



# Whey: Future Directions

Patrick Mannion  
Innova Market Insights  
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WHEY<sup>+</sup>VOLUTION<sup>+</sup>

# Today's presentation

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§ Part I: the market

§ Part II: science

§ Part III: processing

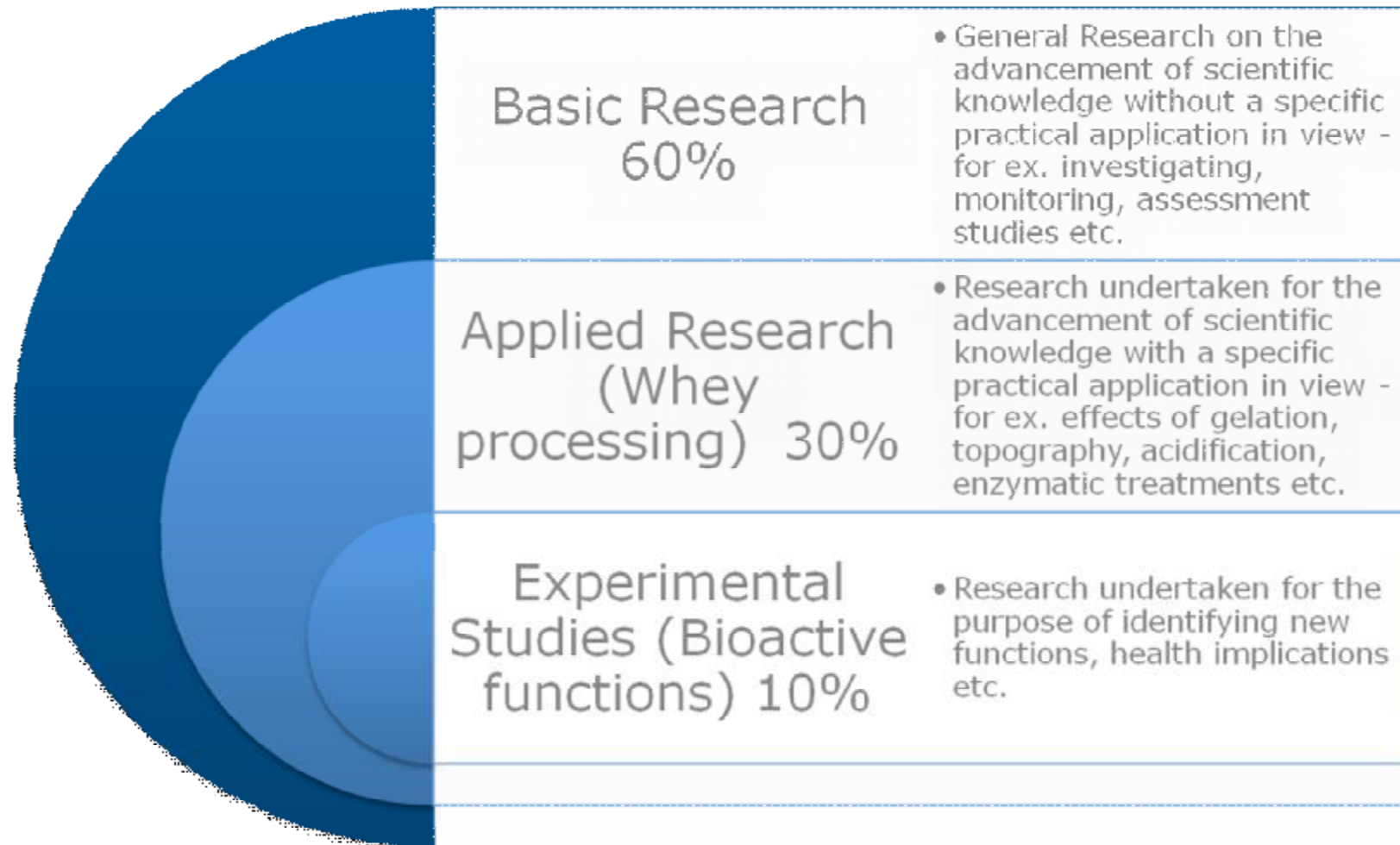
§ Part IV: claims

§ Part V: products

# Part I: the market

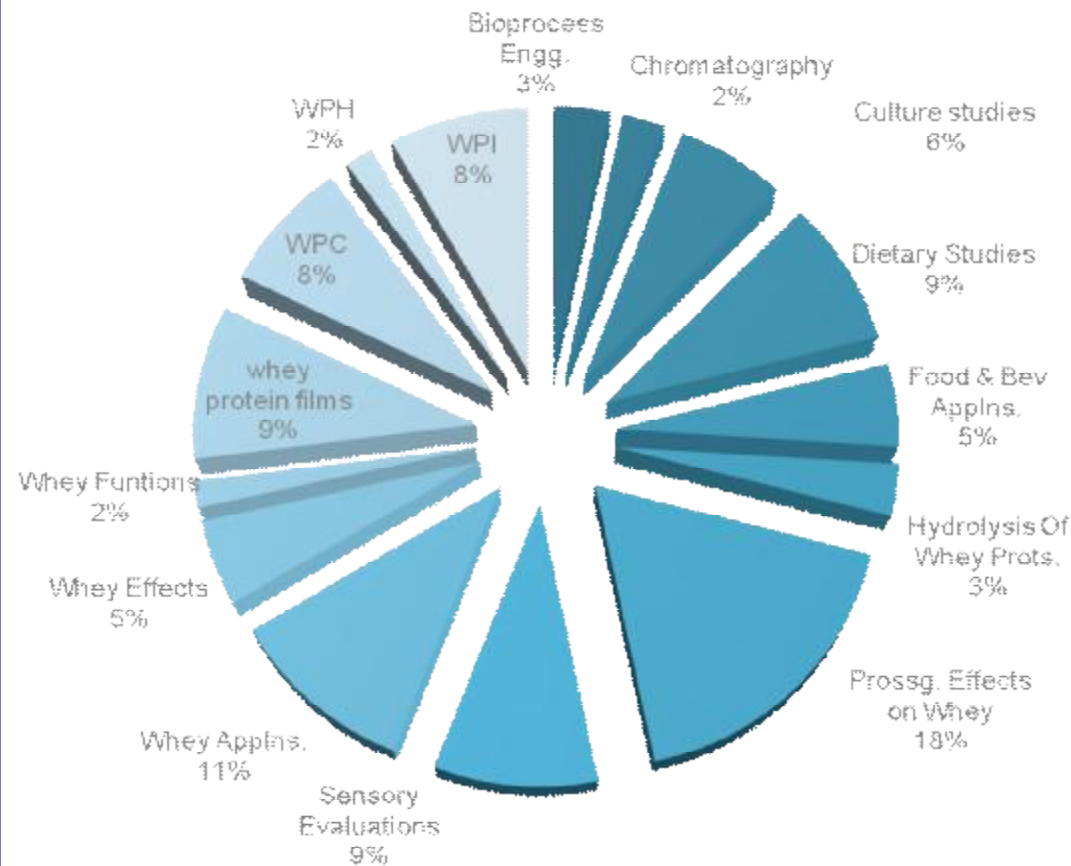
# Part II: science

## R & D Focus on Whey





# Published Research Areas on Whey



\*Source: Science Eye (The Innova Database)

## Whey and targeted nutrition:

Top areas of research in 350 journals reviewed 1995-July 2008 (Science Eye)



## Top Areas of Whey Research

- Application of whey in food (snacks, candies and meat analogs)
- Fractionation and separation
- Role of whey protein in human health
- Whey applications in films, coatings, and gels
- Whey emulsions and stability in acidic environments

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# Published Whey Processing Techniques

Processing Technique	Processing Technique	Processing Technique
Acidic Cold Set Gelation	FPLC	Raman scattering spectroscopy
Adsorption Dynamics	FT-Raman spectroscopy and rheology	Response Surface Methodology
Animal Feed	High Hydrostatic Pressure	Size Exclusion Chromatography
Anion Exchange Chromatography	High Pressure Thermal Denaturation Kinetics	Solvent partition
Anion-Exchange Membranes	High-Capacity Superparamagnetic Ion-Exchangers	Spray Drying
Anti-LF Antibody Immunoaffinity Chromatography	High-Performance Size Exclusion Chromatography	Static Headspace Gas Chromatography
Atomic Force Microscopy	High-Pressure Homogenization	Stirring and Seeding
Bipolar Membrane Electroacidification	HPLC	Submerged Membrane Bioreactor
Calorimetry	HPLC/ESI-MS	Submerged Ultrafiltration Hollow Fibre Membrane Bioreactor Treating
Cation-Exchange Chromatography	Hydrolysis Of Whey Proteins	Sulfonation
Chromatography	Ion Exchange Chromatography	Thermal Denaturation
Combined Enzymatic Proteolysis And High Pressure	Kefir-yeast technology	Thermal Pretreatment
Confocal Laser Scanning Microscopy	Lactoperoxidase system	Thermocalcic Aggregation
Cryoconcentration	Length heterogeneity-PCR	Tribomechanical Micronization
Crystallization Kinetics	Multi-Angle Laser Light Scattering and Size-Exclusion Chromatography	Tribomechanical Treatment
Desalting And Debittering	Multivariate near-infrared and Raman spectroscopic	Ultrafiltration
Dielectric Heating	Nanofiltration	Ultrahigh Pressure-Treated
Dynamic High-Pressure Treatment	NMR PGSTE diffusion	Ultrasound Treatment
Electroacidification with Bipolar Membranes	Optical sensor technology	Ultraviolet Radiation
Encapsulation	Peptic And Tryptic Hydrolysis	X-ray diffraction analysis
Enzymatic crosslinking and membrane sepn. tech.	Ph Controlled Foam Fractionation	Source: Science Eye (The Innova Database)
Enzymatic Hydrolysis	Plasma Mass Spectrometry	
Enzyme Immunoassay	Plasticiser Crystallisation	
Fluidized-Bed System	Polyelectrolyte Screening Effects	

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# Research: Bioactive Whey Fractions

Area	Research Institute
Antioxidant	Desarrollo, (Mexico), Jokioinen, (Finland), Mississippi (USA), Univ of Alberta, (Canada), Univ of Kentucky Lexington, (USA), Victoria Univ, (Australia)
Antiviral/Microbial	Süleyman Demirel Univ, (Turkey), Instituto del Frío, (Spain), Univ. of California, (USA), BioResearch Ireland, (Ireland)
Bone health	Massey Univ, (New Zealand), Univ of Copenhagen, (Denmark)
Cancer support	Univ of Arkansas for Med Sci, (USA)
Cognitive	Univ of Maastricht, (Netherlands)
Dental	Univ of Wales Institute, Cardiff (UK)
Diabetes	Malmö, (Sweden) (AHF)
Gut health	CRNH, (France), Ghent Univ, (Belgium), Norwegian Univ of Life Sciences, (Norway)
HIV/Aids	Mainz Univ Hospital, (Germany)
Infant Nutrition	Univ of Toronto, (Canada), Nestlé Suisse SA, (Switzerland), Helsinki, (Finland), New Orleans, (USA), Univ of Milan, (Italy), Malmö, (Sweden),
Sports recovery	Univ of Saskatchewan, (Canada), Southern California (USA), Laurentian Univ, (Canada), Univ of Campinas, (Brazil), Universal College of Learning, (New Zealand), Victoria Univ, (Australia)
Weight mgt/Satiety	Univ of Surrey, (UK), CSIRO, (Australia), Institute of Biomedicine, (Finland), Maastricht Univ, (The Netherlands), Univ of Adelaide, (Australia)

Source: review of selected science papers



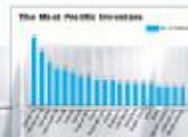
- Innova Market Insights highlighted the key trends in food and beverages at IFT 2008 with 27 presentations.

- Presentations included a study analysis of patent activity in whey and its bioactives.

**taste**the**trend**

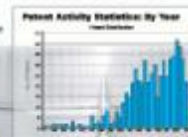
## Patent Activity in Whey

Biactives provide solutions to real consumer needs in application areas across sports nutrition, weight management, immune support, bone health, and general wellness.

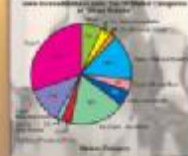


### Increase in Whey Activity

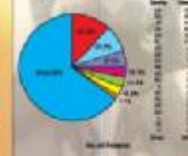
Patient living for 5 years and longer has increased to the last 10 years and almost doubled in the last five years. Research for 'why' and 'how' components resulted in 103 patients on US and European Worldwide cancer databases. 100 blood patients and 218 family bloodlines identified. The future will show how many will benefit as well as commercial results for their respective companies. All copyright will be shared in the patent and 'know how' as well as our own methods.



Top Ten Market Categories for "Volley Prostate"



Top 7 Countries

[illegible]

Team Growth,  
Development &  
Success

<p><b>Maintenance</b></p> <p>Agmatine decarboxylase contains a high amount of essential amino acids and is a highly efficient protein essential for growth, development and maintenance of all types of tissues.</p> <p>Agmatine decarboxylase is therefore a universal independent input formula.</p> <p>A purified agmatine decarboxylase independent has the highest level of bioactivity.</p>	<p>They produce have been applied in the sports medicine arena and is powerful in the power of transpiration, the agmatine level in muscle strength and function. Most ways proteins contain higher concentrations of amino acids compared to other protein sources. Cysteine is a key role in the synthesis of glutathione. Glutathione regulation proteins has protein metabolism.</p>
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in association with IFT

### Author's note

<p>Lactidol and lactonolactone inhibit a choline receptor</p> <p>Neurotransmitters including gamma-aminobutyric acid, gamma-aminobutyric acid, glutamate, and glycine are neurotransmitters. Lactidolactone has significant anxiolytic activity against human</p> <p>Neurotransmitters including gamma-aminobutyric acid, glutamate, and glycine are neurotransmitters. Lactidolactone has significant anxiolytic activity against human</p>	<p>Neurotransmitters including gamma-aminobutyric acid, glutamate, and glycine are neurotransmitters. Lactidolactone has significant anxiolytic activity against human</p> <p>Neurotransmitters including gamma-aminobutyric acid, glutamate, and glycine are neurotransmitters. Lactidolactone has significant anxiolytic activity against human</p>
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### Tackling Hypertension

<p>component in one of the major risk factors for cardiovascular disease and stroke, ACE is a multifunctional enzyme that plays an important role in blood pressure regulation and in lung hypertension.</p> <p>Products with patented ingredients—Enkeas, CTE, Pecton, Bacton, and Ceph, Ceph G-100, B-V, all claim 5 patents on ACE-inhibiting peptides.</p>	<p>Lactogenin is the patented ingredient that actively immunomodulates. The ingredient stimulates the production of human lymphocytes and the phagocytic activities of macrophages. It stimulates antibody synthesis and activates macrophages.</p> <p>It humanizes. Lactogen enhances human immunity in the gastrointestinal tract.</p>
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### Introduction

Lactagogen is the patented ingredient that controls immune-modulation. The ingredient stimulates the proliferation of natural lymphocytes and the phagocytic activities of macrophages. It stimulates antibody synthesis and activates T-lymphocytes. In humans, Lactagogen enhances humoral immunity of the gastrointestinal tract.



**Top Suppliers of Whey Ingredients**

[illegible]

Principal Research Areas in Wey Campgrounds			
Location	Active Campgrounds	Parking	Active Campgrounds

[illegible]

[www.innovadatabase.com](http://www.innovadatabase.com)

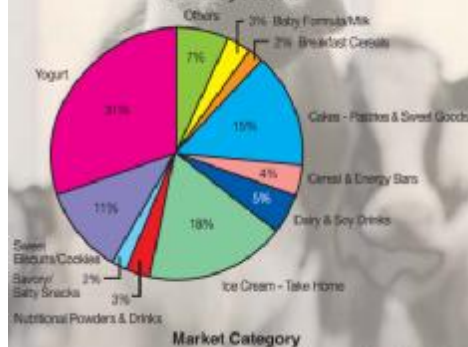
Download this file: <http://www.innovadatabase.com/login/IFTCustomer.rails>

User name: wheyvolution

Pw: whey08

## Top Ten Market Categories for "Whey Protein"

www.innovadatabase.com: Top 10 Market Categories of "Whey Protein"



The study included a Search for 'Whey' and its components resulting in 833 patents on US and European/Worldwide patent databases. 622 root patents and 211 family patents are identified. Highlights of the study include:

- **Top Areas of Research (by US Area Codes)** - 426/583 (Food or Edible Material)

- **Top Areas of Research (by IPC Codes)** - A23L1/305 (Human Necessities: Food or Food Stuffs)

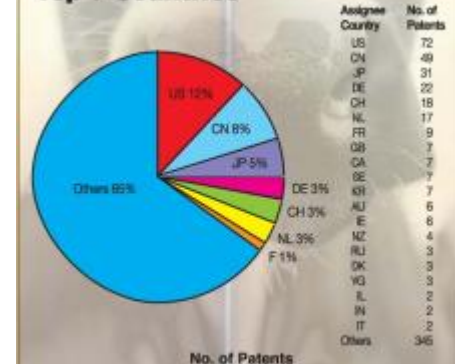
- **The Most Prolific Inventor** - KUWATA TAM (Japan) with 19 Patents

- **Highest no. of Patents issued in the year** - 2004 (42 Patents)

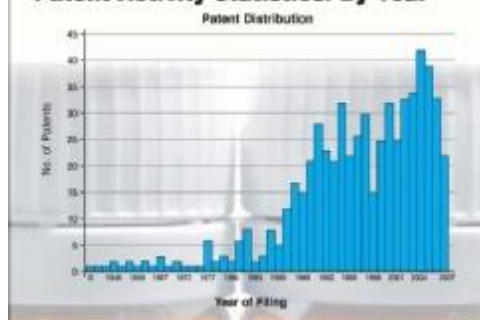
- **Top Country** - US (72 Patents followed by China with 49)

- **Top Assignee** - Snow Brand Milk Products Co. Ltd with 46 Patents followed by Meiji Milk Products (36)

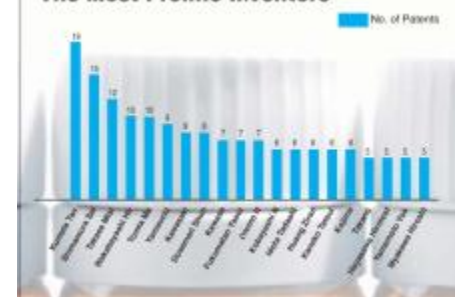
## Top 7 Countries



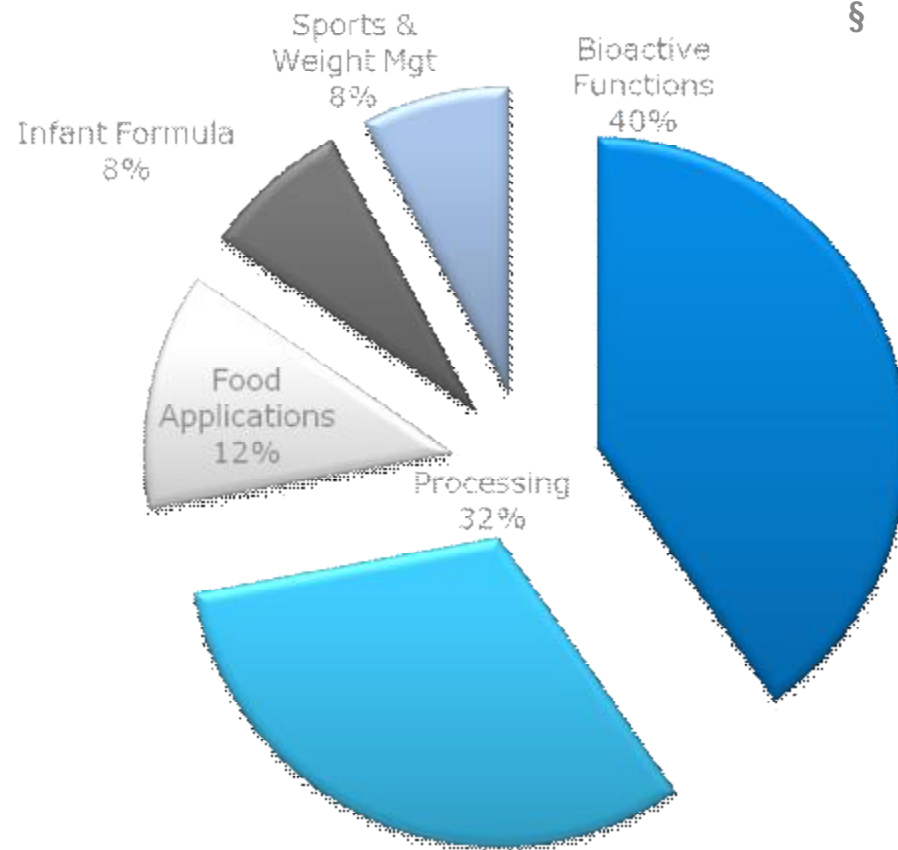
## Patent Activity Statistics: By Year



## The Most Prolific Inventors



# Whey Patents 2006-2007



Source: review of patents issued between 2006-2007

§ It's interesting to note that the top companies spent their R&D funds on researching **bioactive properties of whey compounds**.

- Companies like **Abbott** spent on infant formulas,
- **DSM Ip Assets Bv** spent on whey's bioactive functions and Processing equally;
- **Galactogen Products Ltd** worked on sports bars,
- **Kraft Foods Inc** researched on whey processing and food applications;
- **Meiji Milk Prod Co Ltd** worked on bioactive functions of whey;
- **Nestlé's** R&D spent on infant formulas, whey processing and bioactive functions of whey.
- **Chinese Pharma** companies spent their R&D funds mainly on researching bioactive functions of whey.



## Some leading companies – whey research

Company	Country
Alpavit Hofmeister GmbH & Co Kg	Germany
Arla Foods Ingredients	Denmark
Armor Proteines S.A.S	France
Biolac GmbH	Germany
Bmi	Germany
Bonilait Proteines	France
Carbery Food Ingredients	Ireland
Dairy Crest Ingredients	UK
Dairygold Cooperative	Ireland
Dmv International	The Netherlands
Euroserum	France
First Milk Limited	UK
Friesland Foods Domo	The Netherlands
Glanbia Ingredients	Ireland
Kerry Ingredients	Ireland
Lactalis Industrie	France
Lactoserum France	France
Meggle GmbH	Germany
Milei GmbH	Germany
Nordmilch Ag	Germany
Sachsenmilch Ag	Germany
Valio	Finland
Volac International	UK

Popular Whey Compounds	Company
LACPRODAN®OPN-10	Arla Food Ingredients
XP-828L Dermylex™	Advitech Inc
IMUPlus	Biogene
C12 Pepton	Campina B.V.
Alpha-lactalbumin	Davisco
BioZate	Davisco
C12 peptide	DMV International's
Praventin	DMV International's
PeptoPro®	DSM
NZMP-branded whey	Fonterra
Bioferrin®	Glanbia Nutritionals
Prolibra®,	Glanbia Nutritionals
Immunocal	Immunotec Res Corp Ltd
Lactium®	Ingredia
Calpis	Japan
αs1-casein f23-34; Casein DP	Kanebo, Ltd, Japan
VAAM	Meiji Dairies Corp
Milcin®	Milcin Therapeutics Llc
PEPTAMEN AF	Nestle SA
Endurox	Pacifichealth Lab Inc
Bovine lactoferrin	Sigma Company
MBP®	Snow Brand Milk Prods
L V and IV di-peptides	Unilever
Evolus	Valio Ltd, Finland

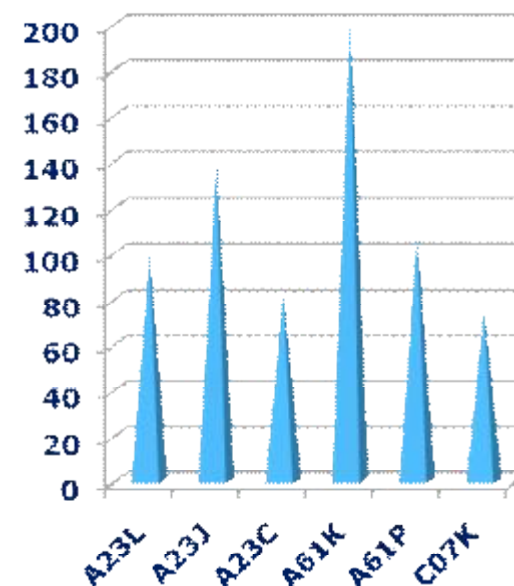
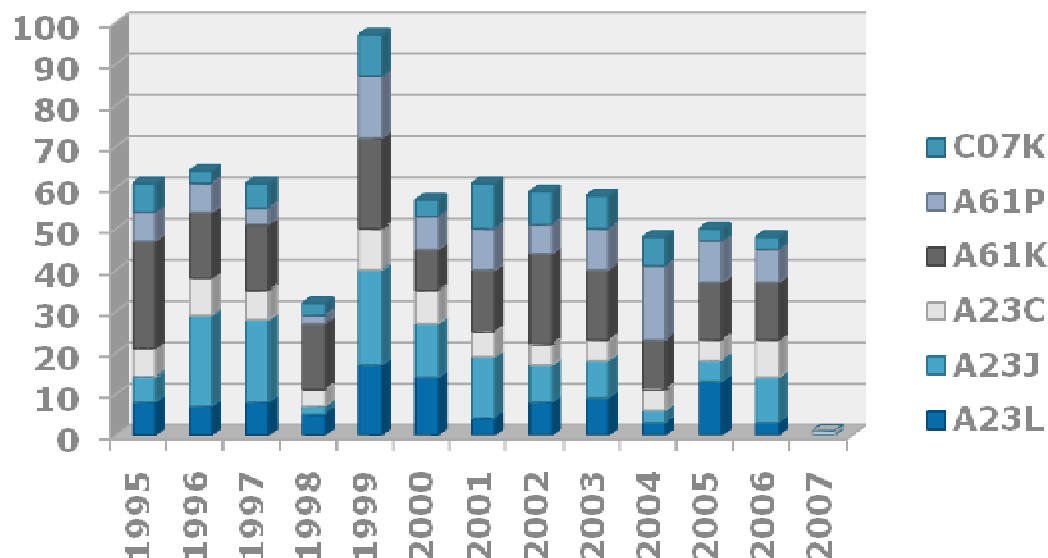
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Source: review of patents



# IPC Code Frequencies and Launches By Code

IPC code frequencies since 1995



## No. of Patents launched by IPC codes (1995 to 2007)

- § [A23J](#) comes under "Foods Or Foodstuffs; Their Treatment".
  - A23J code entirely deals with Protein Compositions for food stuffs.
- § [A61K](#) belongs to 'Preparations For Medical, Dental, Or Toilet Purposes'.
  - sub group [A61K38](#): 'Medicinal preparations containing peptides'. 116 patents were tracked under this Medicinal Peptides class.
- § [A61P](#) 'Therapeutic Activity Of Chemical Compounds Or Medicinal Preparations; Antinfectives'. Innova Market Insights tracked 106 patents under this sub-class.
- § [C07K](#) deals with the Peptides class. 73 patents were tracked in the Peptides class.

# Selected Patent Activity on Health Benefits of Whey

## Patent activity on Whey and Cardiovascular Health

Title	Owner	Patent Number
Bioactive Whey Protein Hydrolysate	New Zealand Dairy Board (Nz)	<a href="#">US20040086958</a>
<b>Blood Pressure Lowering</b> Peptides From Glycomacropeptide	DSM Ip Assets B.V.	<a href="#">EP1851323</a>
Composition For <b>Reducing Cholesterol</b>	Meiji Dairies Corp	<a href="#">JP6165655</a>
Method Of Producing Bioactive Peptide For <b>Anti High Blood Pressure</b> By Using Protease Of Switzerland Lactobacillus To Hydrolyze Lactoprotein	Nanjing Agriculture Univ(Cn)	<a href="#">CN101003828</a>
Compositions And Methods For <b>Enhancing Vasodilation</b>	Glanbia Nutritionals (Ireland) Limited	WO 2007/109681
Blood Pressure Lowering Protein Hydrolysates	DSM Ip Assets B.V.	WO 2006/114441
<b>Blood Pressure Lowering</b> Peptides From Glycomacropeptide	DSM Ip Assets B.V.	WO 2006/089921
Method Of Preparing A Food Ingredient And Food Product Having <b>Angiotensin-I-Converting Enzyme Inhibiting Properties</b> And Products Thus Obtained	Campina B.V. (ZaltbommelNL)	WO 2005/096847
Use Of Casein Peptides For <b>Treating Hypertension</b>	Ingredia	WO 2004/002509

## Patent activity on Whey and Immune Health

Enhanced Large Scale Cultivation Of Bordetella Pertussis Cells For <b>Vaccine Production</b> Using Lactoglobulin	American Cyanamid Company(Stamford,Ct,Us)	<a href="#">US4699786</a>
<b>Immune Specific Lactoserum</b> Against Helicobacter Pylori And Method Of Its Preparing	Itut Ehpideologii I Mikrobio	<a href="#">RU2201256</a>
<b>Immunopotentiator</b> Derived From Whey Protein Concentrate	Riyoushiyoku Kenkyukai	<a href="#">JP9012474</a>
Undenatured Whey Protein Concentrate To Improve Active Systemic Humoral <b>Immune Response</b>	Immunotec Res Corp Ltd (Ca)	<a href="#">US5230902</a>

# Selected Patent Activity on Health Benefits of Whey

## Patent activity on Whey and Anti-viral/Anti-microbial Properties

<b>Antibacterial</b> agent and treatment of article therewith	MORINAGA & CO	<a href="#">WO9314640</a>
<b>Anti-Inflammatory</b> Factor, Method Of Isolation, And Use	Stolle Milk Biologics, Inc.	WO 1999/004805
<b>Antimicrobial</b> Peptides	The University Of Melbourne	WO 1999/026971
Casein-Derived <b>Antimicrobial</b> Peptides And Lactobacillus Strains That Produce Them	Teagasc	WO 2007/057872
<b>Infection Protectant</b>	Snow Brand Milk Products Co. Ltd.	<a href="#">US5344820</a>

## Patent activity on Whey and Anti-cancer

<b>Anti-Cancer</b> Therapeutic Compositions For Prophylaxis Or For Treatment Of Chemically Induced Cancer	Immunotec Res Corp Ltd (Ca)	<a href="#">CA2090377</a>
Methods Of Immune Or Haematological Enhancement, <b>Inhibiting Tumour Formation</b> Or Growth, And Treating Or <b>Preventing Cancer</b>	Fonterra	WO 2006/054908

## Patent activity on Weight Management

Nutritional Intervention Composition For <b>Enhancing And Extending Satiety</b>	Pacifichealth Lab Inc	<a href="#">US20020019334</a>
<b>Satiety Inducing</b> Composition.	Unilever Plc	<a href="#">MXPA04012394</a>
<b>Low-Fat</b> Cereal-Grain Food Composition	The Pillsbury Company	<a href="#">US5262187</a>
Using Protein Fraction From Whey For, E.G. To <b>Promote Slimming</b> , Comprises Beta-Lactoglobulin And Alpha-Lactalbumin At Specified Ratio	Cie Laitiere Europ Soc En Comm(Fr)	<a href="#">FR2889067</a>
Compositions And Methods For <b>Treatment Of Body Weight Conditions</b> With Milk Minerals And Casein Fractions	Glanbia Nutritionals (Ireland) Limited	WO 2003/074129

# Selected Patent Activity on Health Benefits of Whey

## Patent activity on Whey and Infant Nutrition

Composition Comprising Casein Protein And Whey Protein For Addressing Malnutrition	Nestle Sa	<a href="#">NZ517994</a>
Enriched Infant Formulas	Abbott Lab(North Chicago,Il,Us)	<a href="#">US20080057178</a>
Infant Formula Compositions Comprising Increased Amounts Of Alpha-Lactalbumin	Wyeth Corp	<a href="#">US6913778</a>
Methods For To Infants Reducing Adverse Effects Of Feeding Formula	Wyeth Corp(Madison,Nj,Us)	<a href="#">US20050142249</a>
Prod. Of Food Protein Of High Biological Value - With High Tryptophan And Cystine Content By Enzymatic Hydrolysis Of Whey Protein	Heine Willi Prof Dr Med Habil (De)	<a href="#">DE4130284</a>
Reducing Beta.-Lactoglobulin Content In Whey Protein Concentrates For Infant Formula Use	Canadian Dairy Commission Comm	<a href="#">CA1243887</a>
Sterilized Milk Product For Infant Nutrition From Birthday To Five Months	Edovatel Skij Inst Detskogo Pi	<a href="#">RU2189753</a>

## Patent activity on Whey and Sports Nutrition

Endurance Bar	Galactogen Products Ltd(Gb)	<a href="#">WO2006054105</a>
Sustained Improver Of Muscular Fatigue	Kyowa Hakko Kogyo Co., Ltd.	<a href="#">US20060127492</a>
Lactalbumin And Lactoglobulin Free Drink	Beatrice Foods Co.	<a href="#">US3397992</a>

## Patent activity on Whey and Diabetes

A Substantially Insulin-Free Protein Composition, Preparation And Use Thereof, And Products Containing Same And Preparation Thereof	Syvaeoja Eeva Liisa(Fi)	<a href="#">WO9848640</a>
Use Of A Milk Protein Hydrolysate In The Treatment Of Diabetes	Darimont Nicolau Christian(Ch)	<a href="#">WO0137850</a>
Antidiabetogenic Calcium-Peptide Composition	Humana Gmbh(De)	<a href="#">WO2008055801</a>



# Selected Patent Activity on Health Benefits of Whey

## Patent activity on Whey, Bone & Dental Health

Nutritive Composition For Promoting <b>Absorption Of Calcium</b>	Snow Brand Milk Products Co. Ltd.	<a href="#">JP11046720</a>
Use Of Osteopontin In <b>Dental Formulations</b>	Arla Foods Amba	WO 2005/053628
<b>Fluoride</b> Dentifrices Of Enhanced Efficacy	Colgate-Palmolive Company	<a href="#">WO9915142</a>
Food And Medicine Having <b>Osteogenesis Promotive</b> And <b>Bone Resorption</b> Preventive Effects	Snow Brand Milk Products Co. Ltd.	<a href="#">JP2303457</a>
Milk Protein Hydrolysate For <b>Addressing A Bone Or Dental Disorder</b>	Nestle Sa	<a href="#">ZA200107831</a>

## Patent activity on Whey and Cosmetic/Topical

Aseptic <b>Cream Substitute</b>	Cp Kelco, U.S., Inc. (Wilmington, De, Us)	<a href="#">US20030087001</a>
Cosmetic Composition For <b>Holding The Hairstyle</b> , Containing A Milk Protein And/Or Milk Protein Hydrolysate And A Keratin Hydrolysate	Loreal(Paris Fr)	<a href="#">US5679329</a>
Emulsified <b>Cosmetic</b>	Kose Corp	<a href="#">JP5070323</a>
<b>Skin Cosmetic</b> Containing Whey (Lactoskin) Comprising Specific Component	Hasegawa Yoshito	<a href="#">JP9030928</a>
Glycoprotein And/Or Glycomacropeptide Containing Preparations For <b>Medical Uses</b>	Milcin Therapeutics Llc(Us)	<a href="#">WO2005037248</a>

## Patent activity on Whey and Digestive Health

Method Of Preparing Cow Anti-Coli-Proteus <b>Lactoglobulin</b> For Oral Use	Rostovskij Nii Epidemiologii(Su)	<a href="#">SU1743025</a>
Method For Production Of A <b>Kappa-Casein Glycomacropeptide</b> And Use Of A Kappa-Casein Glycomacropeptide	Novonordisk As(Dk)	<a href="#">WO9415952</a>
Method For Production Of Hydrolyzed Protein Products For <b>Dietary And Therapeutic Nutrition</b>	Inst Of Technical Thermal Phys (Ua)	<a href="#">UA23283U</a>

## Patent activity on Whey and Enteral Nutrition

<b>Enteral Feeding</b> Product "Nutrient Elemental"	Kompanija Nutritek Zao Kompani(Ru)	<a href="#">RU2316220</a>
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## Patent activity on Whey and Mood Relaxation

Fresh Dairy Products With <b>Satiatogenic</b> Power And Methods For Preparing Same	Compagnie Gervais Danone	WO/2006/134159
Nutritional Supplement To Alleviate Symptoms Associated <b>With Stress And Reduced Levels Of Serotonin</b>	Advanced Functional Foods International, Inc.	WO/2002/064090

# Interesting Whey Research

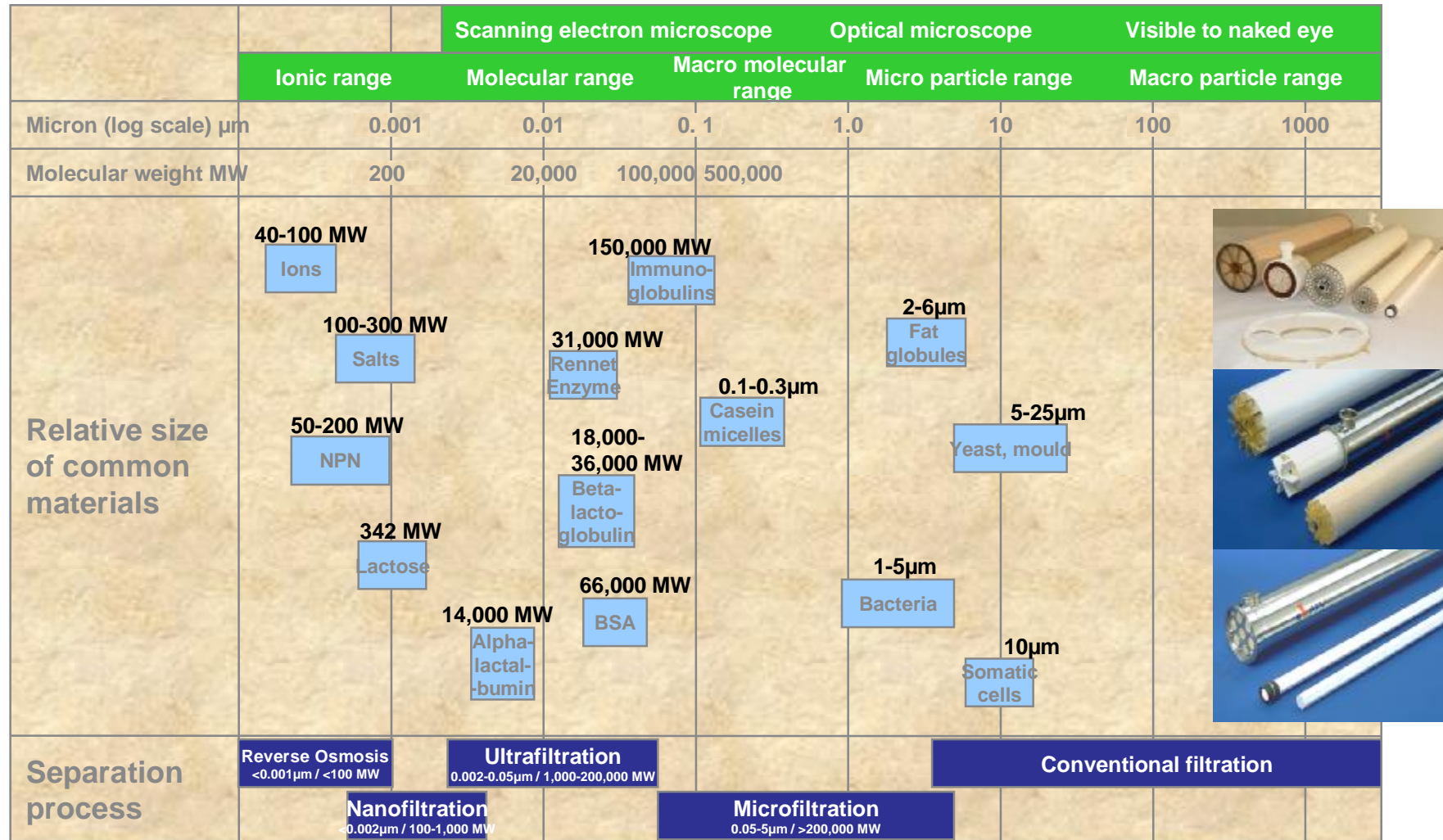
- § Effect of carbohydrates on the emulsifying, foaming and freezing properties of whey protein suspensions
  - *This property may be useful in introducing more starch and whey protein combinations.*
- § Influence of whey protein concentrate on the rheological characteristics of dough, microstructure and quality of unleavened flat bread (parotta)
  - *The finding is useful in preparing ready-to-eat flat breads.*
- § Sensory Properties of Meal Replacement Bars and Beverages Made from Whey and Soy Proteins
  - *New possibilities for bars and beverages with whey proteins.*
- § An open-label dose-response study of lymphocyte glutathione levels in healthy men and women receiving pressurized whey protein isolate supplements
  - *The study suggests whey supplements can increase the antioxidant capacity in healthy people.*
- § Use of whey proteins for encapsulation and controlled delivery applications
  - *WPC can act as an effective bioactive carrier in controlled delivery applications.*
- § Mouthfeel and flavour of fermented whey with added hydrocolloids
  - *It is consistent with a reduced concentration of key volatile compounds.*
- § Efficacy Of Sour Whey As A Shelf-Life Enhancer: Use In Antioxidative Edible Coatings Of Cut Vegetables And Fruit
  - *SWP may be highly useful in ready-to-eat salads and other cut vegetable products.*





# Part III: processing

# The Filtration Spectrum: Milk & Whey Components





# Processing Machinery Supplier Innovations

- **GEA** has been keen to address the rising costs of production and is offering new solutions to lower costs through its Niro and Westfalia companies. Niro has developed a new process for drying of Whey Permeate - The TIXOTHERM Process. Westfalia Separator's HyVOL PROPLUS brands offer substantially increased protein yield and significant cost savings.

**GEA Filtration** has developed a new simple unit for microparticulation of whey proteins. The unit, named MICRO FORMULA™, now makes it possible to utilize the bi-product, whey, to increase product yield and replace fat.

- **Alfa Laval Foodec** has developed decanter centrifuges that have the advantage of a complete range of features – such as the range of Foodec conveyors – that make them suitable for removing the whey from both casein and lactose.

- **Tetra Pak's** Tetra Therm MicroPart module uses diluted WPC-powder, or WPC-retentate produced in an ultra-filtration module, to produce microparticulated whey protein.

- **Anhydro** has developed a continuous process for highly efficient processing of both whey and permeate into valuable products. This patented process is known as the "SCW-" or "SCP-" process, which stands for Super Concentrated Whey and Super Concentrated Permeate

Others: Tetra Pak CPS, C.E. Rogers, Marriott Walker, Filtration Engineering, Keller

The GEA logo consists of the letters 'GEA' in a bold, sans-serif font. A stylized, curved line passes through the letter 'E', suggesting a globe or a dynamic element.The Alfa Laval logo features the words 'ALFA' and 'LAVAL' stacked vertically. The letters are stylized with a blue and red color scheme. Above the text, there are two curved lines that resemble a stylized 'A' or a bridge.The Tetra Pak logo features a stylized blue triangle icon to the left of the words 'Tetra Pak' in a bold, sans-serif font.The anhydro logo features the word 'anhydro' in a bold, lowercase, sans-serif font.

# Some Recent Ingredient Supplier Developments

- § **Arla:** Arla Foods Ingredients is delivering osteopontin (OPN) to infant formula formulations. OPN could deliver similar immune protection to human milk.



- § **Armor Proteines:** Armor Protéines offers Lactosalt Optitaste, a mineral blend mainly obtained from milk cracking processes to lower salt in products.



- § **Carbery:** Carbery is launching a new advanced whey protein isolate for beverage applications called Optipep.



- § **DMV:** DMV International's Textrion Progel 800, a WPC 80 has superb water binding properties which make it suitable for texturising in yoghurts, desserts, processed cheeses, meat and bakery applications.



# Some Recent Ingredient Supplier Developments

**Glanbia:** Glanbia's Solmiko range of milk protein concentrate (MPC) and milk protein isolate (MPI) are an excellent source of native casein and whey proteins in the same ratio as found naturally in milk.



**Hilmar:** Hilmar's whey protein isolate, Hilmar 9410 Instantized WPI, is ideally suited for foods and drinks wanting a positive nutrition advantage.



**Kerry:** Kerry's Ultranor Beta is highly digestible and possesses specific and potentially very significant physiological properties. Ultranor LV3 is specifically designed for clinical nutrition applications.



**Volac's ProCrisp** is a new form of delivering whey protein specially developed for use in nutritional snacks and bars where it combines a high protein content with a lighter, crisper and crunchier texture.



**Fonterra** offers a range of dairy protein crisps with up to 80 per cent protein content ideal ingredient for sports performance, weight management and general nutrition applications.



# Part III: claims

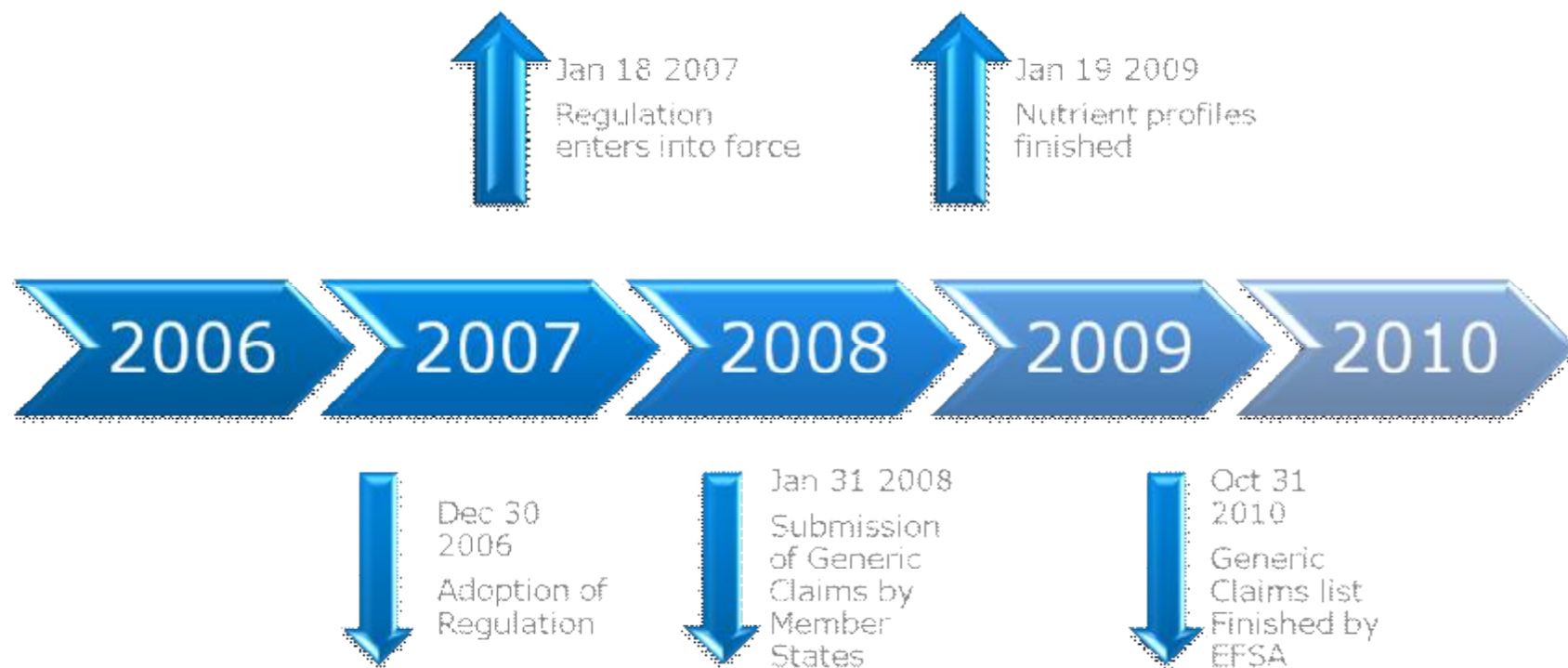


# Where are we going with claims?

- \$ The tough regulatory environment is hampering the creation of truly innovative functional foods.
- \$ Look at a range of products tracked in November 1995.
- \$ Claims being made relate to 'live active cultures', 'dietary fibre', 'trans fat free' and even 'omega 3 which may maintain a healthy heart'
- \$ Have we really moved that far forward in terms of what we are writing on our packaging?



# EU Health Claims Regulation Timeline



# Health Claims Update

## European Regulation on nutrition and health claims

- § The European Food Safety Authority (EFSA) will examine over 2,800 existing claims on food and beverage products.

### General conditions:

- § Claim has to be substantiated with generally accepted scientific data which demonstrate the beneficial physiological effect as claimed.
- § Ingredient should be present in an adequate form and amount.
- § Should be understandable for the average consumer.
- § Should fit within certain 'nutrient profiles' to be established by the EC with input from EFSA.
- § Nutrient profiles avoid health claims on foods with a high content of saturated fat, salt or sugars.



# Health Claims Update

Two types of claims are defined nutrition claims and health claims:

- § A **nutrition claim** is defined as any claim, which states, suggests or implies that a food has particular beneficial nutritional properties due to its composition.
- § A **health claim** means any claim that states, suggests or implies that a relationship exists between a food category, a food or one of its constituents and health.
- § There are three types of health claims:
  - § Article 13.1 of the Regulation describes **generic claims based on generally accepted science**.
  - § In Article 13.5, the second type of health claim is **based on newly developed science or proprietary data**.
  - § Article 14 describes **disease risk reduction claims and claims aimed at children**.





# Health Claims Update

- § 228 new product claims have thus far been submitted to EFSA under Article 14.
- § Only one of the first eight preliminary assessments was given a partial nod.
- § The Authority disputed that dairy products promote good teeth and healthy body weight in children.
- § One Unilever product, where plant sterols were used for lowering blood cholesterol, received a partial nod from EFSA.
- § It is clear that high standards are being set and very strong dossiers being demanded to meet EFSA's intense scrutiny.





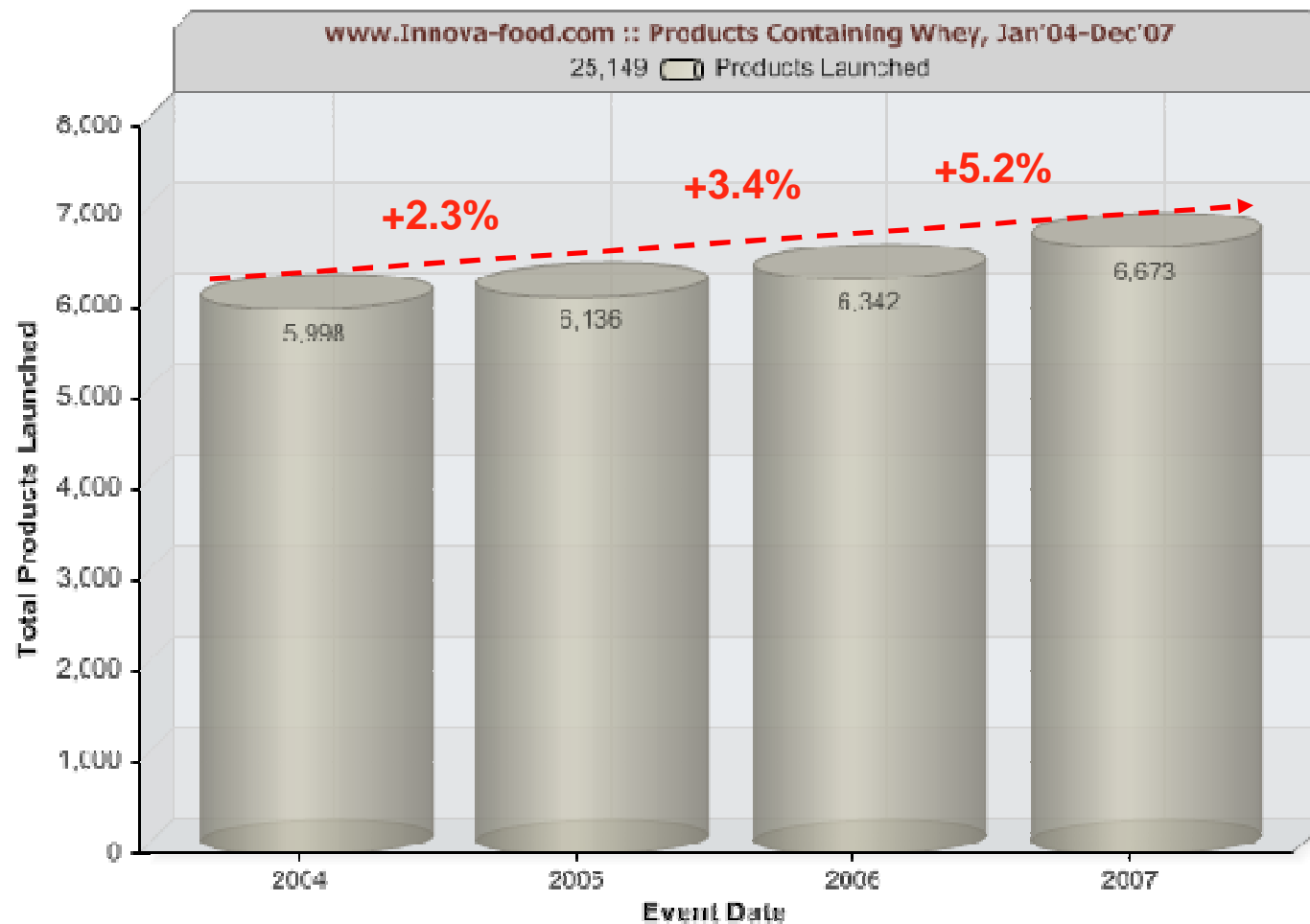
# Claims Being Made on Products Containing Whey

- § **Works with Water Beauty Natural Flavor Spring Water - Raspberry and Rose (UK) (with lactoferrin from DMV International)**
- § **Claim being made:** "Beauty water contains Praventin, a clinically proven bioactive protein rich in lactoferrin which has been shown to reduce the development of the bacteria responsible for many skin impurities, helping prevent the formation of blemishes and spots due to its antimicrobial effects."
- § **SIS Science In Sport Build Strawberry Flavor Fast Build Protein Formula Drink Mix (UK) (with whey protein isolate, whey protein hydrolysate, wheat protein hydrolysate)**
- § **Claims being made:** "Fast build protein formula drink mix powder with vitamins and mineral mix and sweetener to promote protein synthesis and assist your adaptation to exercise. Build has been designed to provide rapidly absorbed protein to promote hyper amino acidemia to help rapidly build and repair muscle."
- § **Quamtrax IsoPro Nutritional Supplement (Spain) (with 100% pure isolated serum protein (including beta lactoglobulin, glycomacropeptide, immunoglobulin, albumin serica bovina, protease peptone, lactoferrin, lactoperoxidase and gammaglobulin))**
- § **Claim being made:** "A protein supplement mix containing only pure isolated serum protein with ion exchange based on a low temperature process that preserves protein denaturalization. IsoPro contains all the fractions of protein serum, reinforces the immune system."
- § **Nestle Nutrition Alfare Formula Milk for Baby (Belgium) (with ultra-filtered extensively hydrolyzed whey protein)**
- § **Claims being made:** "The concentration of albumin has been increased, indicating better protein availability. The concentration of sodium has been decreased, which is suitable for improvement of renal function. Alfare has been specially designed for the treatment of severe and chronic diarrhea, mal-absorption and severe malnutrition."

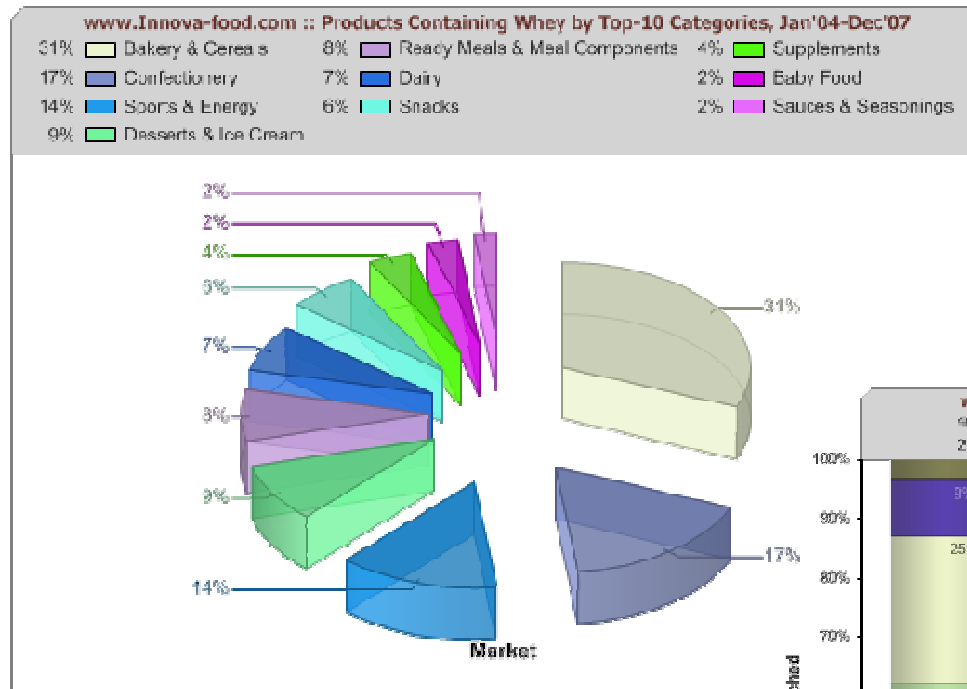


# Part IV: products

# Product launches containing whey



# Where and in which categories is whey being used?



Top 3 countries using whey –  
% total product launches

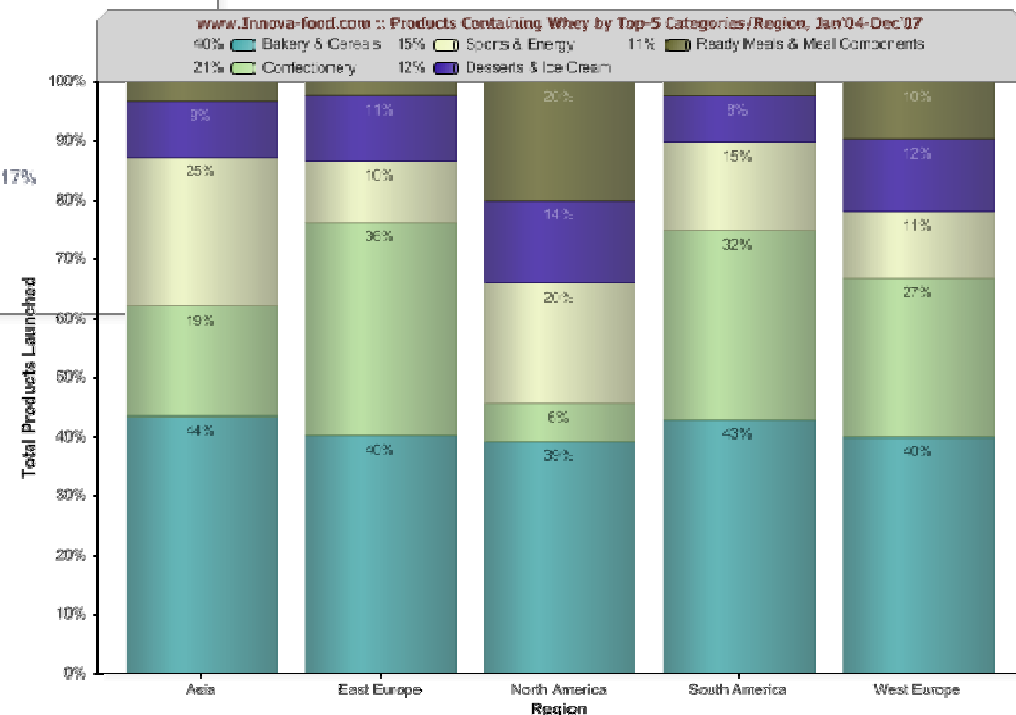
- **46% USA**

- **28% UK**

- **15% Germany**

Top 3 sub-categories using whey –  
% total product launches

- **28% Chocolate confectionery**
- **25% Sports Powders & Drinks**
- **15% Sweet Biscuits/Cookies**



INNOVA MARKET INSIGHTS

Source: The Innova Database



# Marketing whey

- § Between Jan'05-June'08, The Innova Database tracked 355 products claiming to include whey displayed on the front/back of the product package. (excluding Dietary Supplements and Sports & Energy Supplements)



## Top 15 Country

<u>United States</u>	122
<u>Germany</u>	103
<u>United Kingdom</u>	34
<u>Canada</u>	25
<u>Netherlands</u>	14
<u>Italy</u>	11
<u>Japan</u>	11
<u>Austria</u>	9
<u>Russia</u>	7
<u>Singapore</u>	5
<u>China</u>	5
<u>Czech Republic</u>	4
<u>Sweden</u>	4
<u>New Zealand</u>	4
<u>Australia</u>	3

## Top 15 Market Category

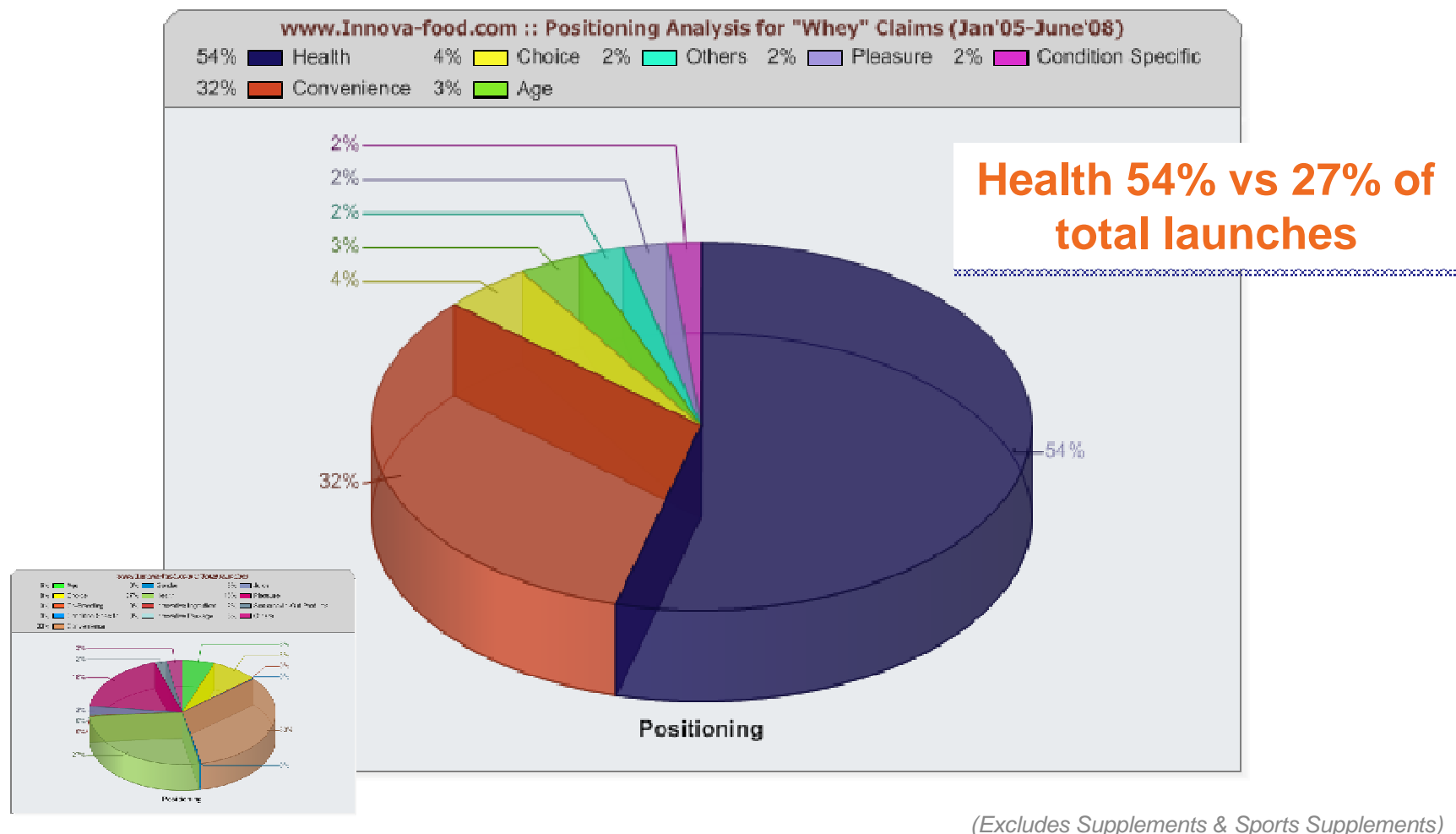
<u>Cereal &amp; Energy Bars</u>	122
<u>Dairy &amp; Soy Drinks</u>	93
<u>Energy &amp; Sports Drinks</u>	29
<u>Breakfast Cereals</u>	21
<u>Baby Formula/Milk</u>	18
<u>Other Soft Drinks</u>	9
<u>Sweet Biscuits/Cookies</u>	8
<u>Oral Feeding</u>	8
<u>Juice &amp; Juice Drinks</u>	8
<u>Cakes - Pastries &amp; Sweet</u>	7
<u>Goods</u>	
<u>Soup</u>	7
<u>Cheese</u>	7
<u>Baby Cereals &amp; Biscuits</u>	5
<u>Meat Products</u>	5
<u>Drink Concentrates &amp; Mixes</u>	4

## Whey Claims – ingredient breakdown

Whey – Ingredient Breakdown for Claims Analysis	% Product Launches (Jan 05-June 08)
Whey, not specified	35%
Whey Protein Isolate (WPI)	30%
Whey Protein Concentrate (WPC)	21%
Whey, not specified (<35%)	5%
Whey protein hydrolysate	5%
Whey, not specified (>75%)	4%

*(Excludes Supplements & Sports Supplements)*

# Positioning Analysis – whey claims



# Detailed Positioning Analysis – Whey Claims

## Sports & Energy

- 40% of products with a Sports & Energy claim contained Whey Protein Concentrate (WPC)
- 48% of products with a Sports & Energy claim contains Whey Protein Isolate (WPI)

## Wellness

- 61% of products with a “Wellness” claim contained WPC
- 27% of products with a “Wellness” claim contained WPI

Top Product “Whey” Claims (Jan’05-June’08)	No of New Products
Convenience	173
<b>Sports &amp; Energy (established)</b>	<b>122</b>
Low Fat	91
Vitamin/Mineral Fortified	53
<b>Wellness (emerging)</b>	<b>41</b>
No Additives/Preservatives	36
No Trans Fats	32
<b>Antioxidant (emerging)</b>	<b>30</b>
Natural	28
<b>Weight Loss (emerging)</b>	<b>25</b>
Gluten Free	24
Low Carb	23
Organic	17



# Whey Claims & Weight Management

- § Diminishing the role of the word 'Diet' but driving the 'Plus' value in consumer's minds.
- § Going beyond cutting into the diet market:
  - Products launched claiming to actually help metabolism & burn calories
  - Products launched claiming to suppress appetite - Satiety craze



FitSmart Bar in cranberry and apple flavor is a convenient, all-natural and nutritionally balanced snack bar.

Claims: Natural ingredients. No added refined sugars. No soy, gluten or GMOs. No trans fats, 10 grams of fiber, and 10 grams of protein. **Beneficial whey protein and natural acacia fiber work together to keep you feeling satisfied between meals.**

# Whey Claims & Weight Management

- ü Some products claiming satiety, attribute this functionality also to the inclusion of whey.



Rich in GMP **whey proteins** for slimming. 20mg of GMP (GlycoMacroPeptide) - acts as an appetite suppressant



Contains glucopeptyl, a patented credit, that combined with the glycomacropetides **resulting from the whey**, reinforces the secretion of CCK hormone recognized to support the feeling of satiety.



With 6 grams of fiber, 6 grams of protein (**whey protein isolate**)

# K20 Protein for Satiety

- § Special K20 protein water mix contains 5g protein and 5g fiber per packet. Special K protein products are designed to promote a feeling of fullness when part of a diet high in protein and fiber.
- § Ingredients: Polydextrose, **whey protein isolate**, citric acid, caramel coloring, contains two percent or less of black tea extract, natural flavoring, soy lecithin, sucralose, acesulfame-K, ethoxylated monoglycerides and diglycerides, tricalcium phosphate, niacinamide, pyridoxine hydrochloride (vitamin B6), vitamin B12. Contains milk and soy ingredients.

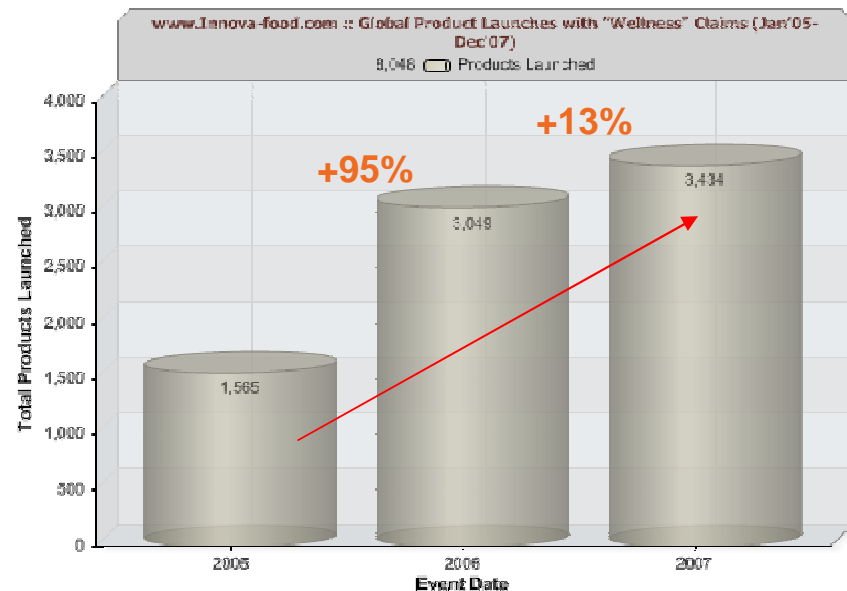


# Adding value to daily products for wellness

§ *Consumer demand added value for their everyday products: Heart Health, Gut Health, Digestive Health, Skin Health and overall general wellness such as vitamin/mineral fortification.*

Typical Claims Include:

- § **Whey** bar with vitamins in vanilla flavor. **Wellness system**
- § In addition to providing the body with a **healthy serving of whey protein**, this delicious drink is brimming with nutrients like vitamins - C, D, B6, and B12, calcium, zinc, magnesium, and 18 amino acids.





# Wellness + Whey Protein

§ Perfectly Protein is a low fat, all natural hazelnut latte drink with whey protein. It is made with 100% arabica coffee and low fat milk.

- **19g protein per bottle**
- Low fat
- All natural
- Flash pasteurized and cold-filled for quality
- **In addition to providing the body with a healthy serving of whey protein**, this delicious drink is brimming with nutrients like vitamins - C, D, B6, and B12, calcium, zinc, magnesium, and 18 amino acids.
- Made from the highest quality 100% natural ingredients.



# Wellness - Trend Words

Point-of-connection words attract the consumer to the brand on the shelf.

The keywords that marketers are employing.....

- § Better-for-you
- § Well-being
- § Vitality
- § Fitness
- § Lifestyle
- § Stress-free
- § Detox
- § Mental clarity
- § Energy boost
- § Optimal health
- § Optimal performance
- § Balance
- § Eat Positive
- § Eat Right
- § Harmony



INNOVA MARKET INSIGHTS

Source: The Innova Database

# Types of Wellness Claims Used

- A great tasting source of protein containing non-fat yogurt and whey. These proteins contain no saturated or trans fat and are low in cholesterol. (USA)
- Optimal mix of ingredients to maximize all-day energy and balance. Ideal carb to protein ratio for sustained energy. With 15 grams of premium and lactose-free whey protein (USA)
- Nutrition and wellness. 40Kcal per 100g. Rich in protein. No colouring. No preservatives. Certified organic. (France)
- Greens and whey protein isolate for optimum nutrition. Raw Greens. Cold processed. Non-GMO. No refined sugars. 0g trans fat. (USA)
- Wellfresh turkey slices: Contains 2% fat, 6% fibers, 25% whey. (Germany)
- Added with whey proteins that contain amino-acids for essential to the formation of muscular tissues. (France)

# Potential market?: the aging population

- § 12% of population is “old” – a growing demographic
  - There are a lot more old people than babies or toddlers
- § More will become elderly and will need assistance with their diet
  - Creating products for adults is less contentious and much less heavily regulated than infant food

## § This is a big opportunity

There are nearly twice as many 65+ as babies in the USA

Young/Old population, %						
% of population aged 0-4						
	1960	1990	2000	2005	2020	2050
USA	11.2	7.7	7.0	6.9	6.4	5.7
% of over 65s						
USA	9.2	12.2	12.3	12.3	15.8	21.0
Source: UN 2006 projections, median variant						



# Key Words For Older People

- § Active
- § Vitality
- § Age Well
- § Pro-Age
- § Anti-Age
- § Best-Age
- § Live Well
- § Youth Partner
- § Fit & Healthy



Skimmed milk drink enriched with vitamins, magnesium, zinc, selenium, and fibers. **Ideal for seniors.** New formula with selenium, youth partner, **antioxidant complex** which contributes to protect cells. (France)



Functional beverage containing 110mg of calcium per bottle. **Helps prevent osteoporosis and bone fractures that occur in the elderly, particularly post-menopausal women** (Japan)



Guangzhouwan Protein Powder for Middle and Aged People: With **soy bean protein content > 32%**. (China)

INNOVA MARKET INSIGHTS

Source: The Innova Database

## Elderly + Whey

- § Whey protein contains a variety of different types of individual proteins, or protein fractions, which provide unique functional benefits apart **from building and repairing muscle.**



Clinutren 1.5 is a nutritionally complete whole protein sip feed, formulated for patients with greater energy and protein requirements.. **(Whey protein)**



Oatmeal and raisin meal replacement bar especially designed **for people with diabetes.**

Claims: High in calcium for bone health. Contains antioxidants to help protect against cell damage, B vitamins to support energy metabolism, chromium to help support glucose tolerance, **and protein to help support muscle mass. (whey protein concentrate)**

# Elderly + Peptides = Multiple Benefits

§ Hydrolysed whey proteins, peptides are especially suited for cardiovascular health in seniors.



With bioactive peptides and minerals for blood-pressure reduction. **bioactive peptides: 7.7mg /100ml**



Carbonated beauty drink for women's skin. With 3 beauty components: **1000mg milk cysteine peptide**, biotin (40 e) and hyaluronic acid. Also contains dietary fiber (soy bean origin) and vitamin c .

*“BioZate 1, a specific hydrolysed whey protein studied by DMV, has been show to reduce blood pressure in human and animal model studies as well as have a positive impact on cardiovascular disease risk factors.”*

# Elderly + Peptides = Cardiovascular Health

§ Works With Water 120/80 Natural Pomegranate Flavoured Spring Water With Dairy Peptides to help lower blood pressure and maintain a healthy heart

- **Water with dairy peptides to help lower blood pressure and maintain a healthy heart.** This product contains special dairy peptides which naturally occur in dairy foods. Scientific studies show that they actively help control blood pressure as part of a healthy diet.
- Suitable for diabetics.
- Gluten free.
- Suitable for vegetarians.
- Lactose free.





# Targeting Elderly Special Needs

§ Other more commonly known benefits for the elderly include

- **Bone Health:** increasing dietary intake of protein reduces bone mineral loss and risk of fracture in older women
- Weight gain/weight loss; Muscle wasting; anti-cancer, antihypertensive, antihyperlipidemic, antibacterial, antimicrobial and antiviral



Milk powder for adult CBP, for healthy bones, with vitamin D3 and high calcium (**whey protein**). Available on the Chinese market.



The protein blend in this product contains **50 percent whey protein**, which stimulates the muscles to recover quicker from injury or illness and increases muscle strength.

**Can the multiple benefits of whey be affordable to all?**

Source: The Innova Database



# Claims/features: meeting the needs of older people

## Claims/features: products with keywords seniors, old people

About half of our normal creatine requirements are taken in with food. To ensure an optimal formation of creatine, we would have to eat 500g of raw fish or meat every day. Vegetables, fruit and carbohydrates contain only traces of creatine. Thus, those who prefer vegetarian foods or, are on a diet, could have a permanently inadequate provision of creatine. "Feeling low" is thus no surprise in such cases, but rather a logical consequence. What is valid for vegetarians, also applies to older people (their bodies show a definite lower storage of creatine). For two reasons (The capacity for creatine storage drops). The consequence (a more rapid decrease in performance). **Older people eat demonstrably less. As a result, creatine intake by way of food is reduced. Those who wish to retain their performance capacity with increasing age, therefore have a considerably increased.**

According to medical studies cited in the New England Journal of Medicine, **Vitamin E has been shown to support the maintenance of heart health in men and middle-aged women.** This fabulous antioxidant supports respiratory and circulatory health, and even promotes wound healing.

DHEA is produced in abundance during youth, peaking at about age 25, with production slowing thereafter. By age 80 it is believed that people have only 10 to 20 percent of the DHEA they had at age 20.

For Adults with lower bowel conditions. **For Seniors 65 years & up.** Formulated to address lower bowel conditions, abnormal cell division, bacterial infections and cholesterol levels. • Improves digestion of proteins, carbohydrates and fats. • Improves immunological and inflammatory responses.

Contains Ginkgo Biloba - good for circulation and memory

Ginkgo may be helpful for **enhancing memory in seniors** with milder forms of memory loss as well. One a day formula.

# Identifying price premium

*Retail price/liter*



INNOVA MARKET INSIGHTS

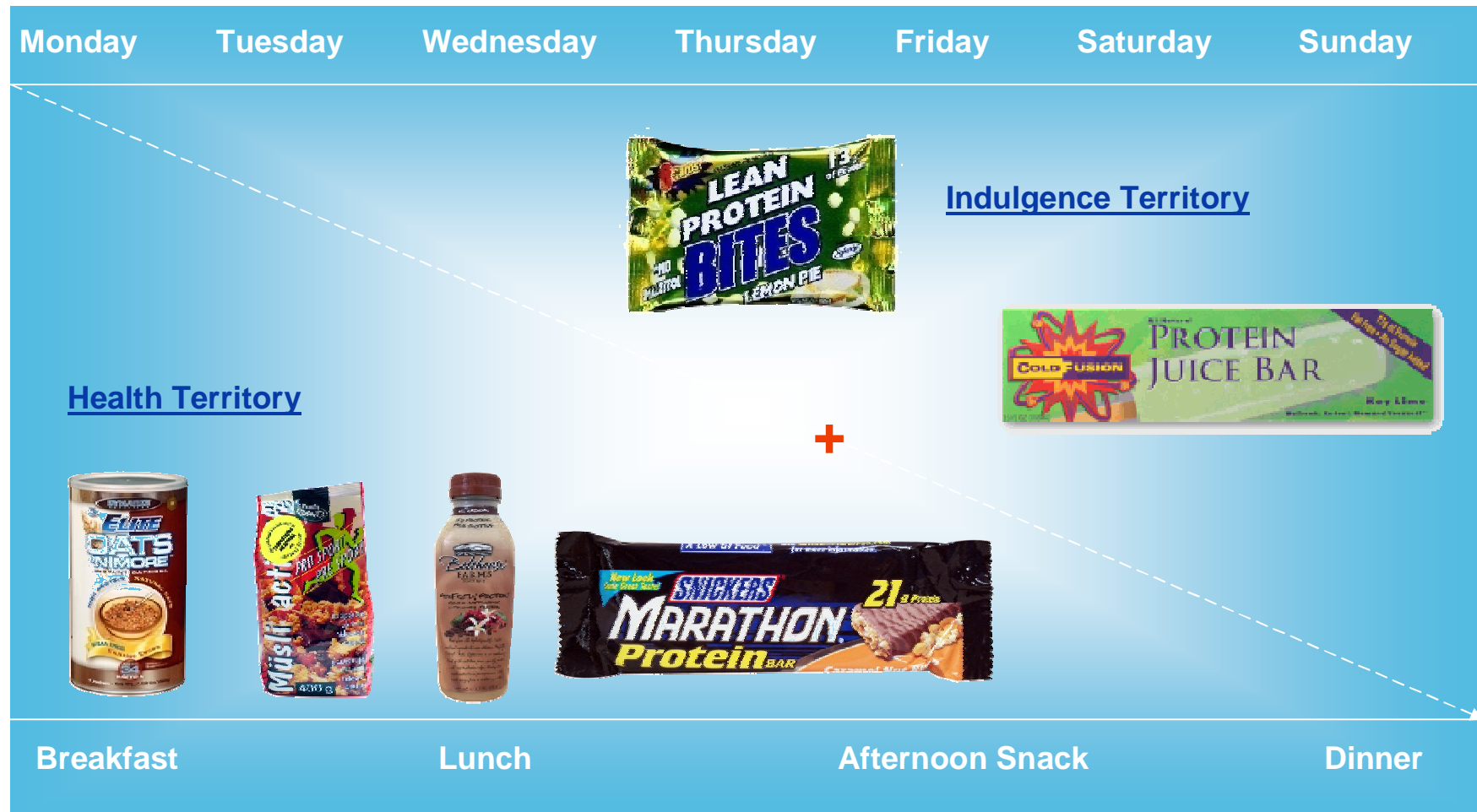
Source: The Innova Database



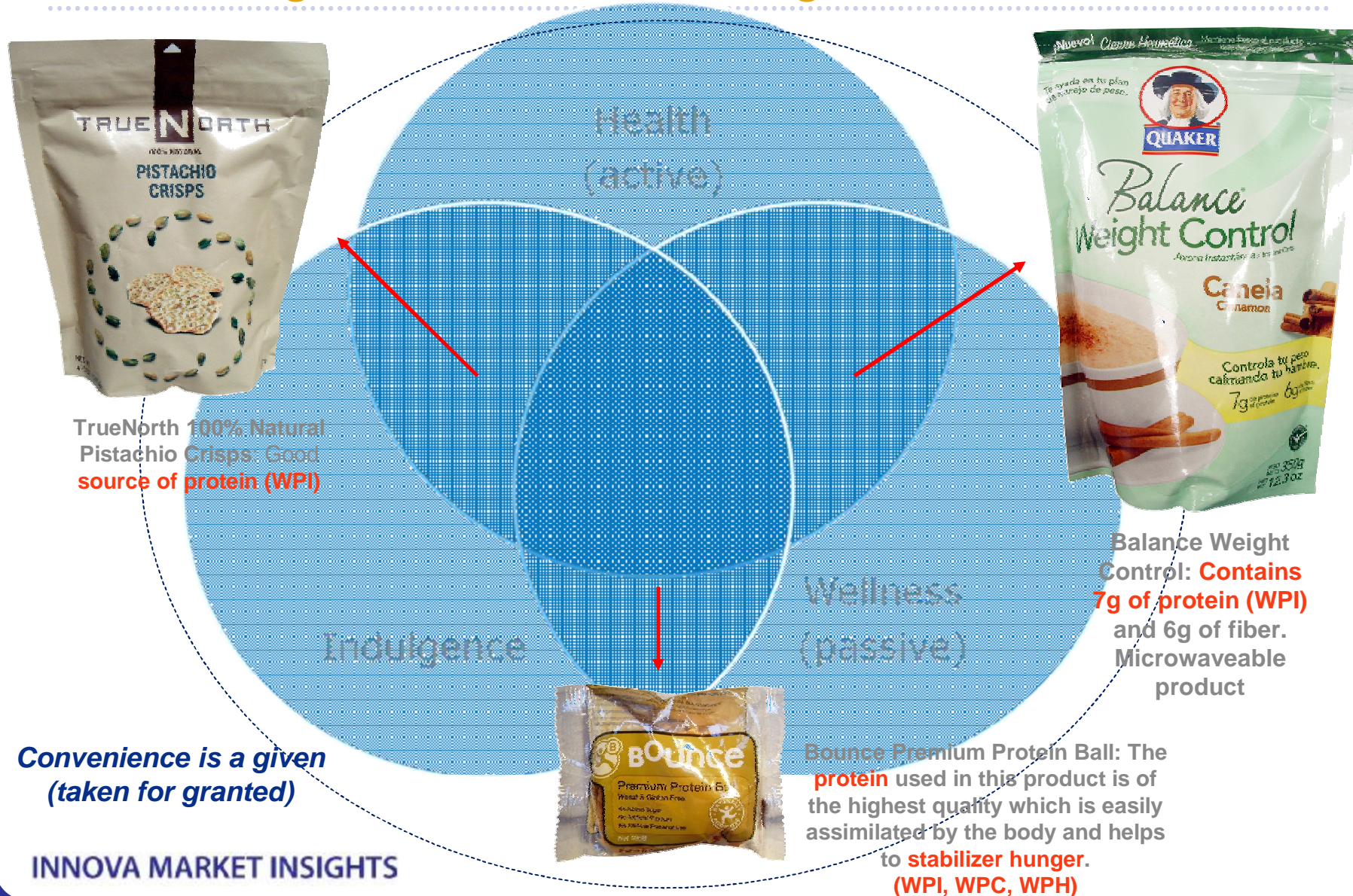
## Adding value through functional ingredients

Product	Functional	Price (EUR)	Total Weight (Kg)	Price/Litre (EUR)
<b>EAS Myoplex Chocolate Protein &amp; Carbohydrate Drink</b>	<b>Sports Nutrition</b>	<b>2.40</b>	<b>0.33</b>	<b>7.26</b>
<b>Bolthouse Perfectly Protein Mocha Cappuccino with Whey Protein</b>	<b>Energy/Wellness</b>	<b>1.79</b>	<b>0.45</b>	<b>3.97</b>
Water 120/80 Natural Pomegranate Flavoured Spring Water With Dairy Peptides	Heart Health	1.64	0.50	3.27
Special K20 Protein Water - Mixed Berry	Energy/Satiety	3.86	0.47	2.04
Miriam Vitality - Whey Drink with Lime Flavor and L-Carnitine		0.98	0.70	1.39

# Growing requirement for healthy & indulgent solutions



# The next generation? – moving into the intersections





# Smoothies combine health, wellness & indulgence

§ Naked Juice Protein Zone Banana Chocolate Protein Juice Smoothie: **30 grams of muscle-replenishing protein**, a good source of potassium, antioxidant vitamin C to help defend against cell damaging free radicals, all wrapped in smooth banana chocolate nirvana juice smoothie.

## Claims:

- All natural juice + boost
- **30g of protein in every bottle.**
- With cocoa powder and other natural flavors and ingredients.
- No sugar added.
- Certified kosher.
- A good source of potassium, antioxidant, vitamin C to help defend against cell damaging free radicals.

Contains whey protein concentrate



# Whey: refreshingly versatile, boundless opportunity



INNOVA MARKET INSIGHTS





Thanks for your attention!

Patrick Mannion  
[patrick.mannion@innovami.com](mailto:patrick.mannion@innovami.com)