IBD."

More information: Takuya Yashiro et al, Pterostilbene reduces colonic inflammation by suppressing dendritic cell activation and promoting regulatory T cell development, *The FASEB Journal* (2020). [DOI: 10.1096/fj.202001502R](https://doi.org/10.1096/fj.202001502R)

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