Could you provide an insight into Clasado BioSciences and outline the benefits of Bimuno?

Clasado’s aim is to provide proven health solutions for food, healthcare and pharmaceutical companies that serve the global health and wellness market. We are developers of unique functional ingredients. Among these is the novel, patent-protected galacto-oligosaccharide (GOS) mixture: Bimuno. It is the only second-generation prebiotic that, in addition to selectively increasing the level of intestinal health-promoting bacteria such as Bifidobacteria, has multiple biological activities that are relevant to the gut, immune system and overall health and wellbeing. Today’s consumers are increasingly seeking ways of promoting health through proactive dietary management and/or supplementation with functional foods. Bimuno lends itself perfectly to this way of thinking, as it is a product with proven health benefits that empowers individuals to take control of their future health.

How was Bimuno created?

Bimuno was created with the aim of targeting colonic microbiota at the species level – and not the genus level, as is the case with other prebiotics. The target of Bimuno is members of a beneficial probiotic group called Bifidobacteria. Various species were initially screened based on their known specific health benefits in order to identify those that could produce high levels of an enzyme called beta-galactosidase, which was chosen from Bifidobacterium bifidum and used to synthesise Bimuno. The result was a GOS with unique chemical structures that exhibited a high degree of prebiotic selectivity and added functionality that has not been previously demonstrated in other prebiotics, including existing forms of GOS.

By what means were the underlying action mechanisms of Bimuno evaluated?

To date, we have conducted 14 human trials that have resulted in a number of encouraging findings. These include a positive effect on
microbiota and the reduction of gastrointestinal discomfort – such as bloating, abdominal pain and flatulence – as well as immunomodulatory, anti-inflammatory, metabolic and anxiolytic effects in specific human populations. Most of these studies have already been published or are currently being prepared for publication. However, a deep understanding of the mechanistic workings of any product is usually obtained from either animal studies, gut models or, in our case, intestinal cell cultures. We have conducted a large number of such studies, most of which have been published in peer-reviewed journals. For example, we have carried out studies with mice, rats and piglets to understand the absorption of Bimuno, its mechanisms related to prevention of infection and how it influences brain neurotransmission. We also used intestinal cell lines to study its anti-inflammatory potential and signaling pathways.

How does Bimuno strengthen the host’s resistance to infection?

The host’s resistance to infection is indirectly strengthened through Bimuno’s positive effect on the microbial balance – namely, in that it helps to improve colonisation resistance – and directly through its ability to act as a decoy molecule. Bimuno’s interaction with the immune system also serves to strengthen the barrier function in the gut.

What have been the most exciting results to date? How do you intend to further develop your research?

Excitingly, we have successfully gathered strong evidence that demonstrates Bimuno’s positive effect on the microbiota in a wide range of human volunteers. We also have robust evidence for its positive immunomodulatory and gastrointestinal effects. Looking ahead, we will be continuing our work in these areas. For example, we will seek to expand our evidence base regarding Bimuno’s ability to reduce symptoms associated with irritable bowel syndrome, as well as its ability to prevent the occurrence of traveller’s diarrhoea and boost the immune function of those most in need, such as infants or the elderly. In addition, we will also continue to work on forging a deeper understanding of its action mechanisms in order to further tailor its use. The most exciting results we have obtained so far are related to our mechanistic work and the possibility that Bimuno’s mode of action – in terms of its immune or anti-inflammatory effect – occurs as a result of its interaction with toll-like receptors.

THE GASTROINTESTINAL TRACT is one of the body’s most important systems. As the group of organs comprising the mouth, stomach, pancreas, liver, gallbladder, small intestine, colon and rectum, this system consists of far more than the body’s digestive site. Governing the intake and absorption of nutrients and water essential for life, it is profoundly linked to overall human health and wellbeing – thus, it is vital to ensure its proper functioning.

Indeed, both the sheer size and complexity of the gastrointestinal system are indicative of its wider systemic importance. With the entire digestive tract measuring about 9 metres long, it forms some 70 per cent of the body’s immune system, while the small intestine contains more neurons than the entire spinal cord. It is also the only system in the body that has its own, independently operating nervous system: the enteric nervous system. However, one of the most fascinating features of the gastrointestinal tract is the microbiota ecosystem that is contained within the colon. Due to their high cell densities, metabolic activities and multiple interactions with the host, colonic microorganisms have been pinpointed as the main facet of this ecosystem.

Intriguingly, the adult human gut microbiota is made up of over 1,000 species and 7,000 bacterial strains, totalling over 15 pounds of mass. Although some gut bacteria are known to be harmful to the host, other species seem to have key protective properties. Bifidobacteria, for example, is a beneficial group of gut bacteria associated with the prevention of both mucosal absorption and the circulation of harmful antigens linked to metabolic diseases. Research that shines the spotlight on the nature and functions of these health-promoting bacteria is therefore crucial.

FORGING LINKS

While scientific investigations mapping the connection between gut microbiota and general human health and wellbeing have been in the pipeline for many years, it is only recently that researchers have begun to forge a clearer understanding of the mechanisms that underpin these complex interactions. “Abnormal or damaged gut microbiota is one of the main root causes of all diseases,” discloses Dr Jelena Vulevic, Research and Development Manager at Clasado Research Services in the Science and Technology Centre based at the University of Reading, UK. “Its effects are not just localised to the gut but are systemic – this is really important, and it is only in the last five to 10 years that we have begun to appreciate it.” Together with collaborators in the UK and abroad, Vulevic has led and participated in descriptive and preclinical studies that contribute to the formation of a solid evidence base for innovative therapeutic strategies based on the manipulation of the microbiome.

One of the most exciting projects Vulevic has been involved in to date is the development of a second-generation galacto-oligosaccharide (GOS) called Bimuno. This product is the result of more than a decade of intensive R&D activities at Clasado BioSciences – a biotechnology company that aims to provide solutions for food, healthcare and pharmaceutical companies in the global wellness market. It produces a functionally active ingredient that has been designed to improve both gut health and general wellbeing, and works by operating as a food source for the beneficial bacteria that reside in the gut, therefore increasing the growth rate of the immune system-boosting Bifidobacteria and reducing the level of harmful

THE BODY AND BACTERIA

About 90 per cent of all cells in the human body are bacteria. The majority of these are found in the gut – and some have health-promoting functions that benefit healthy digestive processes, the strengthening of the immune system and the production of key molecules that reach vital organs through their release into the bloodstream. Ensuring the balance of gastrointestinal microbiota is therefore crucial for the overall health of the entire body. Importantly, products such as Bimuno help to promote this balance, consequently preventing or delaying the onset of metabolic diseases and functional gut disorders.
Since Bimuno reacts differently in different individuals, its primary value lies in the fact that it is a preventive intervention for metabolic diseases and gut disorders such as irritable bowel syndrome.

A SUPERIOR PREBIOTIC

Studies have highlighted that Bimuno is highly effective in individuals whose bacterial balance or immune system has been damaged as a result of stress, ageing, travel abroad, poor diet, infection or certain aggressive antibiotics. Additionally, it has been shown to assuage abdominal pain, flatulence, bloating and diarrhoea – that is, the symptoms aligned with certain functional gut disorders. “The key to Bimuno’s superiority versus other prebiotics is the use of a specific probiotic enzyme in its manufacture rather than a generic enzyme, resulting in a unique oligosaccharide mixture,” explains Vulevic. “Importantly, its unique chemical structures make it highly selective towards beneficial Bifidobacteria, producing the most powerful bifidogenic effect – that is, an increase in the number of selected species of Bifidobacteria – at the lowest daily dose of any commercial prebiotic.”

FUTURE ADVANCES

Vulevic and her colleagues at Clasado BioSciences are planning to continue their illuminating research on the impact of Bimuno on gut health and systemic wellbeing. They will also advance knowledge about the action mechanisms of Bimuno and carve a fuller understanding of its beneficial health effects. “Looking ahead, we are aiming to investigate Bimuno’s effects on the brain and examine its possible uses in the management of stress and anxiety – a key area of our current research endeavours,” Vulevic concludes.