

Gut health: it's not just about dairy.



Consumer demand for new and improved formulations means a material ramp-up in innovation activity

In the ever-competitive food industry, many more products are now marketed to consumers as functional foods. These typically come with specific health benefits beyond their basic nutritional value. Current research estimates that around 60% of these functional foods are targeted towards gut health, with prebiotics and probiotics being the most common category types.

Our analysis of global patent data and specifically, patenting activity associated with general gut health innovations, has identified a number of innovators in the space—and there are many. The top 10 patent owners own just 10% of the total active patent families, meaning patents are either granted or pending. Food and drink-focused consumer goods companies in this group include Nestle, Danone, Yakult Honsha, Meiji Holdings, Reckitt Benckiser, Morinaga Milk and Probiotical S.P.A. The remaining three are research organisations the Korea Food Research Institute and two universities – one Korean, one Chinese.

Of note is the sharp increase in gut health-relevant patents published, with the total number of active patents having increased from less than 1,000 in 2014 to more than 2,000 by the end of 2019. There is no sign of any slowdown in patenting activity, and these patents are being filed across the globe. Korea, China, the US, Japan and France combined account for more than one-third of all active patents filed in this category. This analysis has been enabled by CIPHER, the strategic patent intelligence platform.

Before we go into detail on the data, first some background. Strictly speaking, microbiome refers to the collective genomes of the micro-organisms in a particular environment. Microbiota is the community of micro-organisms themselves. In practice, these terms are often used interchangeably. The human intestinal microbiota normally consists not just of bacteria, but also of archaea, viruses, fungi and yeasts. In essence, it is a highly evolved and complex ecosystem that plays an important role in human health and disease.

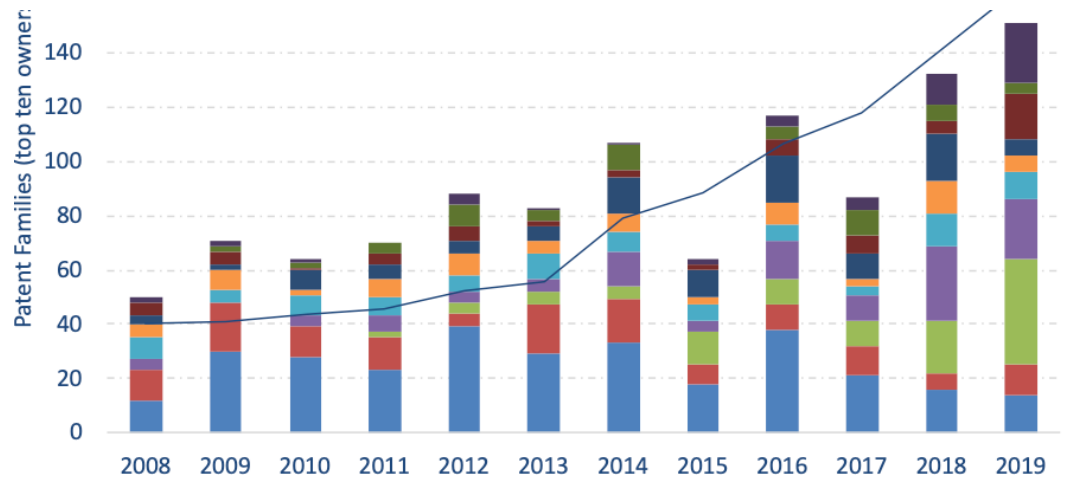
Current research is heavily weighted towards better understanding of what an optimal gut flora or microbiota is. Where there is consensus today it is that poor bacterial diversity has been reproducibly observed in people with inflammatory bowel disease, psoriatic arthritis, type 1 diabetes, atopic eczema, coeliac disease, obesity, type 2 diabetes, and arterial stiffness. A diet including pre- and probiotics is believed to play a pivotal role in shaping the microbiota community and function, and therefore, in our overall gut health.

Gut health patenting activity, double digit growth year on year since 2014



The leading consumer goods multinational patent owners are Nestle, Danone and Japanese firm Yakult Honsha well known for Yakult, the lactic acid bacteria drink developed in the 1930s. These three continue to publish patents in gut health, but of note is the increased patenting activity in recent years by Italian company Probiotical, Japanese firm Morinaga Milk and government funded Korea Food Research Institute. The compound annual growth rate in gut health patenting activity, by patents published, from 2015 to 2019 is 17%.

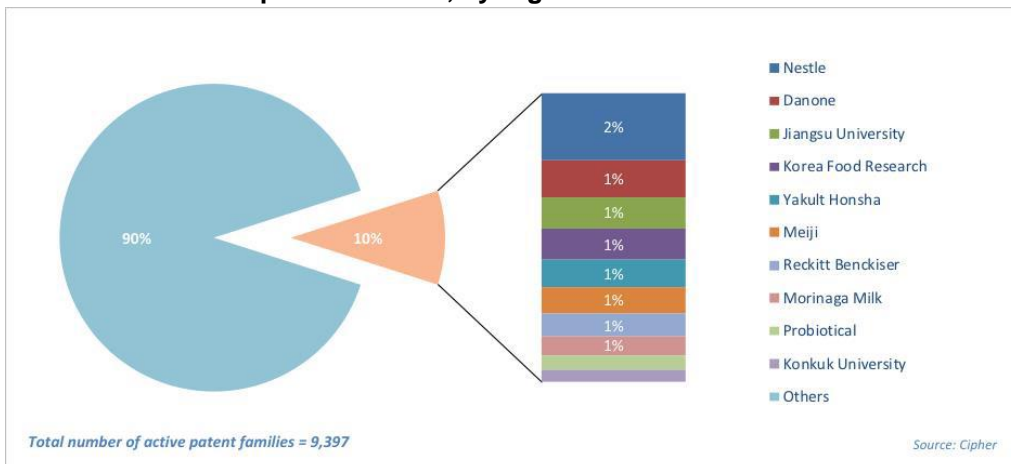
Gut Health: Patent families by publication year, Total & for the Top Ten Owners



High degree of competition in gut health innovation

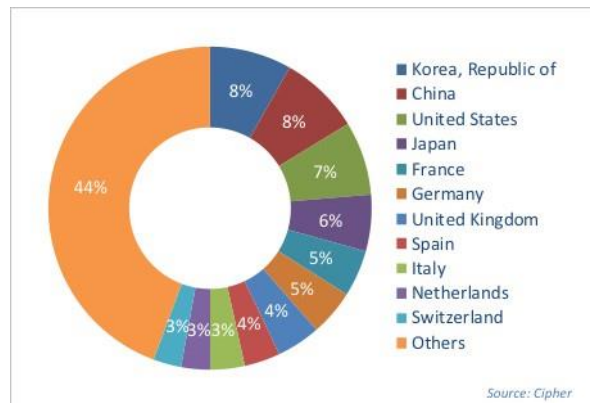
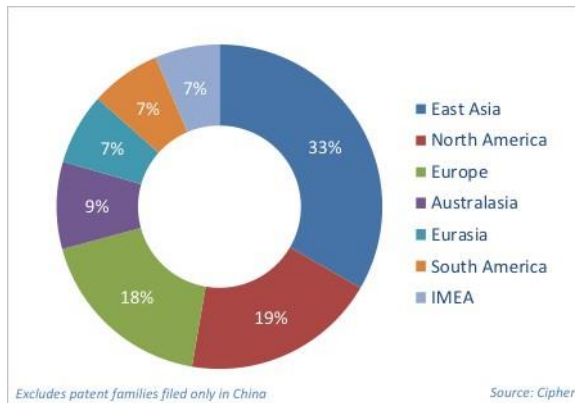
There are a large number of organisations investing in gut health technology. The top ten organisations' patents portfolios account for only 10% of all active patent families in the area of gut health, while the remaining 90% are owned by almost six thousand companies.

Gut Health: Active patent families, by organisation



Even excluding patent families filed only in China, the East Asia region accounts for a third of active patent families, followed by North America and Europe, which together account for another 37% of patent families. By granted patents, Korea and China each account for 8% of the total.

Gut Health: Active patent families by region and Granted patents by country



Gut health and probiotics are not just about dairy, companies are innovating with different food product types and figuring out how to develop individual customised formulations

Probiotics are often associated with dairy products such as yogurt, kefir and fermented milks, but food companies are also using other product categories as a way to deliver the benefits of these ingredients. An example is the confectionary industry and the development by Biorela of chocolate based probiotics products. From one side this gives the chance to have another probiotics food delivery and also changes the perception consumers might have for a specific product category.

Danish bioscience company Chr Hansen has developed a patent around an important aspect: the stability of probiotics in a food matrix and in particular heat stability. The invention describes a foam candy composition having a low water content and a low water activity (essential for the shelf life of the product) and ingredients allowing the use of low temperatures during the production process to protect the probiotic bacteria. The formulation contains glycerin, at least one saccharide and one protein which is not gelatin, such as hydrolysed protein, and no water: the production process uses a low temperature from 50 to 55°C, giving a much higher survival of the probiotic bacteria. After the addition of the probiotic bacteria, the foam candy composition is whipped whereby cool air is incorporated into the mixture which leads to a fast cooling due to more cool air and a high surface area of the foam. With this particular composition and process, it is possible to include probiotic strains sensible to heat as Lactococcus, Lactobacillus, Pediococcus and in particular Bifidobacterium.



Isothrive, an American company based in California, has filed a patent describing a method to create an optimised individualised prebiotic composition based on the principle that every individual has a specific gut microbiome. The method identifies groups of bacteria (assaying a faecal or stomach sample from an individual) and, according to their metabolism and other factors, it is possible to understand whether they are beneficial for the host. Another step is to identify which carbohydrates i.e. prebiotics are better digested by the selected groups.

For example, the properties of a group of microorganisms can include an ability to synthesize bacteriocins, short chain fatty acids (SCFAs), vitamins or anti-cancer agents. These properties can be determined by reference to the genomic sequences of the microorganisms. Carbohydrate preferences of the selected microorganisms are identified as well by identifying specific types of enzymes that are encoded by the genome of the same microorganism. Therefore, it is possible to formulate a specific composition of prebiotics that, once consumed by the host as part of a diet, can help to foster the selected bacteria.

For more information on who owns what and where in the Gut Health space, access CIPHER via your subscription or contact us directly at www.cipher.ai. CIPHER Food and Drink Taxonomy has created all the charts in this report.

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