

Patent Insights Immune Health

Report dated 10 June 2020
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1.INTRODUCTION



1.1.Executive Summary

1

We identified 227 newly published patents since our last report in early 2019 that we considered are relevant to HVN's interest in food for immune health. We expect this growth to continue.

2

This field is not overly dominated by any given players. Instead, the patent landscape is made up by about 500 different entities from across the globe, albeit with a distinct Asian influence from Korean and Chinese filers.

3

138 of the 227 relevant patents have a Traditional Herbal Medicine (THM) basis. Although HVN is unlikely to develop these types of food approaches to tackle immunity, we need to use these patents to better appreciate both the health targets and types of ingredients used to deliver immunity outcomes in our target market.

8

We will be hosting webinars through Tranche 2 to dig deeper into areas of interest in this patent landscape, so keep an eye out for the announcements!

4

Western-style patents lean towards general immunity and anti-inflammation. With THM approaches, we see a clear emphasis on non-viral respiratory diseases and skin (both linked with anti-inflammatory).

7

We share [five Case Studies](#) with immune health approaches via a broccoli extract, a novel enzyme, NZ companies, Korea's berry focus, and coronavirus linkages.



6

Full access to each of the 227 patents are accessible [within Section 4-6](#). Although we highlight a few during this report, you can dig deep into any of these to investigate yourself. Or contact [Peter Brown](#) at IPSynergy to answer any specific burning questions, or if you need an English translation.

5

Within the landscape, we see many relevant approaches to immune health using whole food or components of herbs (particularly for THM), broccoli, cabbage, a range of berries, lettuce, milk bioactives, probiotics, cocoa, honey, onion, and soybean to name just a few. We did not see any patents related to indigenous plants from NZ highlighting this is a white space opportunity.



1.2. Purpose and Outputs of this Report

Provided by [HVN's Science of Food Platform](#), the purpose of this report is to provide HVN members with an update outlining patent insights and trends in food based approaches to immune health since the March 2019 report. The outputs of this report are:

- an executive summary;
- patent trends and insights over the past year, and in comparison to the landscape over the past 20 years;
- spotlight on key patents and case studies with take-home messages for HVN; and
- details and access (through web-links) to each new patent in this review period.

This report should not be taken as specific advice relating to your intellectual property strategy, freedom to operate, commercial or legal matters. You should always seek your own independent advice relating to your situation. IPSynergy is happy to help.

1.3. Subject Matter Focus

Relevant patents are patents published after 9 Feb 2019, providing immune health outcomes through food/drink interventions. We excluded patents generally if they were focused on pharmaceutical drugs, therapeutic treatments of disease states (opposed to preventative approaches of interest), synthetic compounds / molecules, recombinant technology or genetically engineered material, non-human animal treatments, non-oral routes of intervention, and diagnostics.

Bull's Eye patents relate generally to protection from viral respiratory diseases, non-viral respiratory conditions such as asthma or from pollution, anti-inflammation, immune-based skin conditions, immunity health linked to the gut microbiome, or general immunity. Bull's Eye patents will also usually relate to foods, or food components that have links to New Zealand's food industry.

Halo patents are similar to Bull's Eye, but for one reason or another are not deemed of key relevance (e.g. there is poor scientific data to support the patent, or the patent is not focused primarily on immune health).

Background patents refer generally to immune health but not aligned on HVN focus. Many traditional herbal medicines (THM) approaches we found are classed as background patents because they utilise food components which are not relevant to HVN or often are not solely focused on immune health.

2.PATENT TRENDS IN IMMUNE HEALTH

Quick tip: We can interrogate the data generated for this report to answer any specific questions for HVN members beyond the insights shown here. Please get in touch with Peter at IPSynergy (peter.brown@ipsynergy.co.nz) to discuss any burning questions.

IPSynergy has generated the analytics in this report using its access to:

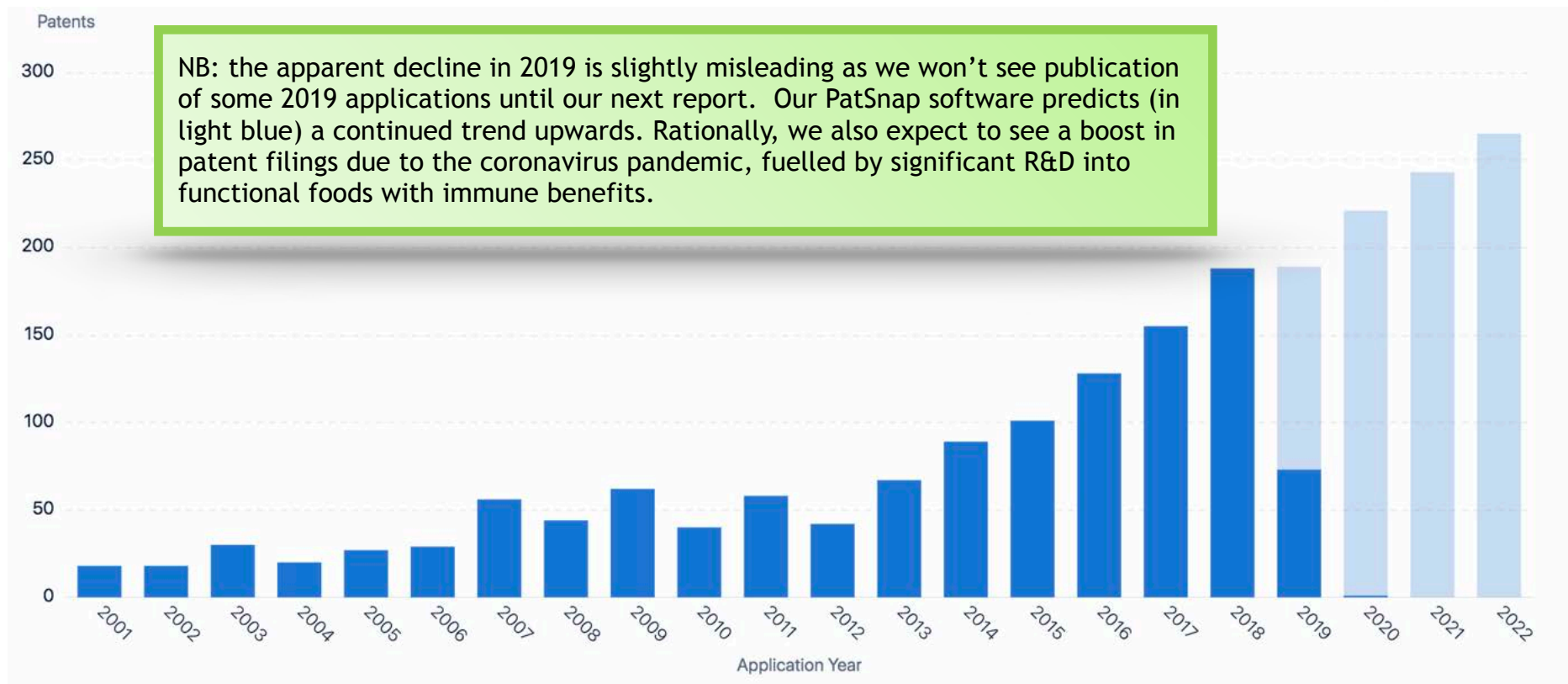
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 **discovery**



2.1. Overall Patent Application Trend in Immune Health Landscape (past 20 years)

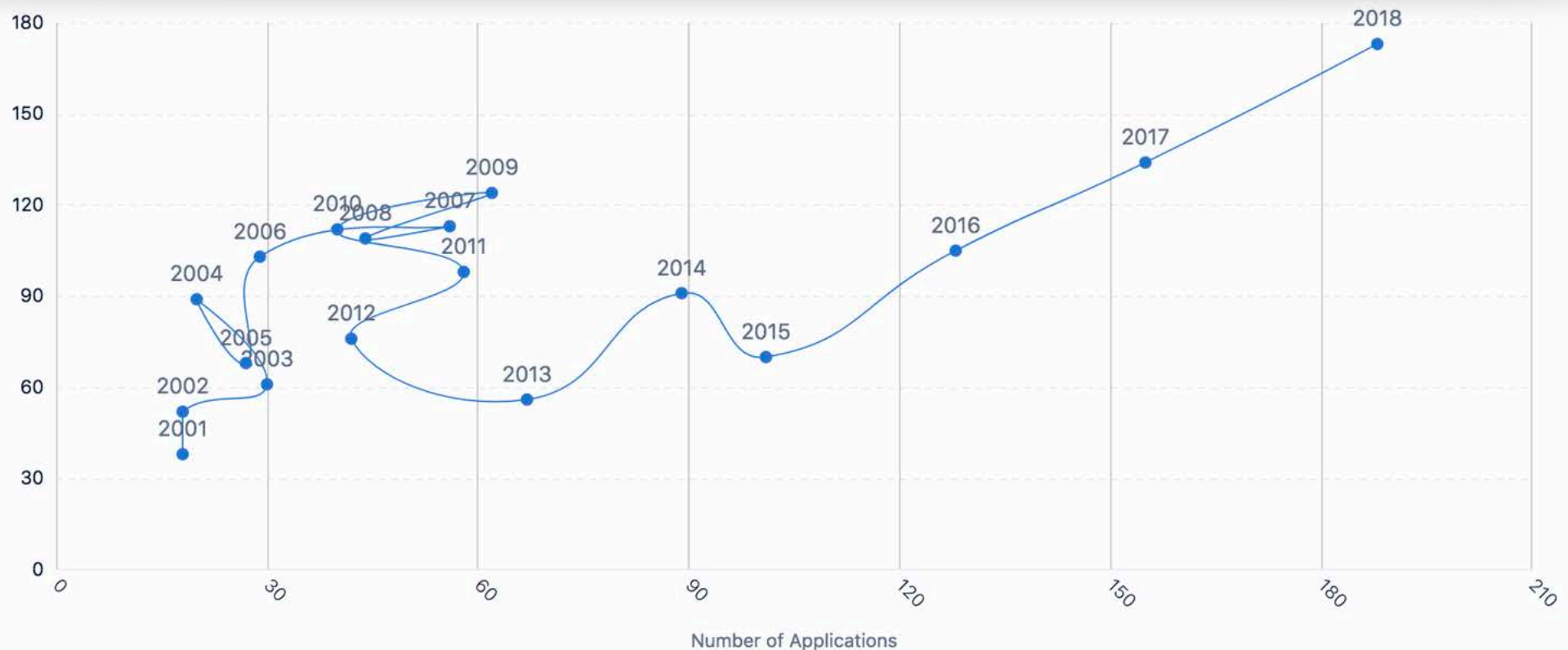
In this update, we identify 227 new patents relevant to immune health since our last report, bringing out total landscape over the past 20 years to 1354 unique patent families (7838 patents globally). As shown below, there has been considerable growth in patent filings related to immune focused functional foods over the past 20 years.



2.2. Technology Lifecycle Analysis (past 20 years)

This graph helps us appreciate that the immune health industry for functional foods is healthy. Particularly over the past 10 years, we see steady growth both in the number of filings, and also the number of Applicants in the playing field. On one hand, this warns of increased competition. But it also gives us confidence that there is significant commercial opportunity to enter this field, especially if we can carve out a NZInc niche on foods that we have expertise and provenance towards, such as indigenous plants. The growing number of patent applicants supports there are many new entities finding ways to differentiate in the market.

Number of Assignees

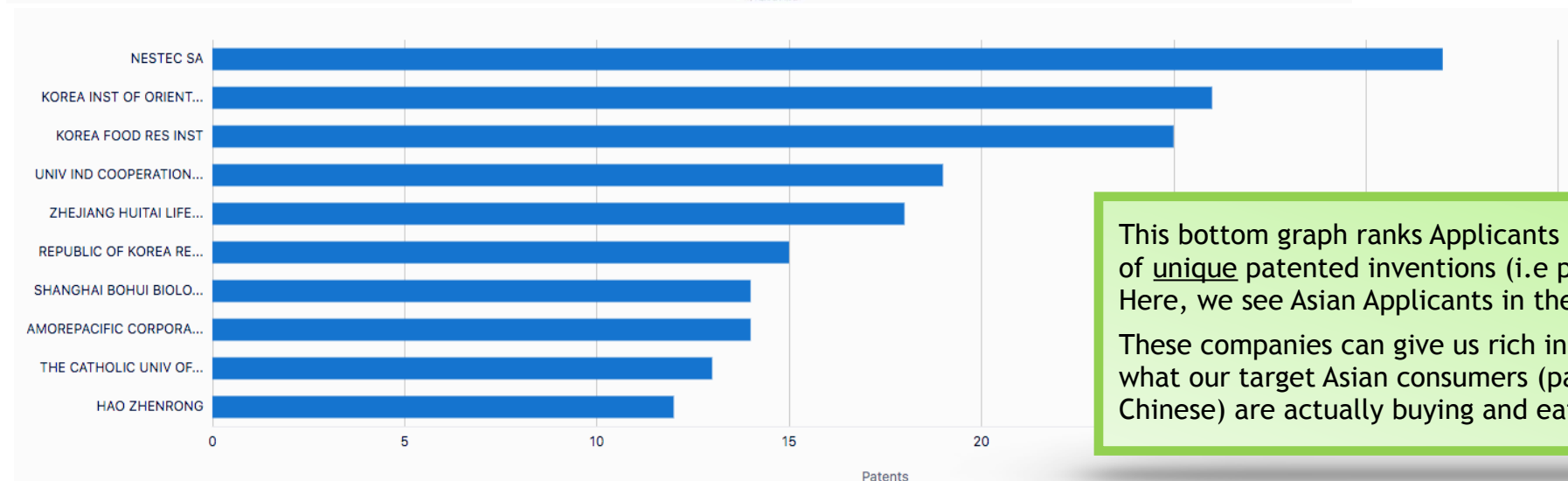


2.3. Ranking of Players in Immune Health Patent Landscape (past 20 years)



Here, we ranked Applicants by total number of patents filed globally, recognising some companies will file many patents for a single invention. Here, Western based multinationals rank highly because they typically invest on fewer blockbusters than Asian entities but file many patents around the world for a given invention.

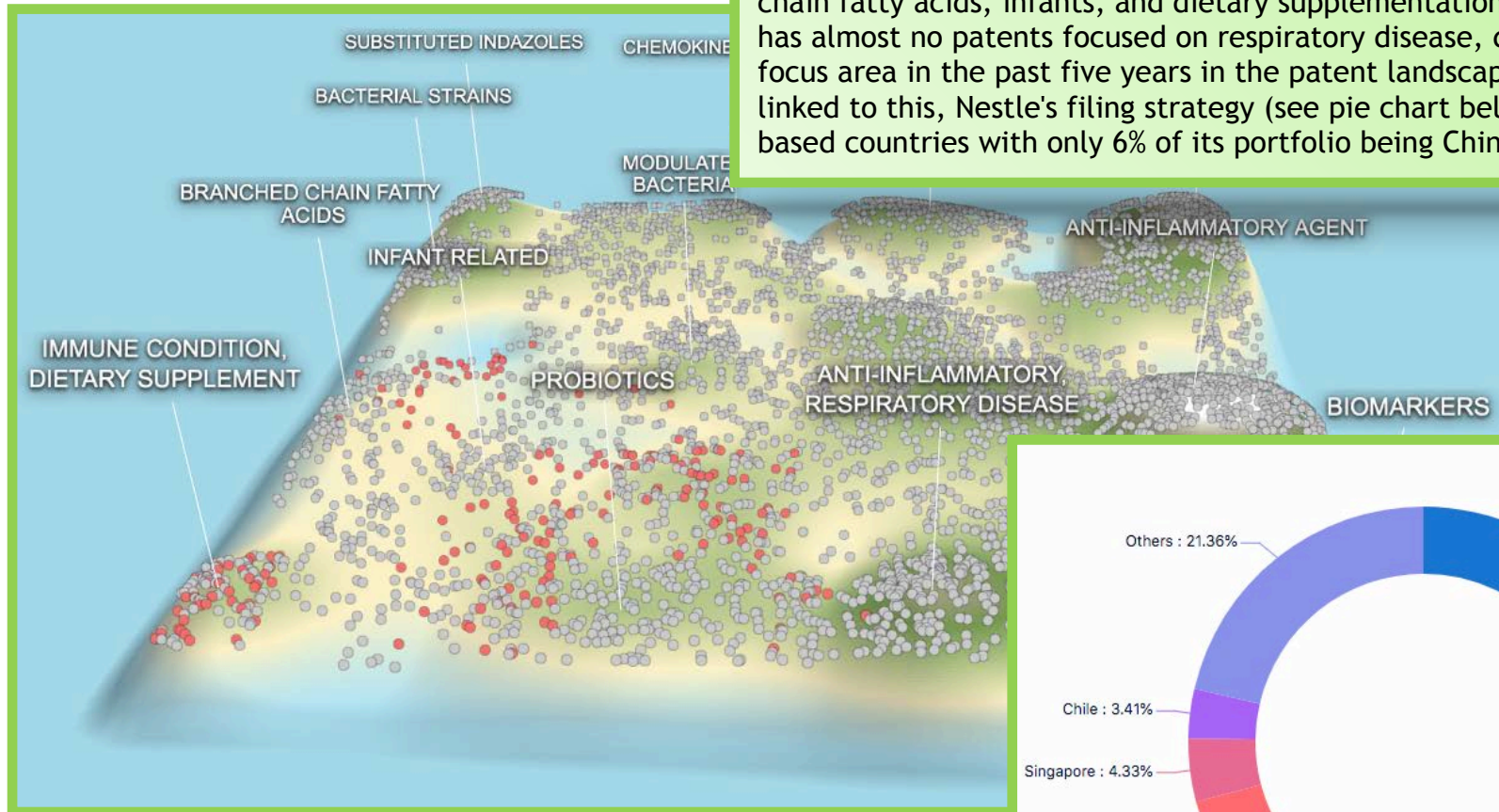
We can gain valuable insights by looking deeper at a given company such as Nestle, (see next page) seeing its focus changes in immune health over time. We can also assess their geographical filing strategy to tap into their commercial insights on market size.



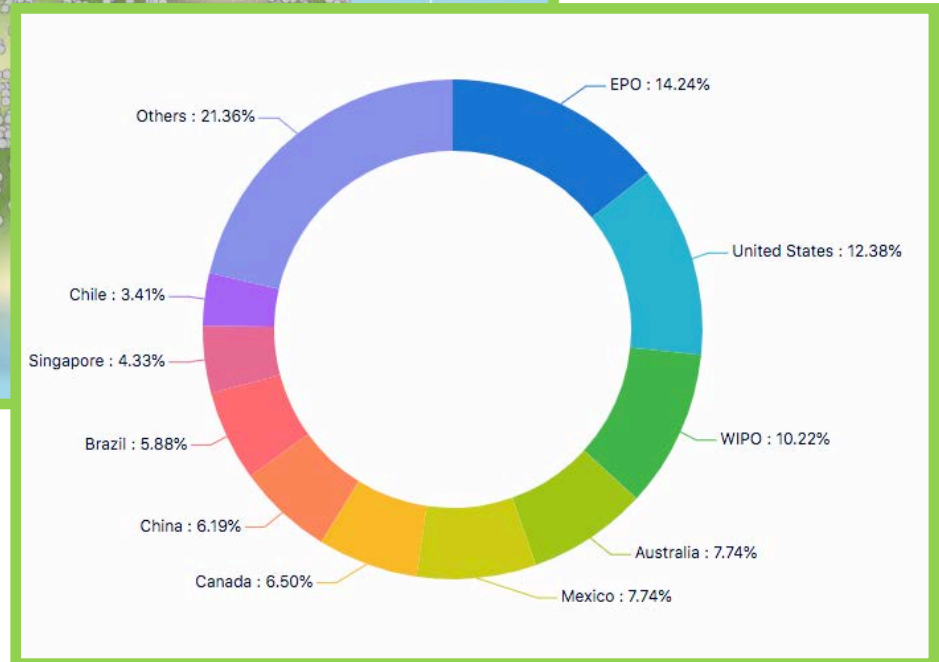
This bottom graph ranks Applicants by their number of unique patented inventions (i.e patent families). Here, we see Asian Applicants in the top 10.

These companies can give us rich insights in terms of what our target Asian consumers (particularly Chinese) are actually buying and eating.

2.4.Nestle's Strategy (past 20 years)

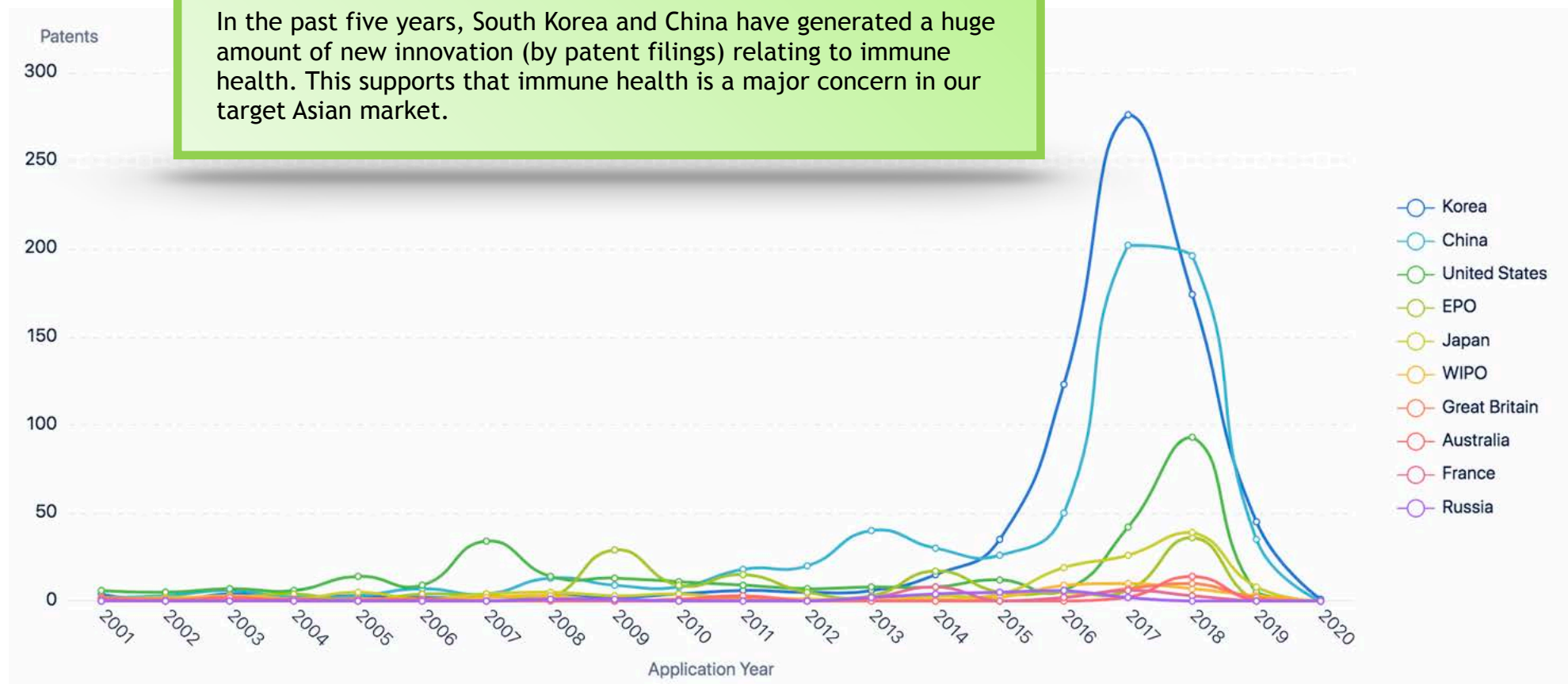


Nestle's Immune Health patent strategy (in red) appears focused on branched chain fatty acids, infants, and dietary supplementations. Interestingly, Nestle has almost no patents focused on respiratory disease, despite this being a clear focus area in the past five years in the patent landscape from China. Perhaps linked to this, Nestle's filing strategy (see pie chart below) targets Western based countries with only 6% of its portfolio being Chinese patents.

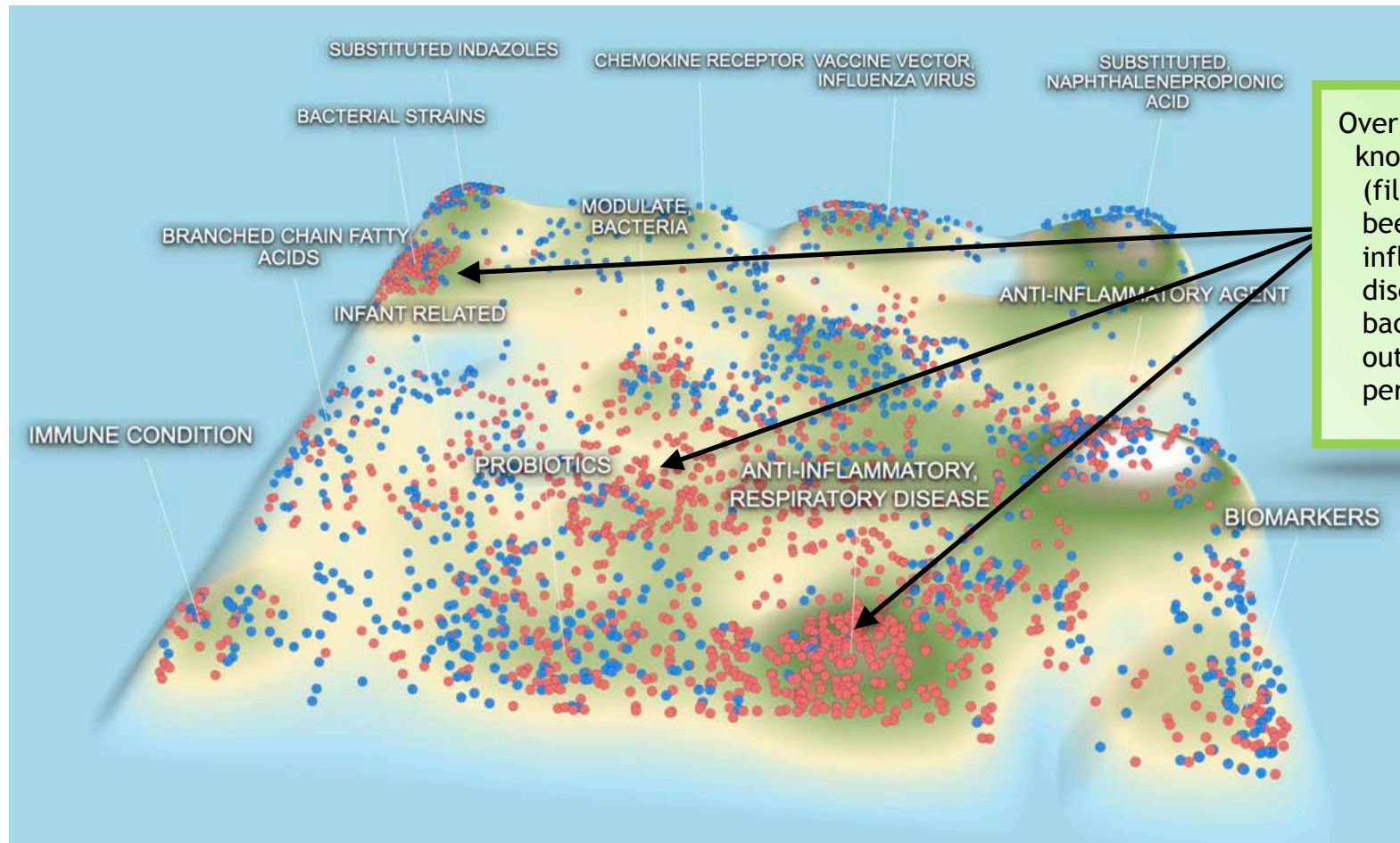


2.5. Countries Generating the Most Immune Health Patents (past 20 years)

In the past five years, South Korea and China have generated a huge amount of new innovation (by patent filings) relating to immune health. This supports that immune health is a major concern in our target Asian market.



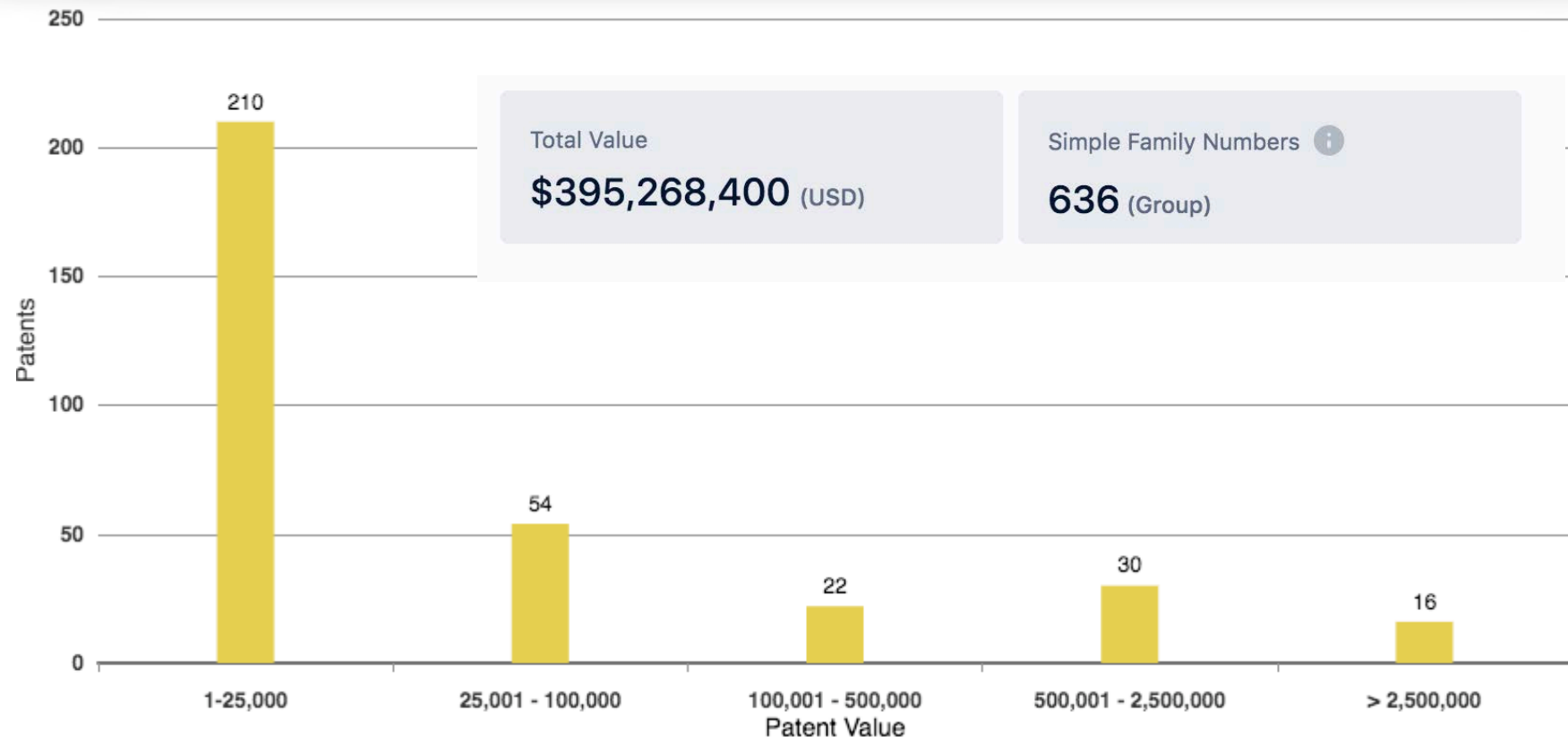
2.6. Focus of Immune Health Patents (past 5 years)



2.7. Immune Health Patent Values (past 20 years)

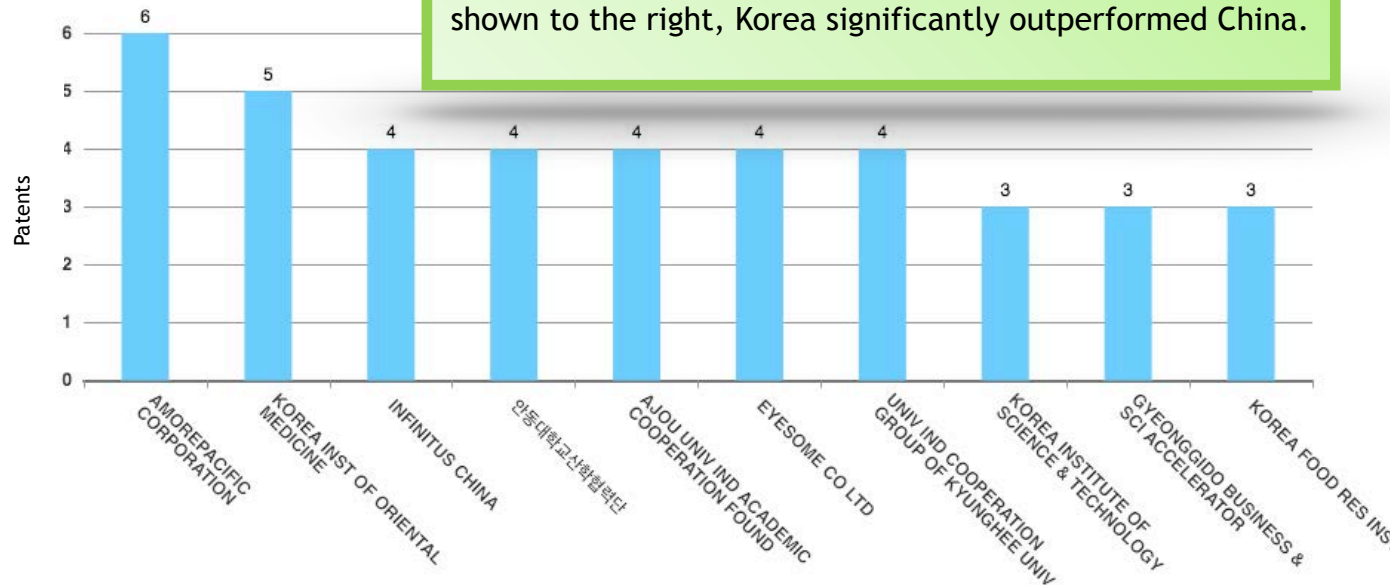
About half of the patents in our broader Immune Health landscape over the past 20 years (currently about 2300 patent families) have sufficient data to assign a patent value. This value is based on PatSnap's algorithm that takes into account each patent family's market coverage, market attractiveness, technology quality, company score and legal score of the patent.

We can see here that 68 of the 636 patents (or about 10%) have a value above US\$100K. By digging down deeper into these numbers we can get rich (excuse the pun) insights into which clusters of patents, and/or subject matter, tend to be most valued.

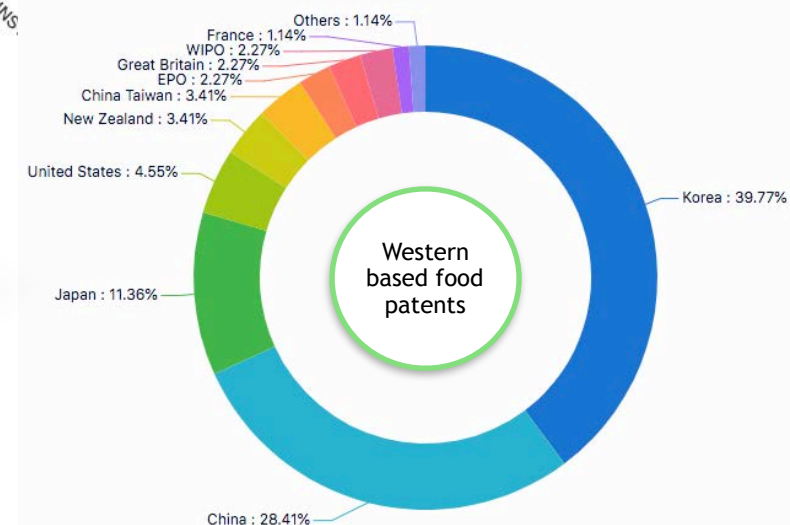
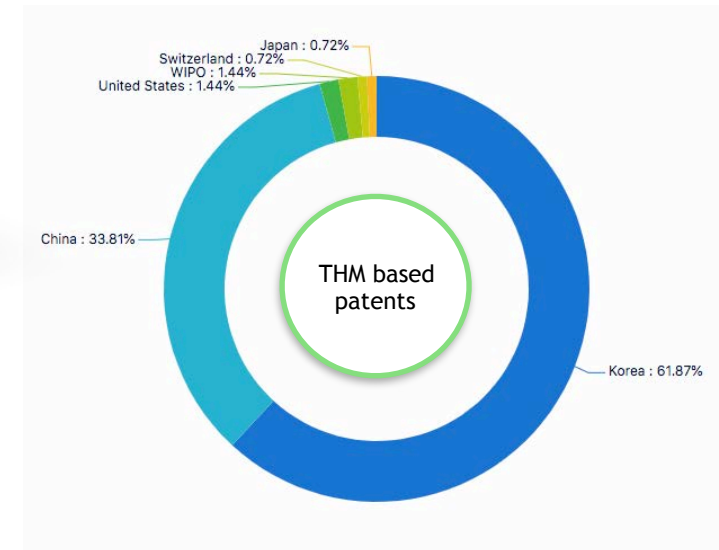
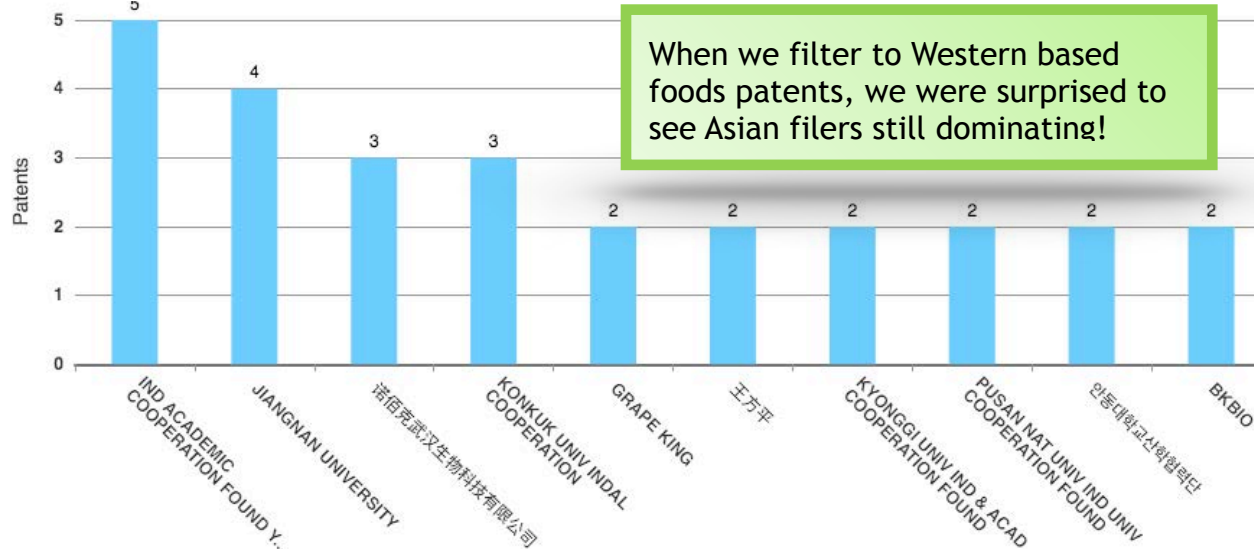


2.8.Top Filing Applicants (past 12 months)

When we filter to THM based patents during this last review period, Asian filers dominate as we'd expect. As shown to the right, Korea significantly outperformed China.

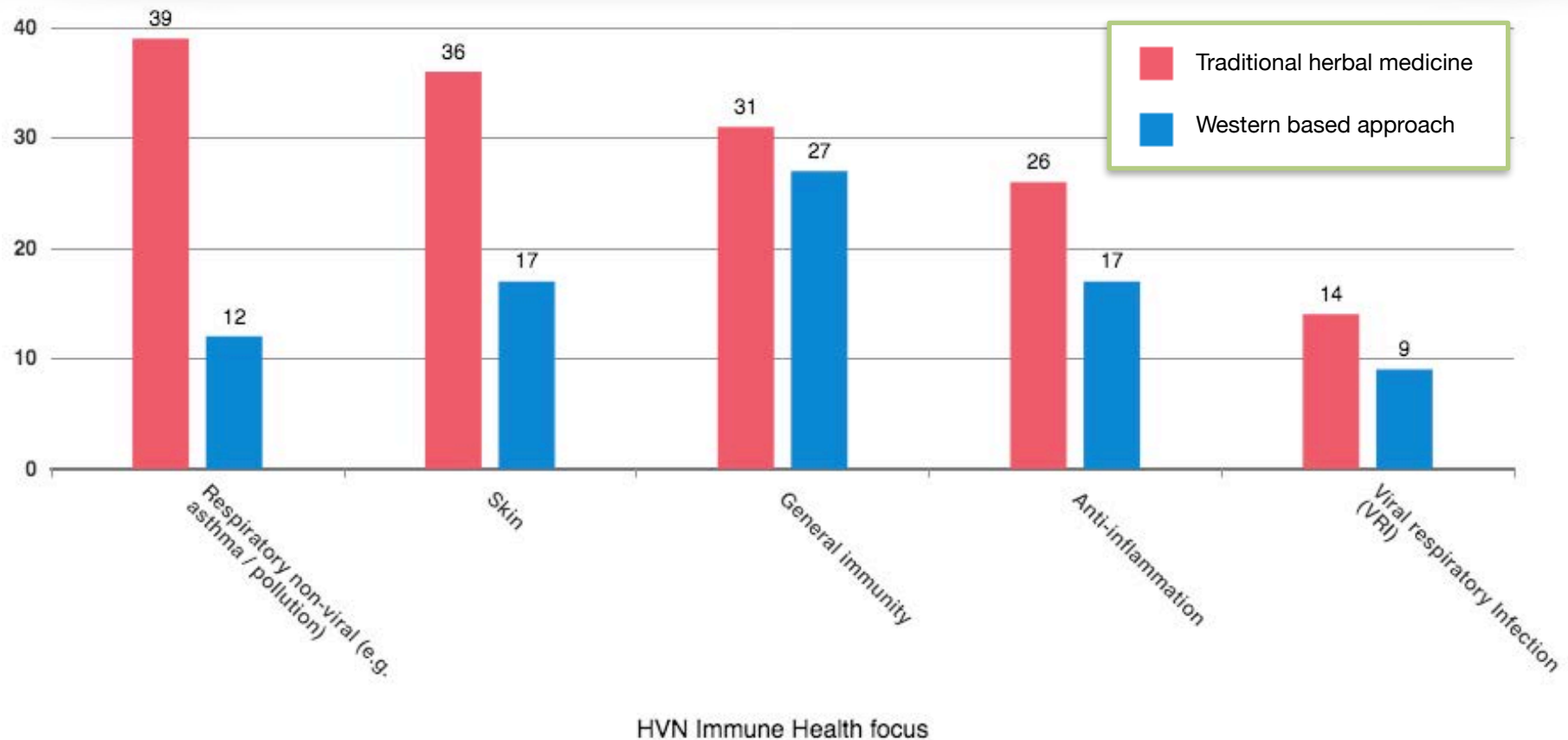


When we filter to Western based foods patents, we were surprised to see Asian filers still dominating!



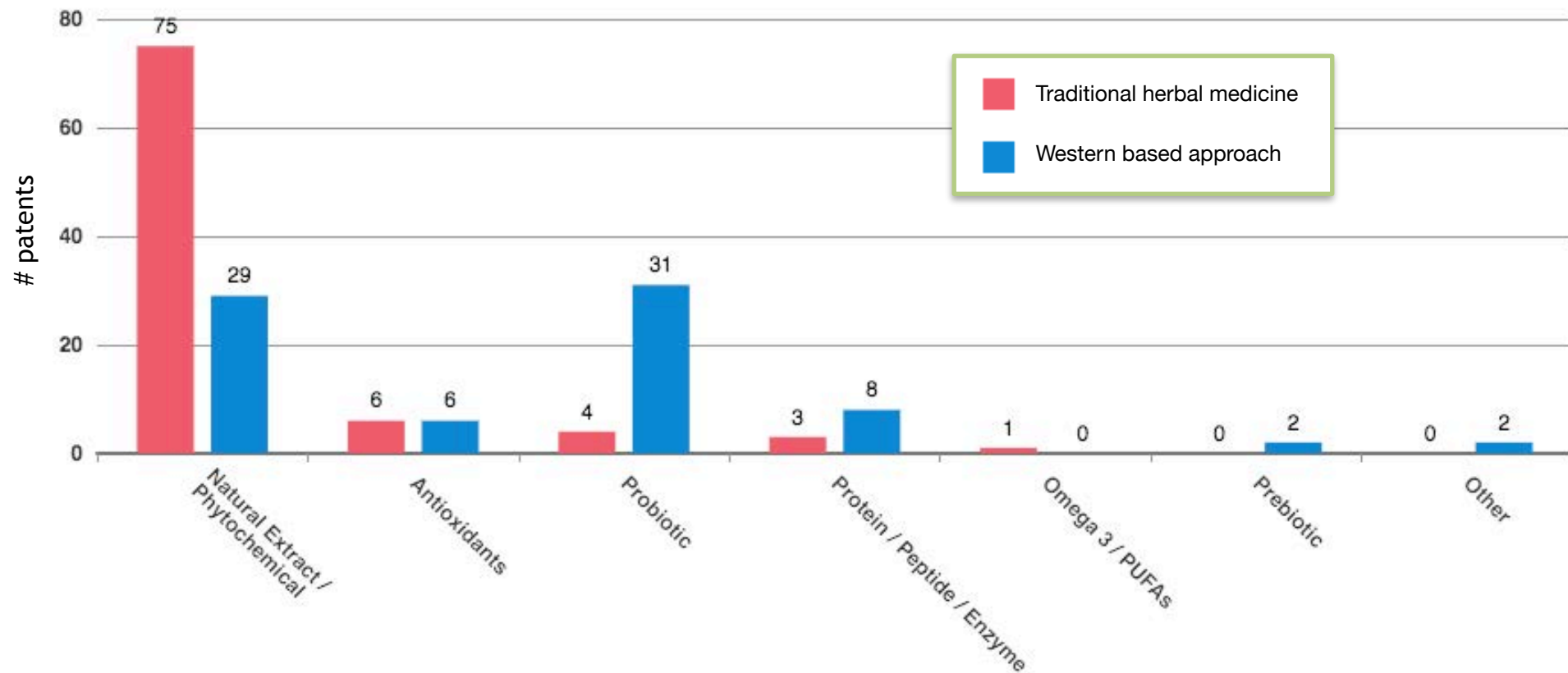
2.9. Specific Health Outcomes for Immune Health Patents (past 12 months)

We see non-viral respiratory (e.g. asthma, pollution, smoking) and skin outcomes dominating the THM based immunity patents. This naturally follows the same pattern for patents filed in Asia (not shown). This signals HVN projects should consider leaning towards these health benefits in foods in Tranche 2 when targeting Asian markets.

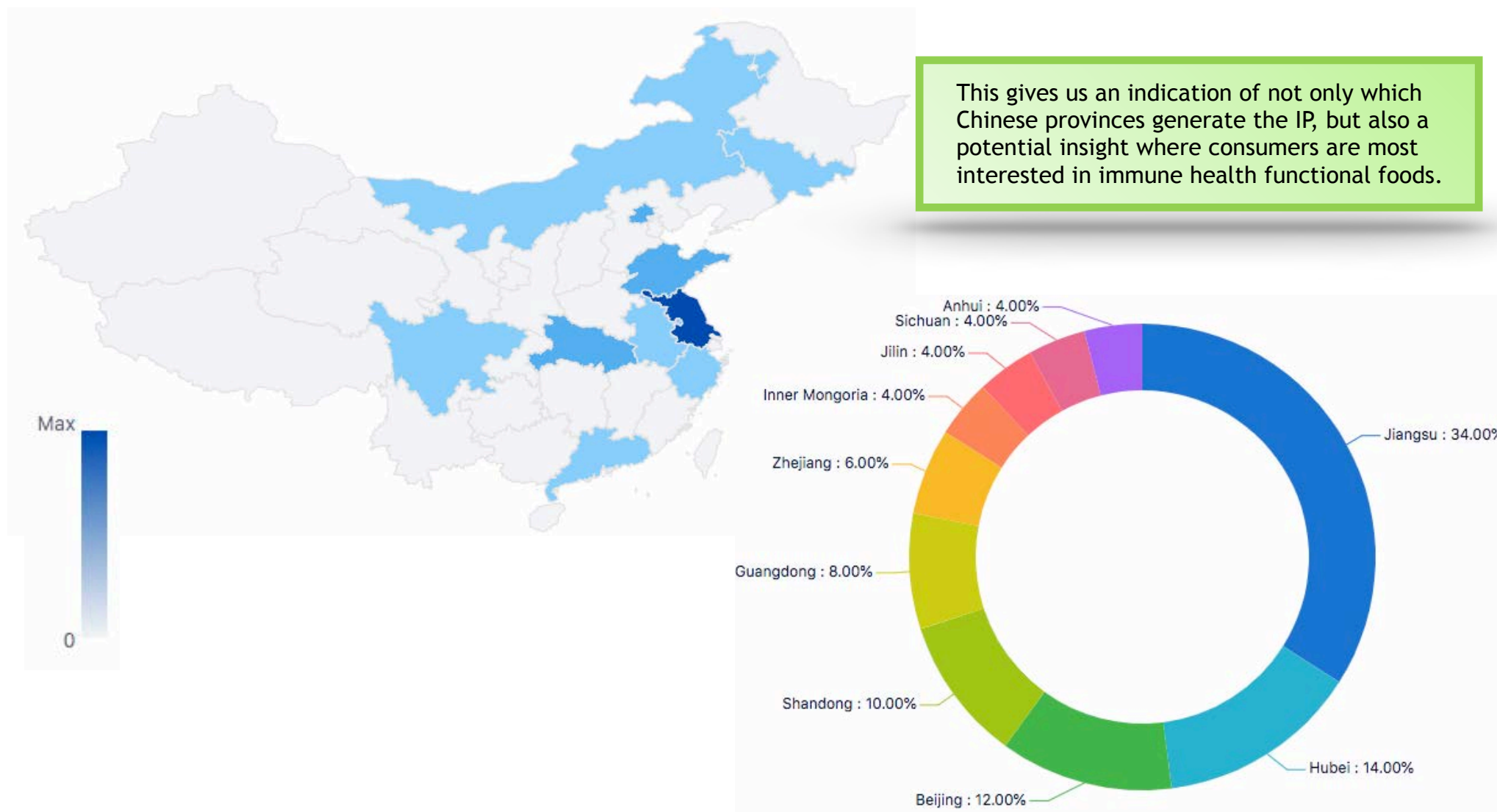


2.10.Primary Functional Actives for Immune Health Patents (past 12 months)

As expected, THM based patents rely heavily on natural extracts, and only a few fall outside this class. Western based approaches to immunity foods are balanced between natural extracts and probiotics, with a handful of others relating to peptides/enzymes, omega 3s, prebiotics and others.



2.11.Chinese Patent Applicants by Province (past 12 months)



3.CASE-STUDIES





3.1.Case Study 1: Broccoli Immunity Booster ([KR101952784B1](#))

WHAT IS THE PATENT ABOUT?

Korean based BKBIO's [patent](#) protects a broccoli-derived polysaccharide fraction, prepared using PEF treatment. The fraction provides immunity enhancing activity. The extract can be used in a variety of food formats as a functional immune enhancer to prevent disease.

WHAT IS THE COMMERCIAL OUTCOME ?

Despite being a very recent development, BKBIO is already selling the broccoli extract [online](#), although no details are given. It also actively promotes its [patent](#), and elsewhere its [PEF technology approach and the related scientific publications](#).



Gachon University

Gyeonggi-do, South Korea

WHAT ELSE DO WE KNOW ABOUT BKBIO?

BKBIO is a functional food developer in South Korea with a wide range of patented and researched extracts in its arsenal, ranging from broccoli, carrots, ginseng, citrus to kale.

BKBIO collaborates with two key universities [Gachon University](#) and [Yonsei University](#), both of which also work with overseas food companies. BKBIO has [46 listed patents](#) and many research publications, many of which are co-owned / co-published with universities.

HVN LEARNINGS & OPPORTUNITIES

- NZ also has expertise in technologies like PEF which we can leverage through HVN's Science of Food.
- We can and should look at collaborations with institutes in our target locations to expedite and focus our innovation to our key markets.
- Patents form a valuable tool for marketing and central to a company's overall commercial strategy.



3.2. Case study 2: Enzymatic Conversion of Lactose to Oligosaccharides in Dairy Products

WHAT ARE THE PATENTS ABOUT?

Taiwan based A.G.V. Product Corp's recent [patent](#) protects a novel trans-glucosidase enzyme that converts glucose to functional levels of oligosaccharides (GOS) in milk during lactose digestion. Besides providing clinical evidence towards immunity outcomes, the patent also highlights beneficial digestive and metabolic health outcomes which are relevant to HVN.

This follows a [patented invention from 2014 owned by FrieslandCampina](#) from the Netherlands, also relating to similar enzymatic conversion of lactose to GOS using immobilised beta-galactosidase. This patent is purely based on processing technology, and has no clinical data.

WHAT IS THE COMMERCIAL OUTCOME ?

[FrieslandCampina have just announced](#) they are commercialising the GOS ingredient branded as Biotis, which we suspect relies on this enzyme technology. Also, the technology is very similar to a [new enzyme recently launched by Novozymes](#), as well as [DuPont](#) (we suspect under license from one or both of the patent holders) that converts lactose in dairy into oligosaccharides. One of the key commercial angles to these technologies is the more natural, gentle approach to achieving functionality, rather than simply adding exogenous bioactives, whilst at the same time reducing lactose (a sugar and allergen).



HVN LEARNINGS & OPPORTUNITIES

- We should not forget to consider leveraging off other technology such as this to boost our already world-renowned dairy industry to develop new, beneficial functional outcomes.
- This is also a great example of using science and enzymes to heighten the innate, natural goodness of dairy.



3.3.Case study 3: Showcasing New Zealand's Immune Health Patents in Last 12 months



HVN'S partner, Plant & Food NZ Limited has a [patent](#) that targets the use of boysenberry & apple extracts for a number of inflammatory / respiratory health outcomes very relevant to HVN's Immune Health focus. According to our PatSnap software, the patent has now been extended into Asia (including at least China, South Korea and Taiwan).

We will enjoy watching this progress in Asia and take learnings from both the patent and commercial viewpoints, given the link of this patent to Anagenix's commercial product, [BerriQi](#).



One of HVN's newest commercial engagements is with [Quantec](#), an innovative dairy company in the Waikato specialising in immune-defensive proteins and high value bioactives.

Quantec has a new [patent](#) focused on emulsions including a bioactive protein such as lactoferrin or lactoperoxidase, optionally with omega-3s as an oil, with a range of health benefits, one of which relates to immunity through protection against pathogenic micro-organism infections.

[Innovative Dairy Consultants](#), an Auckland based company, has filed a new [patent](#) relating to colostrum / immunoglobulin G (IgG) milk compositions. The described novelty resides in a lowered pH between 2.5 to 4.0 that the patent says helps to allow efficient processing and sterilising without negatively impacting the levels of IgG.

Interestingly, we also found Japanese based Riken has a similar new [patent](#) that aims to boost IgG levels in the gut through a composition comprising acetyl cellulose.



3.4. Case study 4: Korean Patent Push on Berry based Immune Health

Korean based [Amorepacific](#) has a new [patent](#) that describes the use of ginseng berry polysaccharides in food based compositions to prevent and inhibit influenza virus infection. They collaborated with Jeonbuk National University.

This innovation has received recent [media attention](#), leveraging off COVID-19's effect on people's interest in immunity-boosting foods.

Amorepacific is one of the top filers from Asia we see in this Immune Health update. Its other patents relate to immune linked skincare through food, also of interest to HVN in Tranche 2.

[Korea Institute of Oriental Medicine](#) lodged a new [patent](#) focused towards preventing allergic diseases including atopic dermatitis, via foods fortified with gardenia berry fruit extract.

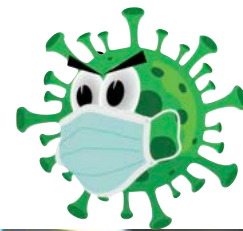
The institute positions itself as a reliable source of [R&D focused on Korean traditional medicine](#).

Korean based [Yonsei University](#) owns a new [patent](#) directed at use of naturally derived punicalagin for inhibiting PAR2 activity, and preventing inflammatory based conditions such as colitis or dermatitis. As noted in the patent, punicalagin is a phenolic compound found at high levels in pomegranate, which is technically a berry. The innovative composition can be provided as a functional food.

We could not find any evidence of commercialisation or media attention towards this innovation, but we will keep a close eye out moving forward.

The commercialisation arm of [Konkuk University](#) in Korea has a new [patent](#) relating to blueberry extracts for general immune health benefits as well as prevention and treatment of colitis.

Although it is still too early to see any commercial outcomes, we have seen the university has published its [findings in the Journal of Nutritional Biochemistry](#), supported by animal trials.



3.5. Case study 5: Coronavirus Related Immunity Patents

Given the unprecedented times we find ourselves in with COVID-19, it would be remiss of us not to scan our Immune Health patent landscape for food approaches to defend against coronaviruses. It is too early to see new patent publications since the start of the pandemic (which won't happen until 18 months after filing), but we found a few here of marginal relevance to other respiratory viruses, which might spark some ideas with our HVN community.

In very recent news, we have seen that [DSM has just announced](#) its *Lactobacillus rhamnosus* GG probiotic (under the [Culturelle brand](#)) is about to enter a large human clinical trial in the USA to assess reduction of SARS-CoV-2 infection and severity of disease. Although we could not track a patent linked directly to this probiotic, DSM have a number of patents directed to new *Lactobacillus* strains and encapsulation for increased probiotic bioactivity for health outcomes.

We expect to see COVID-19 related patent publications, in the next review in 12 months.

Swiss owned [Novartis](#) has a number of New Zealand patents, including [NZ597405](#), all relating to squalene. Squalene is a shark cartilage extract, and Novartis has commercialised it as an adjuvant to boost the influenza vaccine. Therefore it may have application to a SARS-CoV-2 vaccine.

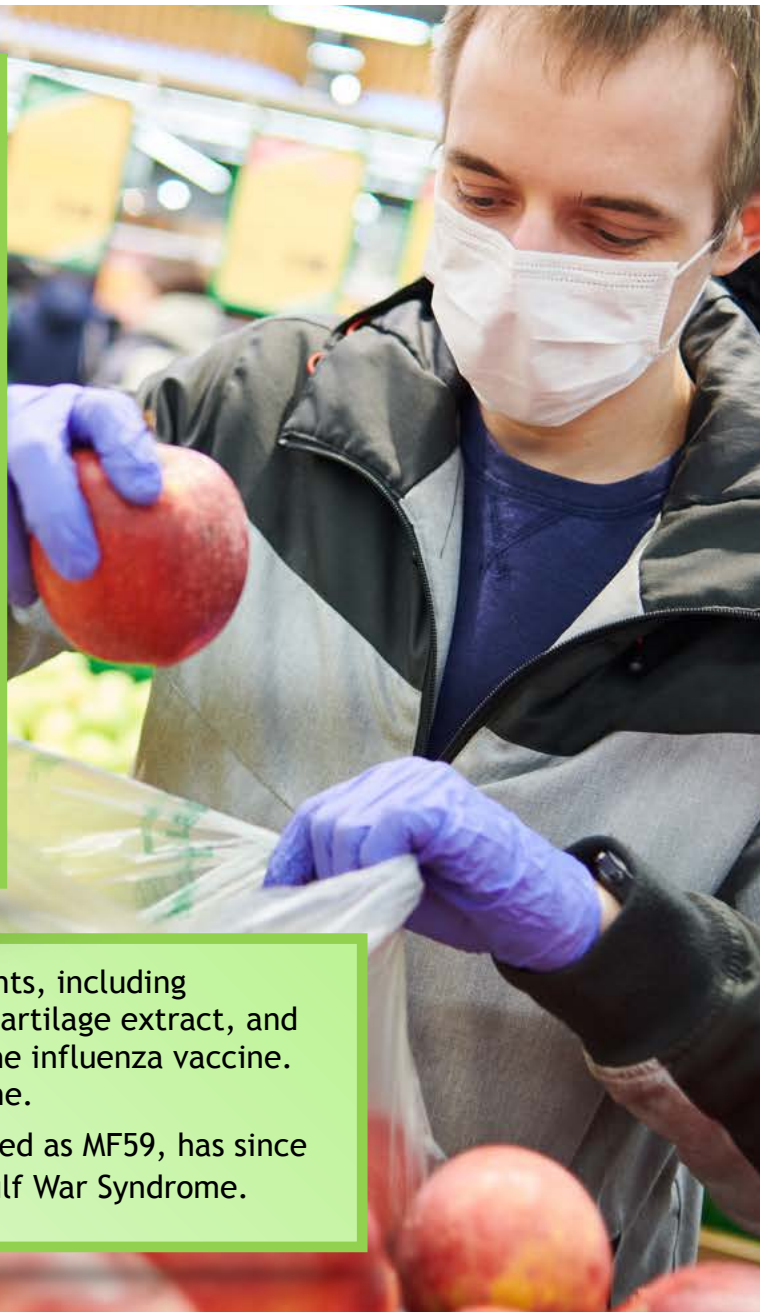
[WHO mentions](#) Novartis's squalene which is commercialised as MF59, has since been cleared as safe after initial concern it led to the Gulf War Syndrome.

A Russian based individual, Boris Farber, has a PCT application recently published as [WO2019212379](#). It relates to the use of probiotic bacteria, *Bacillus coagulans*, for immune deficiencies and respiratory viral infections, including flu, rotaviruses and coronaviruses.

The *Bacillus coagulans* probiotic is a commercially viable probiotic that has seen successes in a wide variety of food products owing to its heat-stability.

A Korean based individual, Heong Jun Yu, has a recently published US patent application, [US15/959268](#) which relates to a food concoction including Manuka honey, frankincense, myrrh, and propolis.

The patent reports, albeit with somewhat dubious science, that the mixture has immune boosting effects towards influenza, MERS coronavirus, and SARS.



4.BULL'S EYE PATENTS

Title	Publication Number	Publication Date	Owner	Health Focus	Primary actives	HVN Food link	Traditional herbal medicine
Composition for improving respiratory disease including extract of paliurus ramosissimus (lour.) poir.	WO2020050633A1	2020-03-12	KOREA FOOD RESEARCH INSTITUTE	Respiratory non-viral (e.g. asthma / pollution)	Antioxidants	Not applicable	Yes
Boysenberry, apple, and blackcurrant compositions and methods of preparation and use therefor	WO2019031972A1	2019-02-14	SHAW, ODETTE M. HURST, ROGER D	Respiratory non-viral (e.g. asthma / pollution)	Antioxidants	Berries	No
Oligo-saccharide enhanced milk products having the functions of modulating blood lipid, improving intestinal flora and promoting immunity, and process for preparing the same	TWI658791B	2019-05-11	A.G.V. PRODUCTS CORP.	General immunity	Prebiotic	Milk	No
Composition, comprising medicinal herb extract or fraction thereof, for prevention or treatment of influenza virus infection	WO2019194358A1	2019-10-10	LG HOUSEHOLD & HEALTH CARE LTD.	Viral respiratory Infection (VRI)	Natural Extract / Phytochemical	Not applicable	Yes
Polysaccharide fraction isolated from broccoli with immune-enhancing activity, anti-tumor activity and method for producing the same	KR1020190014353A	2019-02-12	BK Bio Co., Ltd. Gyeonggi University Industry-University Cooperation Foundation	General immunity	Antioxidants	Not applicable	No
Polysaccharide obtained from red cabbage with immune-enhancing activity, anti-tumor activity and method for producing the same	KR1020190014354A	2019-02-12	BK Bio Co., Ltd. Gyeonggi University Industry-University Cooperation Foundation	General immunity	Natural Extract / Phytochemical	Not applicable	No

Title	Publication Number	Publication Date	Owner	Health Focus	Primary actives	HVN Food link	Traditional herbal medicine
Bioactive dairy products and processes for their manufacture	WO2019045576A1	2019-03-07	INNOVATIVE DAIRY CONSULTANTS LIMITED	General immunity	Protein / Peptide / Enzyme	Milk	No
Methods and compositions for treating inflammatory diseases	US20190083461A1	2019-03-21	HELMHOLTZ ZENTRUM MUENCHEN DEUTSCHES FORSCHUNGS ZENTRUM FUER GESUNDHEIT UND UMWELT (GMBH)	Respiratory non-viral (e.g. asthma / pollution)	Protein / Peptide / Enzyme	Milk	No
Antiviral composition comprising of fermented Isatis indigotica root extract	KR1020190033129A	2019-03-29	Bio Standard Co., Ltd.	Viral respiratory Infection (VRI)	Natural Extract / Phytochemical	Not applicable	Yes
Intestinal immune-enhancing agent, foodstuff, and medicine	WO2019082897A1	2019-05-02	DAICEL CORPORATION RIKEN	General immunity	Natural Extract / Phytochemical	Not applicable	No
Composition for treating dermatitis, containing extract and fraction of aerial parts of gypsophila oldhamiana miq, and use thereof	WO2019103571A1	2019-05-31	KOREA INSTITUTE OF SCIENCE AND TECHNOLOGY	Skin	Natural Extract / Phytochemical	Not applicable	Yes
Antiviral Composition Comprising a Carrageenan as an Active Ingredient	KR101995376B1	2019-07-02	Hanmi Pharmaceutical Co., Ltd.	Viral respiratory Infection (VRI)	Other	Not applicable	No
Composition for preventing or inhibiting influenza virus infection, containing ginseng berry polysaccharides	WO2019212203A1	2019-11-07	AMOREPACIFIC CORPORATION	Viral respiratory Infection (VRI)	Natural Extract / Phytochemical	Berries	Yes
Composition for preventing, alleviating or treating allergic skin diseases, containing, as active ingredient, extract of gardenia fruits from which pigments are removed	WO2020013610A1	2020-01-16	KOREA INSTITUTE OF ORIENTAL MEDICINE	Skin	Natural Extract / Phytochemical	Not applicable	No

Title	Publication Number	Publication Date	Owner	Health Focus	Primary actives	HVN Food link	Traditional herbal medicine
Composition comprising punicalagin for inhibiting par2 activity	WO2020027534A1	2020-02-06	INDUSTRY-ACADEMIC COOPERATION FOUNDATION, YONSEI UNIVERSITY	Anti-inflammation	Natural Extract / Phytochemical	Berries	No
Probiotic powder and preparation method thereof	CN109380733A	2019-02-26	Shenzhen Extreme Alcohol Health Industry Co., Ltd.	Viral respiratory Infection (VRI)	Probiotic Natural Extract / Phytochemical	Berries	Yes
Composition comprising arabinogalactan and polyphenols from larch trees	JP2019069974A	2019-05-09	LONZA LIMITED	Viral respiratory Infection (VRI)	Natural Extract / Phytochemical	Not applicable	No
Food composition for treating cold and flu	KR1020190045050A	2019-05-02	Ryu Hyung-jun Yeskin Co., Ltd.	Viral respiratory Infection (VRI)	Natural Extract / Phytochemical	Honey	Yes
Anti-inflammatory composition containing blueberry extract	KR1020190058091A	2019-05-29	Konkuk University Glocal Industrial-Academic Cooperation Group	Anti-inflammation	Natural Extract / Phytochemical	Berries	No
New application of spirulina gamma-linolenic acid	CN109893520A	2019-06-18	Institute of Hydrobiology, Chinese Academy of Sciences	Anti-inflammation	Antioxidants	Seafood / Marine	No
Compound health tea for preventing influenza	CN109907135A	2019-06-21	Xinchang County Sanpin Tea Co., Ltd.	Viral respiratory Infection (VRI)	Natural Extract / Phytochemical	Not applicable	Yes
Medicated diet for people with common cold	CN109907264A	2019-06-21	Jilin Shengyuan Biotechnology Co., Ltd.	Viral respiratory Infection (VRI)	Natural Extract / Phytochemical Protein / Peptide / Enzyme	Milk	Yes

Title	Publication Number	Publication Date	Owner	Health Focus	Primary actives	HVN Food link	Traditional herbal medicine
Composition for treating and preventing viral infection comprising extracts from <i>Camellia japonica</i>	KR10198934 9B1	2019-06-14	Gangneung-Wonju University Industry-University Cooperation Foundation	Viral respiratory Infection (VRI)	Natural Extract / Phytochemical	Not applicable	Yes
Pharmaceutical composition and health functional food for preventing, improving or treating allergies containing black bean cordyceps sinensis extract as an active ingredient	KR10201900 84703A	2019-07-17	Lee Jae-han	Respiratory non-viral (e.g. asthma / pollution)	Natural Extract / Phytochemical	Not applicable	Yes
Compositions for preventing or treating respiratory diseases containing Lioniceræ Flower extract	KR10201900 83769A	2019-07-15	Alico Pharmaceutical Co., Ltd.	Respiratory non-viral (e.g. asthma / pollution)	Natural Extract / Phytochemical	Not applicable	Yes
Food, cosmetic and pharmaceutical formulation with an immunomodulatory and protective Anti-viral effect	WO2019212 379A1	2019-11-07	FARBER, BORIS SLAVINOVICH FARBER, SOF'YA BORISOVNA	Viral respiratory Infection (VRI)	Probiotic Natural Extract / Phytochemical	Not applicable	No
Strawberry plant extract, extraction method and application of extract in immunoregulation and inflammation resistance	CN11045227 6A	2019-11-15	Singapore Power Exchange Limited	Anti-inflammation	Antioxidants	Berries	No
Liquid composition comprising an extract of cassis leaves and concentrated apple juice	FR3080989A 1	2019-11-15	LAB ATTITUDE	Anti-inflammation	Natural Extract / Phytochemical	Berries	No
Application of citrus fruit volatile oil in preparation of food and medicine for treating alopecia seborrhoeica and food and medicine prepared by same	CN11050771 8A	2019-11-29	Hebei Chenghong Biological Technology Co., Ltd.	Skin	Natural Extract / Phytochemical	Not applicable	No

Title	Publication Number	Publication Date	Owner	Health Focus	Primary actives	HVN Food link	Traditional herbal medicine
Mung bean hull extraction substances having effect of resisting viruses and extraction method of mung bean hull extraction substances having effect of resisting viruses	CN11054806 2A	2019-12-10	Beijing Crown Biotechnology Co., Ltd. Chen Huiwen	Viral respiratory Infection (VRI)	Natural Extract / Phytochemical	Not applicable	No
Anti-inflammatory composition comprising the extracts of lettuce	KR10201901 37257A	2019-12-11	Gyeongbuk Bio Industry Research Institute Andong University Industry-University Cooperation Foundation	Anti-inflammation	Natural Extract / Phytochemical	Not applicable	No
Antiviral composition for influenza a virus comprising plant essential oils as an active material	KR10201901 40708A	2019-12-20	Gwangju Women's University	Viral respiratory Infection (VRI)	Natural Extract / Phytochemical	Not applicable	Yes
Ingestible formulation	WO2020017 980A1	2020-01-23	QUANTEC LIMITED	Viral respiratory Infection (VRI) General immunity	Protein / Peptide / Enzyme	Milk	No
Anti-norovirus agent	WO2020026 951A1	2020-02-06	DENSO CORPORATION CHUBU UNIVERSITY EDUCATIONAL FOUNDATION	General immunity	Other	Seafood / Marine	No
Pharmaceutical composition comprising fermented extract of peppermint for preventing or treating of respiratory diseases	KR10202000 39357A	2020-04-16	Ajou University Industry-Academic Cooperation Foundation	Respiratory non-viral (e.g. asthma / pollution)	Natural Extract / Phytochemical	Not applicable	Yes

5. HALO PATENTS

Title	Publication Number	Publication Date	Owner	Health Focus	Primary actives	HVN Food link	Traditional herbal medicine
Compositions comprising bacterial strains	WO2019180051A1	2019-09-26	4D PHARMA RESEARCH LIMITED	General immunity	Probiotic	Not applicable	No
Composition for improving asthma or chronic obstructive pulmonary disease using an extract of <i>Epilobium pyrricholophum</i>	KR1020190133636A	2019-12-03	Korea Food Research Institute	Respiratory non-viral (e.g. asthma / pollution)	Natural Extract / Phytochemical	Not applicable	Yes
Antioxidizing, antiaging, or Anti-inflammatory composition for strengthening skin barrier and caring for skin cell damage caused by fine dust including fermented tea extract	WO2019066261A1	2019-04-04	AMOREPACIFIC CORPORATION	Skin	Antioxidants	Not applicable	Yes
Composition comprising camellia sinensis L. root extract for caring damages of skin cells by microdust	KR1020190059070A	2019-05-30	(주)아모레퍼시픽	Skin	Natural Extract / Phytochemical	Not applicable	Yes
Polyphenol extract from fruits of the date palm phoenix dactylifera for its nutraceutical use	WO2020074134A1	2020-04-16	MYTAMAR GMBH	General immunity	Antioxidants	Not applicable	Yes
Composition having inhibitory effect on virus and bacteria	WO2019039919A2	2019-02-28	JOO, CHUL-GUE	General immunity	Natural Extract / Phytochemical	Not applicable	No
Composition comprising fraction of rosa multiflora extract as effective ingredient for preventing, alleviating, or treating immune disease	WO2019045287A2	2019-03-07	KOREA FOOD RESEARCH INSTITUTE HUONS CO., LTD.	General immunity Anti-inflammation Skin	Antioxidants	Not applicable	Yes
Crude drug composition for preventing or treating respiratory diseases	WO2019177428A1	2019-09-19	HELIXMITH CO., LTD	Respiratory non-viral (e.g. asthma / pollution)	Natural Extract / Phytochemical	Not applicable	Yes

Title	Publication Number	Publication Date	Owner	Health Focus	Primary actives	HVN Food link	Traditional herbal medicine
Novel tetrapeptide compound derived from shochu distillation residue	JP2018172296A5	2019-10-31	Sanwa Sake Co., Ltd.	Skin	Natural Extract / Phytochemical	Not applicable	No
Immunostimulator and method for preventing infection	WO2020075424A1	2020-04-16	ASAHI GROUP HOLDINGS, LTD.	General immunity	Natural Extract / Phytochemical	Not applicable	No
Composition comprising thymol as effective ingredient for preventing or treating skin wrinkle or atopic dermatitis	WO2019031655A1	2019-02-14	SD BIOTECHNOLOGIES CO., LTD	Skin	Natural Extract / Phytochemical	Not applicable	No
Composition comprising extracts of Lathyrus genus having anti-inflammation activity	KR1020190022114A	2019-03-06	Republic of Korea	Anti-inflammation	Natural Extract / Phytochemical	Not applicable	Yes
Composition for immunity stimulatory activity Using an Enzyme Digest of Sargassum horneri	KR1020190030405A	2019-03-22	Jeju University Industry-University Cooperation Foundation	General immunity	Protein / Peptide / Enzyme	Not applicable	Yes
Novel Strain Of Lactobacillus Plantarum And Composition For Preventing Or Treating Of Inflammatory Disease Using The Same	KR1020190034796A	2019-04-03	Konkuk University Industry-Academic Cooperation Foundation	Anti-inflammation	Probiotic	Not applicable	No
Composition for Improving Atopy Dermatitis Using Active Compounds Isolated from an Extract of Careya arborea	KR1020190035248A	2019-04-03	Republic of Korea Gyeonggi Provincial Economic Science Promotion Agency	Skin	Natural Extract / Phytochemical	Not applicable	Yes
Composition for prevention or treatment respiratory diseases comprising Chrysanthemum morifolium Ramatuelle extract and Scutellaria baicalensis extract as an active ingredient	KR1020190043996A	2019-04-29	Chong Kun Dang Health Co., Ltd.	Respiratory non-viral (e.g. asthma / pollution)	Natural Extract / Phytochemical	Not applicable	Yes

Title	Publication Number	Publication Date	Owner	Health Focus	Primary actives	HVN Food link	Traditional herbal medicine
Composition including mori folium extracts for antioxidant activation and Anti-inflammatory	KR1020190048783A	2019-05-09	Dong-Eui University Industry-University Cooperation Foundation	Anti-inflammation	Natural Extract / Phytochemical	Not applicable	Yes
Composition for preventing or treating atopic dermatitis comprising cupressuflavone or amentoflavone	KR1020190055441A	2019-05-23	Pusan National University Industry-University Cooperation Foundation	Skin	Natural Extract / Phytochemical	Not applicable	No
Ginsenoside composition for treating, improving, or preventing inflammatory disease, and method for preparing the same	KR1020190055785A	2019-05-23	Agricultural company Bisen Bio Corporation	Skin	Natural Extract / Phytochemical Protein / Peptide / Enzyme	Not applicable	Yes
A composition for treating dermatitis comprising aerial part of Arachis hypogaea L. extract and fractions and use thereof	KR101987364B1	2019-06-11	Korea Institute of Science and Technology	Skin	Natural Extract / Phytochemical	Not applicable	Yes
Composition for preventing, alleviating or treating inflammatory diseases, containing, as active ingredient, extract of kaki calyx of immature bansi (flat persimmons) produced in miryang	WO2019117419A1	2019-06-20	KOREA INSTITUTE OF ORIENTAL MEDICINE	Anti-inflammation	Natural Extract / Phytochemical	Not applicable	Yes
Complexes of high isoelectric point proteins with casein	WO2019115507A1	2019-06-20	NESTEC S.A.	General immunity	Protein / Peptide / Enzyme	Milk	No
Cocoa extract and uses	WO2019121583A1	2019-06-27	NATUREX SA L'UNIVERSITE DE LILLE 2 VRIJE UNIVERSITEIT BRUSSEL	Respiratory non-viral (e.g. asthma / pollution)	Antioxidants	Not applicable	No

Title	Publication Number	Publication Date	Owner	Health Focus	Primary actives	HVN Food link	Traditional herbal medicine
Composition containing schisandra chinensis leaf extract as active ingredient for prevention, improvement and treatment of atopic dermatitis	WO2019124863A1	2019-06-27	KOREA INSTITUTE OF ORIENTAL MEDICINE	Skin	Natural Extract / Phytochemical	Not applicable	Yes
Composition for antiinflammation containing extract of soybean root	KR101997033B1	2019-07-08	AMOREPACIFIC	Anti-inflammation Skin	Natural Extract / Phytochemical	Not applicable	Yes
Composition comprising an extract or a fraction of Codonopsis lanceolata for prevention and treatment of anti-inflammatory or asthma	KR1020190090672A	2019-08-02	Well Phyto Co., Ltd.	Anti-inflammation	Antioxidants	Not applicable	Yes
Composition for preventing, ameliorating, or treating allergic diseases, containing isodon inflexus extract as active ingredient	WO2019160210A1	2019-08-22	KOREA INSTITUTE OF ORIENTAL MEDICINE	Skin	Natural Extract / Phytochemical	Not applicable	Yes
Composition for preventing, ameliorating, or treating allergic diseases, containing veronica persica extract as active ingredient	WO2019160209A1	2019-08-22	KOREA INSTITUTE OF ORIENTAL MEDICINE	Skin	Natural Extract / Phytochemical	Not applicable	Yes
Crude drug composition for preventing or treating respiratory diseases	WO2019177424A1	2019-09-19	HELIXMITH CO., LTD.	Respiratory non-viral (e.g. asthma / pollution)	Natural Extract / Phytochemical	Not applicable	Yes
Compound bacterial agent with immune regulation function, preparation method and application thereof	CN109161494B	2019-10-01	Beijing Physical and Chemical Analysis and Testing Center	General immunity	Prebiotic Probiotic	Not applicable	No
Composition for inhibition of protease-activated receptor 2 activity including punicalagin	KR1020190109192A	2019-09-25	Yonsei University Industry-Academic Cooperation Foundation	Anti-inflammation	Natural Extract / Phytochemical	Berries	No

Title	Publication Number	Publication Date	Owner	Health Focus	Primary actives	HVN Food link	Traditional herbal medicine
The composition comprising the extract of <i>Veronicastrum sibiricum</i> L. Pennell as an active ingredient for preventing or treating inflammation, allergy and asthma and the use thereof	KR1020190118019A	2019-10-17	K & G Co., Ltd.	Respiratory non-viral (e.g. asthma / pollution) Anti-inflammation	Natural Extract / Phytochemical	Not applicable	Yes
A composition comprising puffed <i>rehmannia glutinosa</i> having Anti-oxidant, Anti-inflammatory, and immune boosting activity	KR1020190122098A	2019-10-29	Kyunghee University Industry-Academy Cooperation Group Bibong Hub Co., Ltd.	Anti-inflammation	Natural Extract / Phytochemical	Not applicable	Yes
A composition with antitussive and expectoration activities comprising an extract of <i>atractylodis rhizoma alba</i> and <i>schisandrae fructus</i>	WO2019212170A1	2019-11-07	CHONG KUN DANG PHARMACEUTICAL CORP.	Viral respiratory Infection (VRI)	Natural Extract / Phytochemical	Not applicable	Yes
<i>Lactobacillus paracasei</i> strain and use thereof	WO2019216662A1	2019-11-14	KO BIOLABS, INC. SEOUL NATIONAL UNIVERSITY R&DB FOUNDATION	General immunity	Probiotic	Not applicable	No

Title	Publication Number	Publication Date	Owner	Health Focus	Primary actives	HVN Food link	Traditional herbal medicine
Composition for preventing or treating allergic diseases containing mixed extract of two or more among asiasarum root, platycodon root, and cinnamomi ramulus as active ingredients	WO2019231211A1	2019-12-05	KOREA INSTITUTE OF SCIENCE AND TECHNOLOGY SEOUL NATIONAL UNIVERSITY R&DB FOUNDATION UNIVERSITY-INDUSTRY COOPERATION GROUP OF KYUNG HEE UNIVERSITY KOREA ADVANCED INSTITUTE OF SCIENCE AND TECHNOLOGY	Respiratory non-viral (e.g. asthma / pollution)	Natural Extract / Phytochemical	Not applicable	Yes
Composition for preventing or treating atopic dermatitis, containing extract of phaseolus vulgaris var. humilis alef	WO2019240336A1	2019-12-19	PARK, CHAN GYOUNG	Skin	Natural Extract / Phytochemical	Not applicable	Yes
Composition for prevention or treatment of respiratory diseases induced by particulate matter comprising natural plant extracts	KR102058618B1	2019-12-23	Sungkyun Biotech Co., Ltd. Korea Research Institute of Chemical Technology	Respiratory non-viral (e.g. asthma / pollution)	Natural Extract / Phytochemical	Not applicable	Yes
Lactic acid bacterium, natural immune activating agent derived from lactic acid bacterium, and preventive/therapeutic drug for infection and food or beverage	WO2020017390A1	2020-01-23	GENOME PHARMACEUTICALS INSTITUTE CO., LTD. TEIKYO UNIVERSITY	General immunity	Probiotic	Not applicable	No

Title	Publication Number	Publication Date	Owner	Health Focus	Primary actives	HVN Food link	Traditional herbal medicine
Composition for preventing, alleviating or treating respiratory diseases, containing siraitia grosvenorii extract as active ingredient	WO2020027574A1	2020-02-06	KOREA INSTITUTE OF ORIENTAL MEDICINE	Respiratory non-viral (e.g. asthma / pollution)	Natural Extract / Phytochemical	Not applicable	Yes
Bifidobacterium lactis GKK2, composition containing it and its use for improving allergic asthma	CN110835614A	2020-02-25	Grape King Biotechnology Co., Ltd.	Respiratory non-viral (e.g. asthma / pollution)	Probiotic	Not applicable	No
Application of quail eggs and quail egg mucins in anti-allergy	CN108014135B	2020-04-03	China Agricultural University	General immunity	Protein / Peptide / Enzyme	Not applicable	No
Composition for Anti-inflammation comprising beta-pinene as an active ingredient	KR1020190011857A	2019-02-08	Konkuk University Industry-Academic Cooperation Foundation	General immunity Anti-inflammation	Natural Extract / Phytochemical	Not applicable	No
Composition for improving fine dust stimulated respiratory diseases with shitake mushroom and seaweed ear complex extracts	KR101933467B1	2019-02-13	Jangheung-gun	Respiratory non-viral (e.g. asthma / pollution)	Natural Extract / Phytochemical	Not applicable	Yes
Composition for preventing, improving or treating hypersensitivity immune disease comprising beta-glucan and lactic acid bacteria as an effective ingredient	KR1020190014305A	2019-02-12	Glucan Corporation	Anti-inflammation Skin	Probiotic Natural Extract / Phytochemical	Not applicable	No
Composition comprising heat-killed lactobacillus plantarum Im1004 having immunostimulating activity	KR101919938B1	2019-02-08	Lacto Mason Co., Ltd.	General immunity	Probiotic	Not applicable	No

Title	Publication Number	Publication Date	Owner	Health Focus	Primary actives	HVN Food link	Traditional herbal medicine
Lactobacillus mucosae with anti-influenza ability and application thereof	CN109486722A	2019-03-19	Jiangnan University Jiangnan University (Yangzhou) Institute of Food Biotechnology	Viral respiratory Infection (VRI)	Probiotic	Not applicable	No
Application of lactobacillus plantarum CCFM8610 capable of relieving atopic dermatitis	CN109498660A	2019-03-22	Gangnam University	Skin	Probiotic	Not applicable	No
Fungus extract composition and application thereof in preparation of functional foods and health-care products	CN109497511A	2019-03-22	Zhejiang Yangzhikang Biological Technology Co., Ltd.	Respiratory non-viral (e.g. asthma / pollution)	Natural Extract / Phytochemical	Not applicable	Yes
Anti-inflammatory Composition Using an Essential Oil Extract of Vitex rotundifolia	KR101962266B1	2019-03-26	Jeju Sarang Agricultural and Fisheries Co., Ltd.	Anti-inflammation	Natural Extract / Phytochemical	Not applicable	Yes
Probiotic mixing preparation with anti-influenza capability and application thereof	CN109576185A	2019-04-05	Jiangnan University Jiangnan University (Yangzhou) Institute of Food Biotechnology	Viral respiratory Infection (VRI) Skin	Probiotic	Not applicable	Yes
Composition for improving or treating allergic rhinitis comprising Camellia sinensis	KR1020190036074A	2019-04-04	AMOREPACIFIC	Respiratory non-viral (e.g. asthma / pollution)	Natural Extract / Phytochemical	Not applicable	Yes

Title	Publication Number	Publication Date	Owner	Health Focus	Primary actives	HVN Food link	Traditional herbal medicine
Composition for Preventing or Treating Inflammatory Diseases Comprising Sparassis crispa Extract	KR1020190036217A	2019-04-04	Sunmoon University Industry-University Cooperation Foundation	Anti-inflammation Skin	Natural Extract / Phytochemical	Not applicable	Yes
Anti-inflammatory composition comprising Actinidia arguta stem extract produced by ultra high pressure homogenization as effective component	KR101963628B1	2019-03-29	Andong University Industrial-Academic Cooperation Group Isome Co., Ltd.	Anti-inflammation	Natural Extract / Phytochemical	Not applicable	Yes
Composition comprising an extract or a fraction of Codonopsis lanceolata for prevention and treatment of anti-inflammatory or asthma	KR101964580B1	2019-04-02	Well Phyto Co., Ltd.	Respiratory non-viral (e.g. asthma / pollution) Anti-inflammation Skin	Natural Extract / Phytochemical	Not applicable	Yes
Lactobacillus reuteri capable of alleviating allergic asthma and application thereof	CN109628359A	2019-04-16	Gangnam University	Respiratory non-viral (e.g. asthma / pollution)	Probiotic	Not applicable	No
Anti-inflammation Composition and Anit-allergy Composition Using an Extract of Polygonum perfoliata	KR1020190036974A	2019-04-05	Gyeonggi Provincial Economic Science Promotion Agency	Anti-inflammation	Natural Extract / Phytochemical	Not applicable	Yes
Lactobacillus rhamnosus and application thereof in preparation of health foods and medicines for preventing allergic asthma	CN109666614A	2019-04-23	Southwest University	Respiratory non-viral (e.g. asthma / pollution)	Probiotic	Not applicable	No

Title	Publication Number	Publication Date	Owner	Health Focus	Primary actives	HVN Food link	Traditional herbal medicine
Antioxidant, Anti-inflammatory and Anti-histamine composition comprising a mixed herbal extract	KR10197125 6B1	2019-04-22	Kyunghee University Industry-University Cooperation Foundation	Respiratory non-viral (e.g. asthma / pollution)	Natural Extract / Phytochemical	Not applicable	Yes
Composition for preventing, ameliorating or treating atopic dermatitis comprising Sagittaria aginashi extract as effective component	KR10197414 5B1	2019-04-30	Korea Research Institute of Bioscience and Biotechnology	Skin	Natural Extract / Phytochemical	Not applicable	Yes
Food composition for treating chronic rhinitis	KR10201900 45887A	2019-05-03	Ryu Hyung-jun Yeskin Co., Ltd.	Viral respiratory Infection (VRI)	Natural Extract / Phytochemical	Honey	Yes
Compositions for Treating or Preventing Inflammatory Disease Comprising Extract of Hibiscus Syriacus	KR10197795 4B1	2019-05-13	SD Biotechnology Co., Ltd.	Anti-inflammation	Natural Extract / Phytochemical	Not applicable	Yes
Medicinal and edible healthcare product capable of cleaning lung, preventing haze, cleaning throat and moistening throat and preparation method thereof	CN10982094 8A	2019-05-31	Jiangxi Anshuntang Biological Technology Co., Ltd.	Respiratory non-viral (e.g. asthma / pollution)	Natural Extract / Phytochemical	Not applicable	Yes
Anti-inflammatory composition comprising an extract of coffee fermented with lactic acid bacteria	KR10201900 59494A	2019-05-31	Gangneung-Wonju University Industrial-Academic Cooperation Group Nomination hall	Anti-inflammation	Probiotic Natural Extract / Phytochemical	Not applicable	No

Title	Publication Number	Publication Date	Owner	Health Focus	Primary actives	HVN Food link	Traditional herbal medicine
Composition for preventing or improving inflammatory skin diseases comprising combined herbal extracts	KR1020190063140A	2019-06-07	Korea Convergence Technology Research Institute Seowon University Industry-Academic Cooperation Foundation	Skin	Natural Extract / Phytochemical	Not applicable	Yes
Pharmaceutical composition for treating rhinitis and application of pharmaceutical composition	CN109908215A	2019-06-21	Beijing Kunqiu Health Technology Co., Ltd.	Respiratory non-viral (e.g. asthma / pollution)	Natural Extract / Phytochemical	Not applicable	Yes
A composition for Anti-inflammation comprising hemistepta lyrata extract	KR1020190067654A	2019-06-17	National Nakdong River Biological Resource Museum	Anti-inflammation	Natural Extract / Phytochemical	Not applicable	Yes
Composition for alleviating, inhibiting, or treating fine dust, sick house syndrome or allergic rhinitis comprising red onion as an active ingredient	KR1020190067101A	2019-06-14	Social welfare corporation Samsung Life Insurance Foundation	Respiratory non-viral (e.g. asthma / pollution)	Natural Extract / Phytochemical	Not applicable	No

Title	Publication Number	Publication Date	Owner	Health Focus	Primary actives	HVN Food link	Traditional herbal medicine
Antiviral composition for influenza virus comprising leuconostoc mesenteroides DSR 218 as an active material	KR1020190071469A	2019-06-24	Korea Food Research Institute Daesang Corporation Korea University Industry-University Cooperation Foundation	Viral respiratory Infection (VRI)	Protein / Peptide / Enzyme	Not applicable	No
Composition for treating atopy dermatitis comprising fermented product of Moringa by Rhizopus oligosporus and methods of preparation thereof	KR1020190074163A	2019-06-27	Factorial Holdings Co., Ltd.	Skin	Natural Extract / Phytochemical	Not applicable	Yes
Traditional Chinese medicine composition for preventing and treating respiratory system diseases and preparation method thereof	CN110051791A	2019-07-26	Yunnan Datang Hanfang Pharmaceutical Co., Ltd.	Respiratory non-viral (e.g. asthma / pollution)	Natural Extract / Phytochemical	Not applicable	Yes
Composite extract composition for promoting immunity against the effects of the effects of anti-inflammatory and anti-inflammation comprising a beer yeast as an effective ingredient	KR1020190085761A	2019-07-19	Woongjin Lileet Co., Ltd.	General immunity	Natural Extract / Phytochemical	Not applicable	No
Lactobacillus rhamnosus and application thereof	CN110122877A	2019-08-16	Shenzhen Huada Gene Agriculture Holdings Co., Ltd. Huada Precision Nutrition (Shenzhen) Technology Co., Ltd.	General immunity	Probiotic	Not applicable	No

Title	Publication Number	Publication Date	Owner	Health Focus	Primary actives	HVN Food link	Traditional herbal medicine
Antiviral agent and antiviral composition	JP201913764 4A	2019-08-22	Jiangnan Chemical Co., Ltd.	Viral respiratory Infection (VRI)	Natural Extract / Phytochemical	Not applicable	No
Composition comprising extract of Chaenom sinensis for treating asthma	KR10201901 02563A	2019-09-04	Dongshin University Industry-Academic Cooperation Foundation	Respiratory non-viral (e.g. asthma / pollution)	Natural Extract / Phytochemical	Not applicable	Yes
Radix angelicae beauty tea as well as preparation method and application thereof	CN11027983 5A	2019-09-27	Bozhou Vocational and Technical College	Respiratory non-viral (e.g. asthma / pollution)	Natural Extract / Phytochemical	Not applicable	Yes
Pharmaceutical and functional food composition comprising phosvitin and lysozyme for enhancing immunity	KR10201901 11828A	2019-10-02	Konkuk University Industrial-Academic Cooperation Group With Bio Co., Ltd.	Anti-inflammation	Protein / Peptide / Enzyme	Not applicable	No
New strain of ganoderma lucidum	CN11033839 8A	2019-10-18	Sichuan Academy of Chinese Medicine Sciences Shanghai Medical School (Chengdu) Medical Technology Co., Ltd.	Respiratory non-viral (e.g. asthma / pollution)	Probiotic	Not applicable	No

Title	Publication Number	Publication Date	Owner	Health Focus	Primary actives	HVN Food link	Traditional herbal medicine
Composition for improvement of respiratory function	KR1020190117228A	2019-10-16	Agricultural Corporation Corporation Korean Peninsula	Respiratory non-viral (e.g. asthma / pollution)	Natural Extract / Phytochemical	Not applicable	Yes
Composition for prevention or treatment of allergic skin diseases comprising fermented extract of ginseng	KR102032110B1	2019-10-15	Konkuk University Glocal Academic Cooperation Group Alpha Cripotech Co., Ltd.	Skin	Natural Extract / Phytochemical	Not applicable	Yes
A composition for Anti-inflammation comprising hemistepta lyrata extract	KR1020190119020A	2019-10-21	National Nakdong River Biological Resource Museum	Anti-inflammation	Natural Extract / Phytochemical	Not applicable	Yes
Health protection tea with yin nourishing and lung moistening functions	CN110384765A	2019-10-29	Sun Zhiguang	Respiratory non-viral (e.g. asthma / pollution)	Natural Extract / Phytochemical	Not applicable	Yes
A pharmaceutical composition for prevention or treatment of respiratory disease comprising Ginsenoside Re	KR1020190122453A	2019-10-30	GIL MEDICAL CENTER	Viral respiratory Infection (VRI)	Natural Extract / Phytochemical	Not applicable	Yes

Title	Publication Number	Publication Date	Owner	Health Focus	Primary actives	HVN Food link	Traditional herbal medicine
Composition for Anti-Allergy Using an Extract of Gnetum macrostachyum	KR1020190124966A	2019-11-06	Republic of Korea (Director of the National Institute of Biological Resources, Ministry of Environment) Gyeonggi Provincial Economic Science Promotion Agency	Skin	Natural Extract / Phytochemical	Not applicable	Yes
Bifidobacterium lactis nbk-W13 and application thereof	CN110452842A	2019-11-15	Nobak (Wuhan) Biological Technology Co., Ltd.	General immunity Anti-inflammation	Probiotic	Not applicable	No
Composition comprising inotodiol compound as effective ingredient for prevention or treatment of allergy disease	WO2019225783A1	2019-11-28	THE INDUSTRY & ACADEMIC COOPERATION IN CHUNGNAM NATIONAL UNIVERSITY (IAC) CARBOEXPERT INC.	Respiratory non-viral (e.g. asthma / pollution)	Natural Extract / Phytochemical	Not applicable	Yes
Composition for anti-virus Comprising Nano-Sized Lactic Acid Bacteria from Kimchi	KR1020190129322A	2019-11-20	Biogenics Korea Co., Ltd.	Viral respiratory Infection (VRI)	Probiotic	Not applicable	No

Title	Publication Number	Publication Date	Owner	Health Focus	Primary actives	HVN Food link	Traditional herbal medicine
Cordyceps sinensis extract and application thereof	CN11051129 2A	2019-11-29	Dongguan East Sunshine Health Products R & D Co., Ltd. Guangdong East Sunshine Pharmaceutical Co., Ltd.	General immunity	Natural Extract / Phytochemical	Not applicable	No
Selenium-enriched substitutional tea for treating allergic rhinitis	CN11050773 5A	2019-11-29	Enshi Daozhidao Biotechnology Co., Ltd.	Respiratory non-viral (e.g. asthma / pollution)	Natural Extract / Phytochemical	Not applicable	Yes
Composition for Anti-allergy Using Extracts of Ulmus davidiana and Perillae Folium	KR10204897 7B1	2019-11-28	Mjin Corporation	Respiratory non-viral (e.g. asthma / pollution) Skin	Natural Extract / Phytochemical	Not applicable	Yes
Composition for preventing and/or improving pollinosis	JP201920160 9A	2019-11-28	Ikeda Flour Milling Co., Ltd.	Respiratory non-viral (e.g. asthma / pollution)	Natural Extract / Phytochemical	Not applicable	No
A composition for preventing or treating atopic dermatitis comprising the extract of corn silk	KR10201901 35839A	2019-12-09	Korea (Director of Rural Development Administration)	Skin	Natural Extract / Phytochemical	Not applicable	Yes
Bifidobacterium capable of relieving atopic dermatitis and application of bifidobacterium	CN11061616 7A	2019-12-27	Gangnam University	Skin	Probiotic	Not applicable	No
Mixture of three selected probiotic strains for human use	RS20180637 A1	2019-12-31	-	Respiratory non-viral (e.g. asthma / pollution) Skin	Probiotic	Not applicable	No

Title	Publication Number	Publication Date	Owner	Health Focus	Primary actives	HVN Food link	Traditional herbal medicine
Composition for prevention or treatment of influenza virus infection comprising medicinal herb extract or its fraction	KR1020200013005A	2020-02-05	LBK Bio Co., Ltd. Gyeonggi University Industry-University Cooperation Foundation G Household & Health Care Co., Ltd.	Viral respiratory Infection (VRI)	Natural Extract / Phytochemical	Not applicable	Yes
Composition including ocimene or salt thereof as active ingredients for preventing or treating allergic disease or atopic dermatitis	KR102076937B1	2020-02-13	Yonsei University Industry-Academic Cooperation Foundation	Skin	Natural Extract / Phytochemical	Not applicable	No
Composition including ethyl vanilin or salt thereof as active ingredients for preventing or treating allergic disease or atopic dermatitis	KR102076939B1	2020-02-13	Yonsei University Industry-Academic Cooperation Foundation	Skin	Natural Extract / Phytochemical	Not applicable	No
Composition including carvone or salt thereof as active ingredients for preventing or treating allergic disease or atopic dermatitis	KR102076938B1	2020-02-13	Yonsei University Industry-Academic Cooperation Foundation	Skin	Natural Extract / Phytochemical	Not applicable	No

Title	Publication Number	Publication Date	Owner	Health Focus	Primary actives	HVN Food link	Traditional herbal medicine
Pharmaceutical composition for preventing or treating inflammatory disease comprising extract of <i>Pilea martinii</i> as effective component	KR1020200020354A	2020-02-26	Kyunghee University Industry-Academy Cooperation Group Korea Research Institute of Bioscience and Biotechnology	Anti-inflammation	Natural Extract / Phytochemical	Not applicable	Yes
A bifidobacterium lactis GKK2, a composition comprising thereof and its use for improving allergic asthma	TW202008994A	2020-03-01	GRAPE KING BIO LTD.	Respiratory non-viral (e.g. asthma / pollution)	Probiotic	Not applicable	No
Composition comprising <i>Viola tokubuchiana</i> extract for preventing, improving or treating respiratory disease	KR1020200021740A	2020-03-02	Ajou University Industry-Academic Cooperation Foundation	Respiratory non-viral (e.g. asthma / pollution)	Natural Extract / Phytochemical	Not applicable	Yes
Composition comprising <i>Forsythia velutina</i> extract for preventing, improving or treating respiratory disease	KR1020200021738A	2020-03-02	Ajou University Industry-Academic Cooperation Foundation	Respiratory non-viral (e.g. asthma / pollution)	Natural Extract / Phytochemical	Not applicable	Yes
Composition comprising <i>Viburnum carlesii</i> extract for preventing, improving or treating respiratory disease	KR1020200021739A	2020-03-02	Ajou University Industry-Academic Cooperation Foundation	Respiratory non-viral (e.g. asthma / pollution)	Natural Extract / Phytochemical	Not applicable	Yes

Title	Publication Number	Publication Date	Owner	Health Focus	Primary actives	HVN Food link	Traditional herbal medicine
Composition for preventing, treating or improving skin immunity disease	KR1020200039370A	2020-04-16	Nambu University Industry-Academic Cooperation Foundation	Skin	Natural Extract / Phytochemical	Not applicable	No

6. BACKGROUND PATENTS

Title	Publication Number	Publication Date	Owner	Health Focus	Traditional herbal medicine
Oral Microbiota Promotion for Immune System Associated Inflammations	US20190083435A1	2019-03-21	KNOZE JR. CORPORATION	Anti-inflammation	No
Methods for formulating orally ingestible compositions comprising lipophilic active agents	US20200061195A1	2020-02-27	POVIVA TEA, LLC		No
Homogeneous polysaccharide with immunoregulatory activity and preparation method therefor	WO2019052119A1	2019-03-21	SECOND AFFILIATED HOSPITAL OF GUANGZHOU UNIVERSITY OF TRADITIONAL CHINESE MEDICINE	General immunity	No
Acidic beta-lactoglobulin beverage preparation	WO2020001765A1	2020-01-02	ARLA FOODS AMBA	General immunity	No
Composition for type iv allergy	WO2019208151A1	2019-10-31	ASAHI KOHSAN CORPORATION	Skin	No
Method for producing immune activator and method for producing food and drink for immune activation	US20190387780A1	2019-12-26	TORII, KAZUHITO TORII, TOMOKO	General immunity	Yes
Composition and Nutritional Supplement Made Therefrom	US20190054152A1	2019-02-21	LONZA LLC	General immunity	No
Powder formulation having a function of enhancing immunity and method for preparing the same	US20190105361A1	2019-04-11	INFINITUS (CHINA) COMPANY LTD.	General immunity	Yes
Powder formulation having a function of enhancing immunity and method for preparing the same	US20190104757A1	2019-04-11	INFINITUS (CHINA) COMPANY LTD.	General immunity	Yes
Powder formulation having a function of enhancing immunity and method for preparing the same	US20190125813A1	2019-05-02	INFINITUS (CHINA) COMPANY LTD.	General immunity	Yes

Title	Publication Number	Publication Date	Owner	Health Focus	Traditional herbal medicine
Probiotic bacteria preconditioned in a gos-containing medium and use thereof	WO2019025637A1	2019-02-07	NESTEC S.A.	General immunity	No
Traditional chinese medicine composition and use thereof	US20190070246A1	2019-03-07	INFINITUS (CHINA) COMPANY LTD.	General immunity	Yes
Anti-inflammatory composition comprising macropin peptide as active ingredient	WO2019059711A1	2019-03-28	INDUSTRY-ACADEMIC COOPERATION FOUNDATION, CHOSUN UNIVERSITY	Anti-inflammation	No
Composition for treating fine dust-caused skin cell damage, comprising green tea extract	WO2019078463A1	2019-04-25	AMOREPACIFIC CORPORATION	Skin	Yes
Oxyasin-6 peptide isolated from Oxya chinensis sinuosa and antimicrobial, antimycotic and antiallergic composition comprising it	KR1020190051474A	2019-05-15	Republic of Korea	Skin	Yes
Nutritional Composition for Moisturizing Lung and Method for Preparing the Same	US20190159498A1	2019-05-30	CI, ZHONGHUA	Respiratory non-viral (e.g. asthma / pollution)	Yes
Composition for preventing or treating acne comprising glycyrrhiza fraction	KR1020190055916A	2019-05-24	Catholic University Industry-University Cooperation Foundation	Skin	Yes
Composition for preventing, improving or treating atopic dermatitis containing mixed herbal extract as active ingredient	WO2019132625A1	2019-07-04	N&C MEDIMETIC AGRICULTURAL CORPORATION CO., LTD.	Skin	Yes
A composition for skin smoothing comprising an extract of fermented poncirus fructus	KR101994618B1	2019-07-02	Cosmax Corporation	Skin	Yes
Composition for skin whitening comprising Cacalia firma extract as effective component	KR1020190074566A	2019-06-28	Andong University Industrial-Academic Cooperation Group Isome Co., Ltd.	Skin	Yes

Title	Publication Number	Publication Date	Owner	Health Focus	Traditional herbal medicine
Anti-inflammatory composition comprising <i>Cacalia firma</i> extract as effective component	KR1020190074568A	2019-06-28	Andong University Industrial-Academic Cooperation Group Isome Co., Ltd.	Anti-inflammation	Yes
Pharmaceutical composition for enhancing immune function comprising enzyme treated royal jelly powder as an active ingredient	CN110075128A	2019-08-02	Beitek gmbh	Anti-inflammation	Yes
Plasma-treated pepper leaf extract with improved anti-inflammatory effect and manufacturing method thereof	KR1020190088752A	2019-07-29	Andong University Industrial-Academic Cooperation Group Isome Co., Ltd.	Anti-inflammation	No
A composition improving skin wrinkle or striae distensae and having Anti-inflammation effect comprising <i>Ailanthus altissima</i> root bark extracts	KR1020190090242A	2019-08-01	Human Cosmetic Co., Ltd.	Skin	Yes
Composition for antioxidant and anti-inflammatory comprising fraction of <i>Ledum palustre</i> L. extract as effective component	KR1020190136769A	2019-12-10	Daegu Catholic University Industrial-Academic Cooperation Group Yoo Jun-jae	Respiratory non-viral (e.g. asthma / pollution) Skin	Yes
Biologically active polypeptide FDPTLHQ and preparation method and application thereof.	CN108794588B	2020-01-21	Shanghai Bohui Biotechnology Co., Ltd. Zhejiang PhiTex Life Health Technology Co., Ltd	Anti-inflammation	No
Geumgangsong extract with improved anti-inflammatory effect through plasma treatment and manufacturing method thereof	KR1020200022984A	2020-03-04	Andong University Industrial-Academic Cooperation Group I-Sum Co., Ltd. Agriculture company	Skin	Yes
Compound edible mushroom tea bag for enhancing immunity	WO2019024011A1	2019-02-07	JIANGSU ANHUI BIO-TECHNOLOGY CO., LTD	General immunity	Yes

Title	Publication Number	Publication Date	Owner	Health Focus	Traditional herbal medicine
Fuzhuan tea and preparation technology thereof	CN109315534A	2019-02-12	Zhang Fuzai		Yes
Composition rich in tea polyphenol and Chinese herb extract and application	CN109331089A	2019-02-15	Pizhou Gaxing Pharmaceutical Technology Service Co., Ltd.	Skin	Yes
Ginger essential oil-enriched traditional Chinese medicine extract composition and application	CN109331157A	2019-02-15	Pizhou Gaxing Pharmaceutical Technology Service Co., Ltd.	Skin	Yes
Composition of anti-haze lung-heat clearing tea	CN109331125A	2019-02-15	Jiangsu Hyde Environmental Technology Co., Ltd.	Respiratory non-viral (e.g. asthma / pollution)	Yes
Composition for immune enhancement comprising sargassum coreanum enzymatic extract	KR101947276B1	2019-02-12	Pukyong National University	General immunity	Yes
Composition for regulating immunity, resisting fatigue and relaxing bowels, and preparation method of composition	CN109363187A	2019-02-22	Heilongjiang Feihe Dairy Co., Ltd.	General immunity	Yes
Solid drink and preparation method thereof	CN109363047A	2019-02-22	Fan Shumin	General immunity	Yes
Composition of resveratrol and traditional Chinese medicine extract and application	CN109364113A	2019-02-22	Jiangsu Qianyaotang National Medical Research Institute Co., Ltd.	General immunity	Yes
Method for preparing food or pharmaceutical composition comprising fermented extract of garlic sprout as an effective ingredient	KR1020190015886A	2019-02-15	Osle D & F Co., Ltd.		No
Traditional Chinese medicine tea for treating psoriasis	CN109393094A	2019-03-01	Wang Xuanqing	Skin	Yes

Title	Publication Number	Publication Date	Owner	Health Focus	Traditional herbal medicine
Food therapy formula for treating cough caused by lung heat by using pears	CN109418832A	2019-03-05	Wang Fangping	Respiratory non-viral (e.g. asthma / pollution)	No
Food therapy formula for treating cough with copious whitish viscid sputum by using oranges	CN109418993A	2019-03-05	Huang Rui	Respiratory non-viral (e.g. asthma / pollution)	Yes
Fine dried noodles containing traditional Chinese medicine components and processing method of fine dried noodles	CN109430709A	2019-03-08	Dalian Zhenxin Technology Co., Ltd.	General immunity	Yes
Dietetic therapy formula for treating cough with dyspnea and emesis by using loquats	CN109452586A	2019-03-12	Wang Fangping	Respiratory non-viral (e.g. asthma / pollution)	Yes
Composition enriched in sea-buckthorn extract and application	CN109464493A	2019-03-15	Pizhou Gaxing Pharmaceutical Technology Service Co., Ltd.	General immunity	Yes
Preparation method of plant powder product	CN109497224A	2019-03-22	Yunnan Enya Biotechnology Co., Ltd.		Yes
Novel tenacibaculum sp. and composition comprising thereof	KR1020190024835A	2019-03-08	A & P Co., Ltd.		No
Diet therapy formula for treating summer thirst by utilizing peaches	CN109511914A	2019-03-26	Wang Fangping		No
Novel Strain Of Weissella Cibaria And Use Of The Same	KR101961069B1	2019-03-21	Seungah Lee	General immunity	No
Probiotics composition for prevention and treatment of rotaviral infection	KR1020190029126A	2019-03-20	Bifido Corporation	General immunity	No
Micro-ecological preparation by using lactic acid bacteria to ferment radix astragali, preparation method and application thereof	CN109528814A	2019-03-29	Inner Mongolia Mongolian Peptide Bioengineering Co., Ltd.	General immunity	Yes

Title	Publication Number	Publication Date	Owner	Health Focus	Traditional herbal medicine
Health food for conditioning phlegm-dampness constitution symptoms, and preparation method of health food	CN109567184A	2019-04-05	Jilin Hengshi Yichuan Food Technology Development Co., Ltd.	Respiratory non-viral (e.g. asthma / pollution)	Yes
Pomelo plaster and preparation method thereof	CN109619484A	2019-04-16	Zhangzhou Youzhixiang Food Co., Ltd.	Respiratory non-viral (e.g. asthma / pollution)	Yes
Health-care active lyophilized powder for enhancing immunity and preparation method thereof	CN109620889A	2019-04-16	Tang Qingchi	General immunity	Yes
Composition for preventing, ameliorating or treating dermatitis comprising complex of natural oil and natural extract treated with anion generated by plasma as effective component	KR101942009B1	2019-04-11	Agricultural company Uiedang Co., Ltd.	Anti-inflammation	Yes
A composition for treatment of dermatitis containing grateloupia imbricata holme extract	KR1020190038495A	2019-04-08	Pukyong National University	Skin	Yes
Food composition for relieving symptoms of viral diseases	US20190110512A1	2019-04-18	YU, HEONG JUN		No
Inflammation-diminishing and detoxifying tea	CN109674894A	2019-04-26	Yang Tianmei	General immunity	Yes
Beverage for preventing and curing cardiovascular and cerebrovascular diseases and preparation method thereof	CN109691602A	2019-04-30	Hunan Bojun Biomedicine Co., Ltd.	General immunity	Yes
Shaji tea and application thereof and preparation method thereof	CN109699786A	2019-05-03	Tea Research Institute, Chinese Academy of Agricultural Sciences	Anti-inflammation	Yes

Title	Publication Number	Publication Date	Owner	Health Focus	Traditional herbal medicine
Composition For Improving Scalp Comprising Extract Of Euonymus Alatus	KR1020190044957A	2019-05-02	Daegu Catholic University Industrial-Academic Cooperation Group Dongsung Pharmaceutical Co., Ltd.	Skin	Yes
Composition for treating psoriasis	KR1020190046241A	2019-05-07	Yeskin Co., Ltd. Hyungjun Ryu		Yes
Compositions for Treating or Preventing Inflammatory Disease Comprising Complex Extract of Thymus vulgaris	KR101977977B1	2019-05-14	SD Biotechnology Co., Ltd.	Anti-inflammation	Yes
A composition having anti-oxidation or anti-inflammation comprising Selaginella tamariscina extracts, fractions thereof or compounds isolated therefrom as an active ingredient	KR1020190057225A	2019-05-28	Gangneung-Wonju University Industry-Academic Cooperation Foundation	Anti-inflammation	Yes
Composition including jasmone as active ingredients for Anti-allergy, prevention or treatment of atopic dermatitis, or skin regeneration	KR101984195B1	2019-05-30	Botanic Sense Co., Ltd.	Skin	No
Medicinal food for treating lung and relieving cough and preparation method thereof	CN109875034A	2019-06-14	Mou Jing Wen Yuanqiang	Respiratory non-viral (e.g. asthma / pollution)	Yes
Compound immunity-enhancing nutritional food formula and preparation method thereof	CN109875044A	2019-06-14	Guoke Runze (Shandong) Special Medicine Diet Technology Co., Ltd.	General immunity	Yes
Probiotic composition with weight loss function and preparation method and application thereof	CN109924506A	2019-06-25	Shandong Huanyi Biotechnology Co., Ltd.		No

Title	Publication Number	Publication Date	Owner	Health Focus	Traditional herbal medicine
Application of bacteroides fragilis extract to preparation of composition for preventing and treating allergic dermatitis	CN109954005A	2019-07-02	Guangzhou Zhiyi Biological Technology Co., Ltd.	Skin	No
Traditional Chinese medicinal composition for enhancing immunity, as well as preparation method and application thereof	CN110025742A	2019-07-19	Chongqing Yuelong Biopharmaceutical Co., Ltd.	General immunity	Yes
Loquat composition fermented by micro-ecological technology and preparation method thereof	CN110038093A	2019-07-23	Shandong University Huangshan Qishang Biological Technology Co., Ltd.	General immunity	Yes
Chinese herbal medicine flower honey oral liquid and preparation method thereof	CN110150608A	2019-08-23	Youyizhongkang Medical Technology (Yichang) Co., Ltd.	General immunity	Yes
Anti-inflammatory composition containing medicinal herbs	KR1020190101632A	2019-09-02	Misak Bio Co., Ltd.	Anti-inflammation	Yes
Lactobacillus rhamnosus and application thereof	CN110295130A	2019-10-01	Nobak (Wuhan) Biological Technology Co., Ltd.		No
Medicine-food homologous compound preparation suitable for astronauts and capable of improving immunity	CN110326776A	2019-10-15	Weihai Sailui Aerospace Technology Co., Ltd.	General immunity	Yes
Lactic acid bacteria composition capable of preventing and treating bacterial vaginosis	CN110339216A	2019-10-18	Jingyue Biotechnology Co., Ltd.		No
Compositions for Anti-Bacterial and Anti-Inflammatory Effect Comprising Callus Extract of Hibiscus Syriacus	KR102034844B1	2019-10-21	SD Biotechnology Co., Ltd.	Anti-inflammation	Yes

Title	Publication Number	Publication Date	Owner	Health Focus	Traditional herbal medicine
Lactobacillus acidophilus capable of improving intestinal flora and regulating immunity, and application of lactobacillus acidophilus	CN110396487A	2019-11-01	Beijing Ketuo Hengtong Biotechnology Co., Ltd.		No
Anti-inflammatory composition containing medicinal herbs	KR1020190124674A	2019-11-05	Misak Bio Co., Ltd.	Anti-inflammation	Yes
Wolfberry radix astragali tea	CN110447741A	2019-11-15	Gansu Mingui Traditional Chinese Medicine Technology Co., Ltd.	General immunity	Yes
Lactobacillus plantarum and application thereof	CN110484459A	2019-11-22	Nobak (Wuhan) Biological Technology Co., Ltd.	Anti-inflammation	No
Application of Fulonggan in preparing medicine or health product for preventing and treating immune complex diseases	CN110507667A	2019-11-29	Southeast University	General immunity	Yes
Tea formula for reducing dampness and study thereof on preparation method	CN110522863A	2019-12-03	Suizhou Wansongtang Kanghui Health Products Co., Ltd.	General immunity	Yes
A composition having anti-bacterial activity comprising Selaginella tamariscina extracts, fractions thereof or compounds isolated therefrom as an active ingredient	KR1020190135448A	2019-12-06	Gangneung-Wonju University Industry-Academic Cooperation Foundation	General immunity	Yes
Health-care food capable of tonifying spleen and consolidating body resistance	CN110574918A	2019-12-17	Meng Lingtao	General immunity	Yes
Tea for preventing haze and removing heat from lung to relieve cough and preparation method of tea	CN110583826A	2019-12-20	Institute of Agricultural Products Processing, Chinese Academy of Agricultural Sciences	Respiratory non-viral (e.g. asthma / pollution)	Yes

Title	Publication Number	Publication Date	Owner	Health Focus	Traditional herbal medicine
Pharmaceutical Composition For Use In Preventing Or Treating Inflammatory Skin Disorders Comprising GHKWKYMVM	KR1020200008493A	2020-01-28	Pusan National University Industry-University Cooperation Foundation	Anti-inflammation	No
Dietary supplement for lowering blood sugar, increasing immunity, and increasing cardiac function and increasing physical stamina	US20200100535A1	2020-04-02	HSIA, MS.I-SZU	General immunity	Yes

7.THE EXTRA STUFF

7.1.Searching and Refinement Process

The search and refinement process was carried out in the following steps:

- Preparation of search criteria including key words and International Patent Classifications (IPCs) to target subject matter of interest, testing and refining to ensure relevant subject matter found. Searching using Boolean search criteria within PatSnap software accessing over 130 million published patents globally, to develop an initial raw dataset of patent families. The search and the results of this report captures new patents published between 8 February 2019 to 25 April 2020, and with a priority date after 18 August 2017.
- From a total of about 1000 raw search results, we filtered these down to 227 patent families we deemed relevant to this Immune Health HVN platform.
- We then further classified each “relevant” patent by the health target(s), type of active(s), relevance to HVN interest foods, and as traditional herbal medicine based or Western based patents. Each relevant patent was then classed as Bull's Eye, Halo or Background as previously defined in section 1.3. The list of all relevant patents and links to the full text are provided in Sections 4-6.

7.2. Author of this Report

This updated report was prepared by Dr. Peter Brown, Director of IPSynergy (www.IPSynergy.co.nz). Peter is a registered patent attorney in NZ and Australia, holds a PhD in protein biochemistry and has substantial commercial experience dealing with food science, innovation and IP strategies. If you have any questions regarding this report, please feel free to contact Peter (peter.brown@ipsynergy.co.nz).