

Collagen Stewardship Alliance

## COLLAGEN: WHY THE HYPE?

EXPLORATION OF THE KEY FACTORS BEHIND THE EXPLOSIVE GROWTH OF THE GLOBAL COLLAGEN MARKET AND THE OUTLOOK FOR ITS FUTURE

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### What is collagen and why does it matter so much?

- Collagen is a protein primarily made up of three amino acids: proline, hydroxyproline and glycine
- It is the most abundant protein in the body, making up around 30% of total protein
- It is responsible for the structure of our skin and all our connective tissues and is particularly abundant in bones, skin, tendons, joint cartilage and ligaments
- Its role is to ensure cohesion, elasticity and the regeneration of all the connective tissues in our body
- As we age our bodies produce less collagen which results in a decline in the structural integrity of the skin, the emergence of wrinkles and loss of skin firmness



The triple helix structure of collagen protein gives collagen its unique functional properties including strength and elasticity

Source: Frost & Sullivan

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### The benefits of collagen have been known for centuries, but it was not until more recently that it was extracted and its health benefits studied



The timeline shows the evolution of collagen knowledge from ancient times to modern scientific study. Key milestones include:
 

- 1840: The first scientific study of collagen structure by Louis-Nicolas Vauquelin.
- 1850: The first scientific study of collagen structure by Louis-Nicolas Vauquelin.
- 1880: The first scientific study of collagen structure by Louis-Nicolas Vauquelin.
- 1912: The first scientific study of collagen structure by Louis-Nicolas Vauquelin.
- 1930: The first scientific study of collagen structure by Louis-Nicolas Vauquelin.
- 1950: The first scientific study of collagen structure by Louis-Nicolas Vauquelin.
- 1970: The first scientific study of collagen structure by Louis-Nicolas Vauquelin.
- 1990: The first scientific study of collagen structure by Louis-Nicolas Vauquelin.
- 2010: The first scientific study of collagen structure by Louis-Nicolas Vauquelin.

Source: Frost & Sullivan

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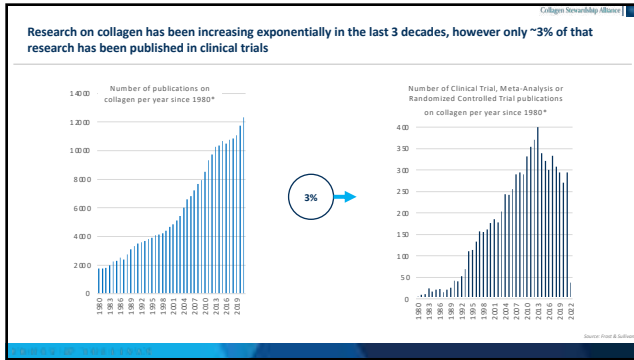
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Collagen Newsworthy Abstracts

The range of potential health benefits of collagen are the primary driver behind the hype

<p><b>Joint &amp; Bone Health</b></p>	<ul style="list-style-type: none"> <li>The use of collagen for <b>joint and bone health</b> is well recognized for both treatment of pain and preventative health care</li> <li>It is driven by the demands of an aging population, and the increase in active lifestyles</li> </ul>
<p><b>Beauty &amp; Skin Health</b></p>	<ul style="list-style-type: none"> <li>Collagen has a range of positive effects for <b>beauty</b> including skin hydration, anti-wrinkles/aging, hair and nail health and wound healing</li> <li><b>Beauty from within</b> is the fastest-growing market but topical products are also growing strongly</li> </ul>
<p><b>Sports Nutrition</b></p>	<ul style="list-style-type: none"> <li>With the increased awareness of the benefits of a healthy lifestyle, <b>sports nutrition</b> has been rapidly growing</li> <li>Collagen is market for health maintenance, improvement of performance, injury prevention and as an alternative source of protein</li> </ul>
<p><b>Other benefits</b></p>	<ul style="list-style-type: none"> <li>More and more studies are focusing on <b>other benefits</b> of collagen such as digestive/gut health, immune health, sleep and recovery health</li> </ul>

Source: Intel & Science

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Collagen Newsworthy Alliance

**These benefits aligned strongly with key global mega trends and mean collagen is applicable to a broad and diverse range of consumer groups**

The desire for a healthy lifestyle and the increasing popularity of regular exercise are two drivers that also target a younger population. This, as well as the ease of incorporation of collagen peptides into various formulations, is an important advantage to support growth of the market within this key demographic.

**1. Aging Society:** An aging society has led to an increased prevalence of joint related diseases and a drive to improve skin elasticity and firmness.

**2. Running and Exercise:** Recently, the link between physical health and maintaining mental health has driven the increase popularity of regular exercise. Maintaining joint health is critical in order to facilitate people to do this.

**3. Healthy Lifestyle:** The growing awareness and desire for a healthy lifestyle, enhanced by the COVID-19 pandemic, has led to an increased demand for value-added and nutritious food and beverages and an increased spending on personal care products.

Source: Frost & Sullivan

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**A further drive behind the growth is the incorporation of collagen into many different application/product formats**

- Supplement applications lead the market.** It is expected that supplements will continue to dominate the market due to their high dose concentration and their simplicity and ease of consumption.
- Functional food and beverages** account for almost a quarter of the market. Depending on the organoleptic properties of the specific form of collagen, its incorporation into a wide range of products is feasible and this is expected to drive further growth of this segment.
- Growth in the **personal care/cosmetics category** is a leading driver for collagen demand. Beauty-from-within products, included in the supplements category, currently account for higher demand than topical cosmetics, although collagen is seen as a highly desirable ingredient by consumers.
- Use of collagen within pet/animal care also continues to grow, though this market remains relatively small in comparison to other segments.
- There is a niche market for collagen ingredients in pharmaceutical applications, but this is largely in the R&D phase.

Source: Frost & Sullivan

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Collagen Newsworthy Alliance

**No other single ingredient can compete with collagen in terms of its scientifically proven efficacy for a wide range of health benefits and its ease of incorporation in to a wide variety of product formats**

- Competition for collagen ingredients typically comes from two groups of ingredients:
  - Other animal derived ingredients (HIA, chondroitin, glucosamine, MSM, Omega 3 etc)
  - Natural ingredients/botanicals and minerals (Capsaicin, curcumin, ginger, calcium, magnesium, vitamins, zinc etc)
- Increasingly, rather than competing with collagen, these ingredients are combined with collagen in functional F&B, cosmetics and supplements
- In the future non-animal derived collagen ingredients could a competitor. There is a lot of interest and innovation in this topic, however it is still far from commercialisation.

Source: Frost & Sullivan

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Collagen Security Alliance

There are 28 known types of collagen each with their own unique attributes, commercially available products are typically Type I, Type II and Collagen Peptides

	Type I	Type II – Native/undenatured	Type II – Matrix/hydrolysed	Collagen Peptides
Attributes	Most abundant form. Provides structure of the skin, muscles and ligaments. Forms the longest triple helix, and is therefore extremely strong and elastic.	Found in the cartilage and the eye. Occurs naturally in a matrix with glycosaminoglycans (GAGs). Native/undenatured is the intact molecule, whilst hydrolysed/matrix is the formed of short-chain peptides.		Hydrolysed collagen, which can be easily absorbed.
Raw Material Sources				
Main Benefits	Skin and hair care, Wound healing.	Joint health (decreases collagen destruction).	Joint and skin health (increases collagen production).	Joint health, Beauty from within, Sports/active nutrition.
Key Applications	Topical	Supplements, F&B, pet/animal and topical	Supplements	Supplements, F&B, pet/animal and topical
Major Competitors				

Source: Frost & Sullivan

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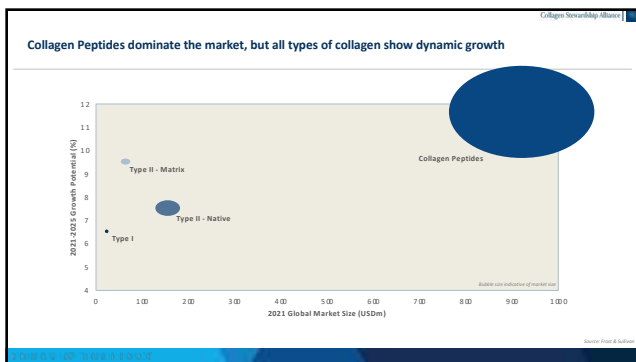
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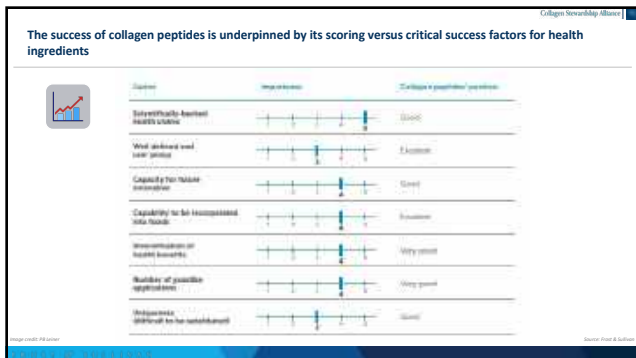
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Collagen Yearbook 2020


**Growth of collagen is strong across all regions however the US is now the single largest national market as a result of extremely strong growth in the past few years**



- The US leads as the number 1 global market for collagen peptides. With strong consumer demand, the local players are transitioning to sourcing raw materials from within the country to overcome and withstand any further challenges regarding logistics and supply. A common trend driving the market within the US has been utilizing distributors to extend reach.
- Growth within the NAFTA region can be attributed to the significant commercial success of key B2C market players, specifically in the US, with a focus on bovine raw material as an attractive, sustainable and premium collagen peptide source.



- EMEA is expanding strongly. Following the overall market trend, the increased focus on healthy living and awareness of the benefits of collagen drives demand whilst the market has also seen the entrance of consumer brands from the US.



- APAC is expanding strongly. This sustainable high single digit growth is driven by the increased consumer awareness of the benefits of a healthy lifestyle and the popularity of anti-aging products, especially regarding skin health.
- China and, in particular, Japan/South Korea are the largest single markets within the APAC region, with the former's strength, in part, due to population density within the country. In Japan/Korea, as in the rest of APAC, growth stems in particular from demand for beauty-from-within products.

Source: Frost & Sullivan

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Collagen Yearbook 2020


**The outlook for all types of collagen ingredients remains positive but market participants should be aware of challenges, especially linked to raw materials supply**



Effects of COVID have led to logistical supply issues, causing a drive to reassess the supply chain and source materials closer to home. The residual effects of COVID could be over in the next year.




Issues relating to raw material supply, partially due to COVID, have caused an increase in raw material prices. This is expected to continue as a long-term effect, especially for bovine raw materials.



Due to supply issues, especially the high-in-demand bovine raw materials, there is a push for porcine and fish raw materials to keep up with demand. Fish collagen is seen as a more popular source as it can be marketed as halal and vegetarian.

Ethical sourcing, transparency, and sustainability are becoming bigger themes in the market.



Supply issues are also driving technological innovation, such as the development of technologies for the use of lower quality raw material and progression towards higher concentration within the products.

Another key direction of research is towards niche raw materials (such as egg shells and jellyfish) and non-animal derived collagen that offers equivalent health benefits. Although this continues to be an active area of research, challenges with large scale commercialisation means it will not impact the market within the next 5 years.

Source: Frost & Sullivan

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Collagen Yearbook 2020

**The health benefits of collagen and its use in many different products has driven explosive growth recently, but the market is still far from reaching its peak and plenty of room for further growth**

- Based on the development path followed by other well known and more mature health ingredients, collagen ingredients are still in the very early stages of their product lifecycle and sales have not reached their peak
- The market for collagen will grow at between 7-12% a year for the next 5 years, depending on the type of collagen
- Market penetration for collagen ingredients and products remains relatively low across Europe, North America and Asia-Pacific, further indicating huge potential for growth
- The collagen market is dominated by dietary supplements, but its popularity in food and beverages and cosmetics is rising
- The market is not without challenges, particularly in terms of raw materials
- Stewardship of the market is important to ensure best practice by industry players and support in the education of consumers to ensure collagen's full potential is realised

Source: Frost & Sullivan

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