

2024 Investor Relations

The future of dental treatment that changes the world

HysensBio

Opening a new era of dental care with HysensBio's technology



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Corporate Profile

Name	HysensBio Co., Ltd.
CEO	Joo-Cheol Park, Suk Hyun Yi
Foundation	July 25, 2016
Business Domain	Development of Intractable Dental Diseases
Headquarter	Gyeonggi-do, Rep. of Korea
Capital	KRW 3.8B (USD 3.1M)
# of Employees	38
Website	www.HysensBio.com

Corporate Value

Mission

We aim to contribute to healthy life of humankind by developing therapeutics based on the original "Cell Activation Platform" technology

Vision

World-renowned biotech company developing treatment for incurable diseases

Core Value

Passion / Commitment / Trust / Open-Mindedness

History

1999~

- Began scientific research on dentin regeneration

2016~2019

- Confirmed regenerative function of dentin regenerative protein
- **Established HysensBio Co., Ltd.**
- **Developed the novel peptide KH001, Selcopintide**
- Funded by Ministry of Trade, Industry & Energy (KRW 2B)
- Series A(2018), Series B(2019) Funding
- New Technology Award, Ministry of Trade, Industry & Energy



2020~2022

- Selected as Potential Unicorn Company by Ministry of SMEs & Startups
- Proceed with KH001 clinical trial phase 1/2a
- Series C Funding(2021)
- IR52 Jang Young-shil Award, Ministry of Science & ICT
- Established JV with Orion Holdings and out-licensing to Orion Biologics



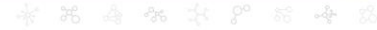
2023

- Completion of phase 1/2a clinical trial(Dentin Hypersensitivity)
- SI / Pre-IPO Funding
- Biohealth R&D Best Company Award, Ministry of Trade, Industry & Energy



2024

- Clinical trial(Dentin Hypersensitivity) phase 2 IND approval(Korea, USA) and initiation(Korea)
- Clinical trial(Dental Caries) phase 2 (IIT) IND approval(Korea)



World-Class Leader

Secured new drug development capabilities through 20 years of research and development.



Professional Background

- Professor, Seoul National University School of Dentistry (2007~)
- R&D Director, Seoul National University Dental Research Institute (2017~2018)
- Associate Dean of Research Affairs, SNU School of Dentistry (2013~2014)
- Research Associate Professor, SUNY at Buffalo (2002~2003)
- The 12th Academic Award (Gold Prize), Korean Academy of Dental Science (2016)
- New Technology Award, Ministry of Commerce Industry & Energy (Nov 2019)
- Grand prize in Creative Innovation of 50+ Awards, LINA Korea (2020)
- Inaugurated as the new president of International Association for Dental Research Korean Division (KADR) 2020

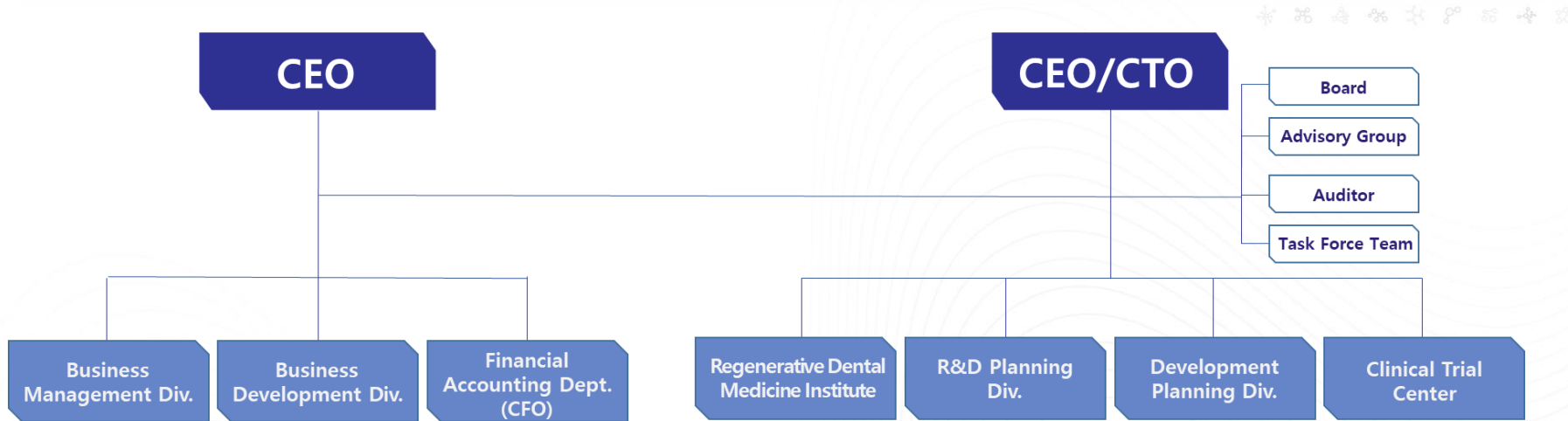
Academic Activities

- International Association for Dental Research (IADR)
- Pulp Biology Regeneration Group (PBRG)
- Gordon Conference: Tooth & Bone
- Tooth Morphogenesis and Differentiation (TMD)
- Tripartite Conference on Teeth and Bone

Published Paper: 116 (as of Mar 2023)

Park, Joo-Cheol
Founder & CEO / Professor (D.D.S., Ph.D.)





- **Research-focused company**

- More than 60% are R&D members (11 Ph.D., 10 Masters)

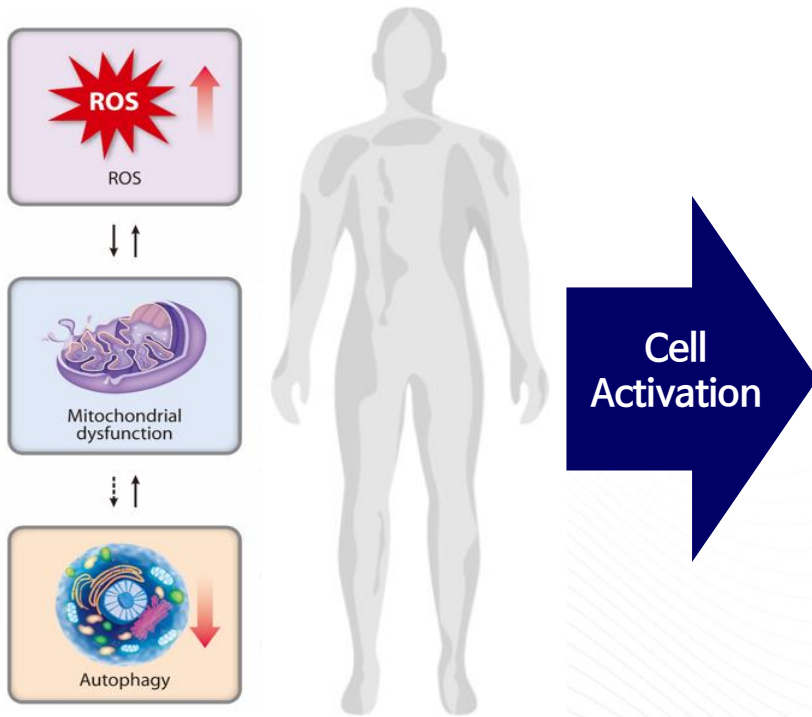
- **Focused on Dental Research**

- 4 Dentists, 3 Dental hygienist, 1 Veterinarian
- 3 Pharmacists incl. 1 Korean Oriental Pharmacist, 1 Registered Nurse
- 10 PhDs in R&D

- **Academic/Management Advisory group**

- 3 Academic(emeritus prof. of dentistry)
- 1 Management(former CEO of dental industry company)
- 1 Global clinical trial/manufacturing(peptide expert)

HysensBio's "Cell Activation" R&D Pipeline



Cell Senescence
Dormant Cell

Category	Project	Code	Indication
Dental disease 	Odontoblast Reactivation	KH-001	Dentin hypersensitivity
		KH-002	Dental caries
	PDL Fibroblast Reactivation	HBO-001	Amelogenesis imperfecta
		KH-201	Periodontitis
Skin disease		HB-401	Skin ageing
		HB-402	Intractable wound
Eye disease		HB-601	Age-related macular degeneration
Metabolic syndrome		HB-801	Metabolic dysfunction-associated steatohepatitis(MASH)

The logo for Dentopine, featuring a stylized blue and green tooth icon to the left of the word "Dentopine" in a bold, sans-serif font. The "D" is blue, and the rest of the word is green. A registered trademark symbol (®) is located to the upper right of the word.

Dentopine®



Dentopine Pipeline

The World's First Dental Disease Specialized Therapeutics Technology



“ But Dental Treatment Technology is still stagnant. ”

“Oral care has been an industry ripe for **disruption for decades**” (Forbes, 2018.05)

“There’s a **big need for biology** to impact upon dentistry and drag it out of the 19th century.”
(MSNBC, 2018.01)

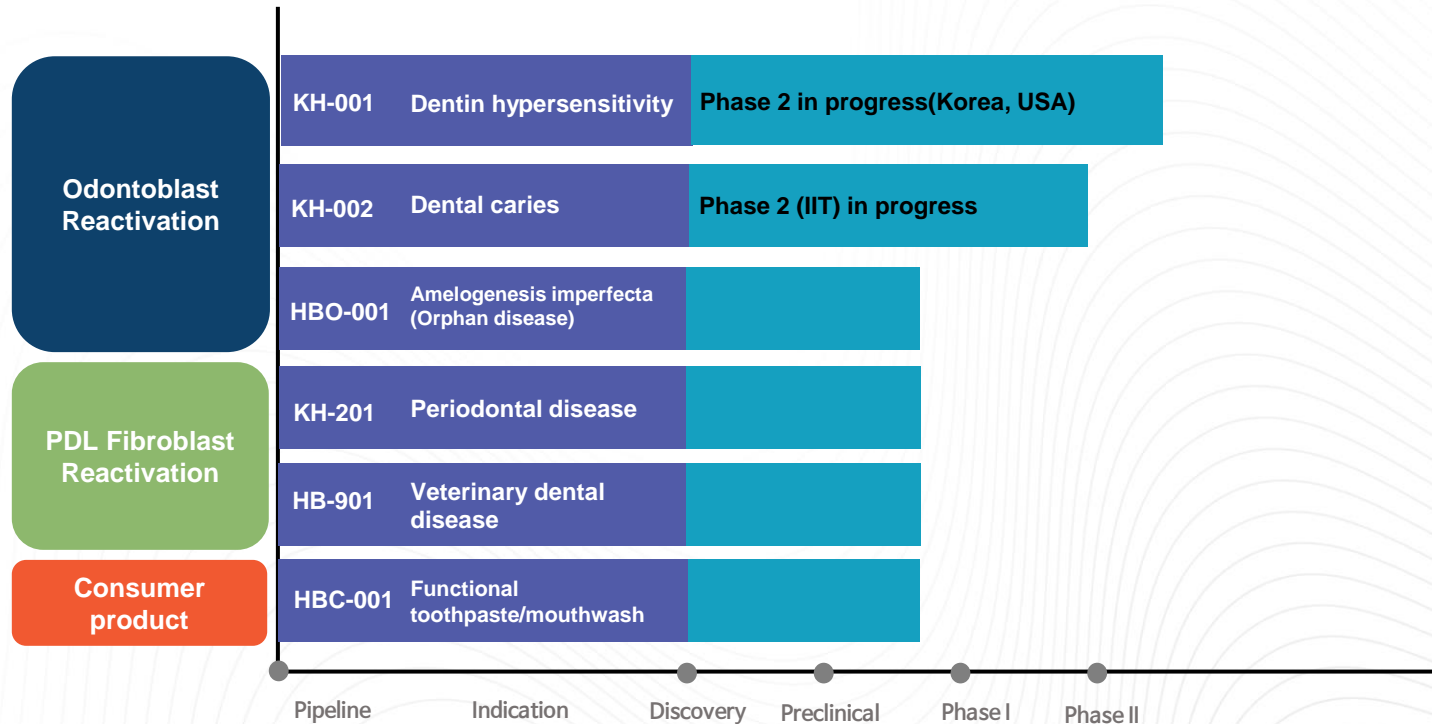
“Despite promising breakthroughs in basic biomedical science, the pace at which innovative and disruptive new technologies are developed and introduced into dental practice lags behind that of medicine.”

(Michael L Barnett, J Am Cell Dent, 2006)



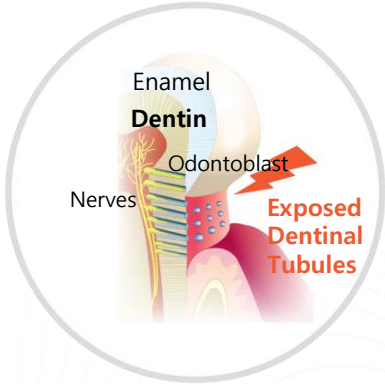


HysensBio's world's first dental disease specialized therapeutics technology developed to treat intractable dental diseases based on advanced biotechnology





Etiology of dentin hypersensitivity : Damage of dentin



01

Etiology: Pain derived from exposed dentin in response to cervical abrasion or tooth damage to enamel. Usually occurs in people over age 30. **No fundamental treatment available**, hence suffer from lifelong toothache.

02

Symptom: Due to cervical abrasion, tooth crack, cavity and periodontitis, certain triggers (like ice cream or hot coffee) can stimulate the nerves inside the teeth, resulting in a **sudden, short, sharp pain**

03

Prevalence: **1.1B DH patients** WW, 20M dental patients in Korea, **57%** of adults have DH (Korea, 2019)

(Source: Epidemiology of dentin hypersensitivity, Christian H. Splieth, 2013)

Unmet Needs of DH

Patients

Dentin hypersensitivity



No fundamental treatment; limited pain relief by temporarily blocking dentinal tubules with functional toothpaste or dental restorative materials

Dental caries

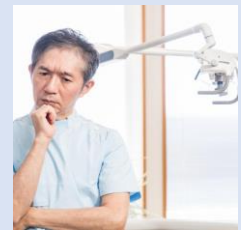


Pain after treatment and over time, secondary caries might occur due to microleakage

- **Fundamental treatment that occludes the dentinal tubules and regenerates new dentin with the same thickness as that of the damaged dentin**
- **Fundamental treatment to block bacterial infection through physiologic dentin regeneration is needed**

Dentists

Decreased patient satisfaction and credit due to recurrence



Needs for fundamental treatment

Country	percentage
USA	87
UK	87
France	100
Germany	75
Italia	88
Spain	100

Survey for acceptance of KH001 in major countries



MOA of KH-001

Development of 'First-in-Class' dentin hypersensitivity treatment by regenerating physiologic dentin and restoring damaged dentin thickness

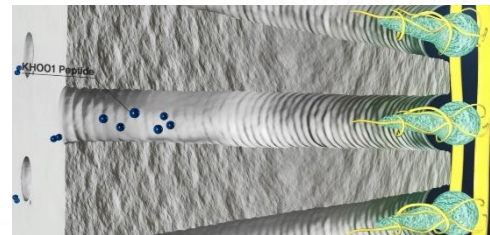
World's First Native Dentin Regeneration

- 01 Odontoblast reactivation & differentiation
- 02 Exposed dentinal tubule occlusion via physiologic remineralization
- 03 Physiologic dentin regeneration

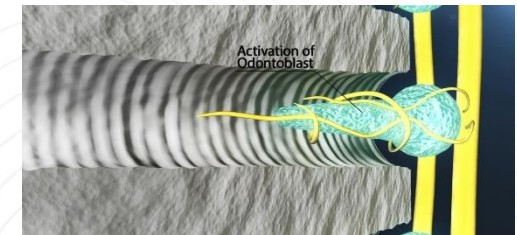
Tests with KH-001

- ✓ Stable in acidic environment & extreme temperature (-70~95°C)
 - Stably reaches odontoblasts in pulp
- ✓ Biological occlusion of the exposed dentinal tubules – Prevention of tissue fluid leakage (Microleakage Test)
 - Biological Dentin Sealing

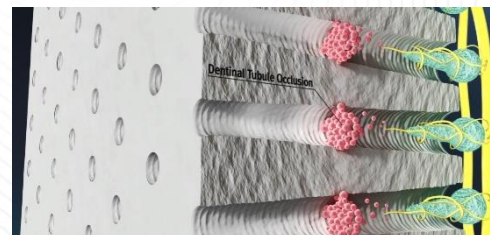
MOA of KH-001



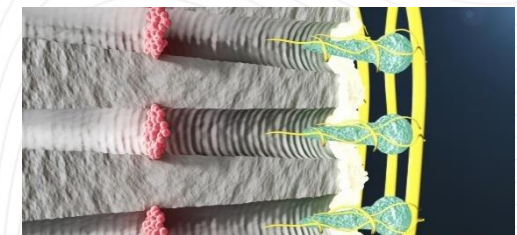
1 KH001 peptide applied to dentinal tubules



2 Dormant odontoblasts stimulated and reactivated



3 Dentinal tubule occluded by regenerated dentin



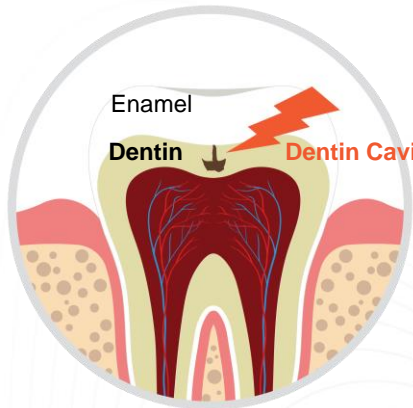
4 Damaged dentin thickness restored

For more information: <https://youtu.be/Ctb7VWvLSIs>



Symptom of Dental Caries (Cavity)

No progress in fundamental dental technology, such as drilling & filling over the past 100 years



01

Etiology: Acid excreted by bacteria present in oral cavity breaks down enamel of the tooth surface

02

Symptom: [Enamel damage] No initial symptom, [Dentin damage] **Sensitive to cold/hot food, pain when chewing food**, [Pulp damage] Pain even without stimulation

03

Prevalence: 2.3B dental caries patients WW, **91%** of American adults have permanent tooth decay, annual medical care cost of more than \$120B, **4th disease with the most outpatients**: 6,450K cases with \$5.4M medical care expenses

04

Treatment Market: USD 230B SAM in 2021 incl. 71B patients(**31%**) in US

(Source: Primary Research, Frost & Sullivan Analysis, 2021)

Limitations of Existing Dental Caries Treatment



- Difficult to completely remove deep cavity
- Patients feel uncomfortable during treatment

- Experience pain even after treatment
- Over time, secondary cavity may occur due to microleakage



Great unmet needs for dental caries treatment technology that both patients & dentists satisfy with

- ✓ Need fundamental cavity treatment through physiologic dentin regeneration



MOA of KH-002

- Activate odontoblasts in cavity-affected area · Occlude dentinal tubules
- Block bacteria progression · Regenerate dentin & Eliminate inflammation

Unmet Needs & Solution of Dental Caries Treatment

Unmet Needs

- One of the most common diseases, but with a prevalence that is not decreasing
- Secondary caries incidence of up to 25%
- Increase in infant tooth caries and difficulty in treating children
- Difficulty in treating root caries in the elderly

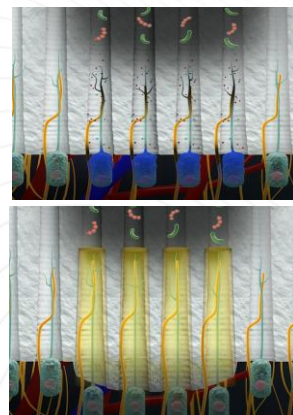
Solution

- Preservation of natural teeth (Minimize drilling of teeth)
- Regenerative treatment through fundamental **autologous cell activation**
- Treatment of **stage 2~4 dental caries**, which account for the majority of dental caries patients
- Prevent secondary caries

1 Drill out cavity area and apply KH-002



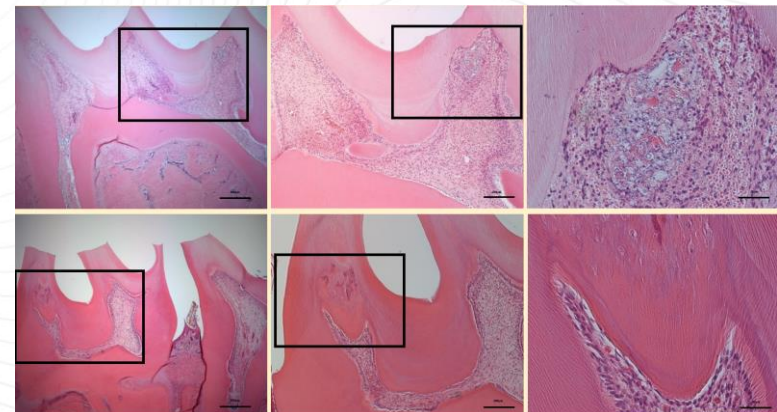
2 Odontoblast activation → Dentinal tubule occlusion, physiologic dentin regeneration



Control

KH-002

3 Elimination of bacteria and inflammation



For more information: <https://youtu.be/AT2qGjqTKlw>



Amelogenesis imperfecta: Relieving extreme pain – primary treatment

Improved pain caused by amelogenesis imperfecta, a rare disease with dentin regeneration technology through odontoblast activation

Amelogenesis Imperfecta

- **Symptom:** Extreme pain resulting from tooth wear/breakage/loss/cavities due to incomplete formation of enamel and subsequent sensitive irritation responses
- **Prevalence:** 1 in 700 individuals (Sweden) ~ 1 in 14,000 (US)
- **Rare disease status:** Designated in the US
- **Currently applying for FDA orphan drug designation**





Periodontitis Treatment current situation & evaluation

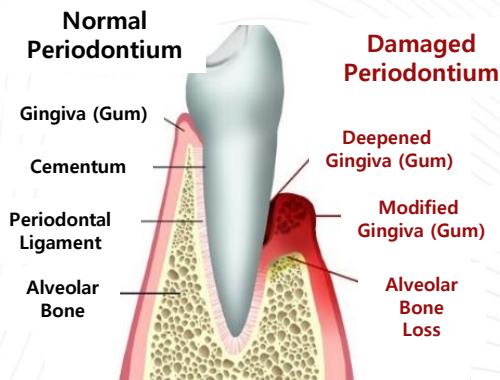
Disease with the most outpatients in Korea. The number of patients continues to increase due to aging population, but there is still no fundamental treatment.

What is Periodontitis?

01 Etiology: Inflammation of gingiva (gum), periodontal ligament and bone tissue

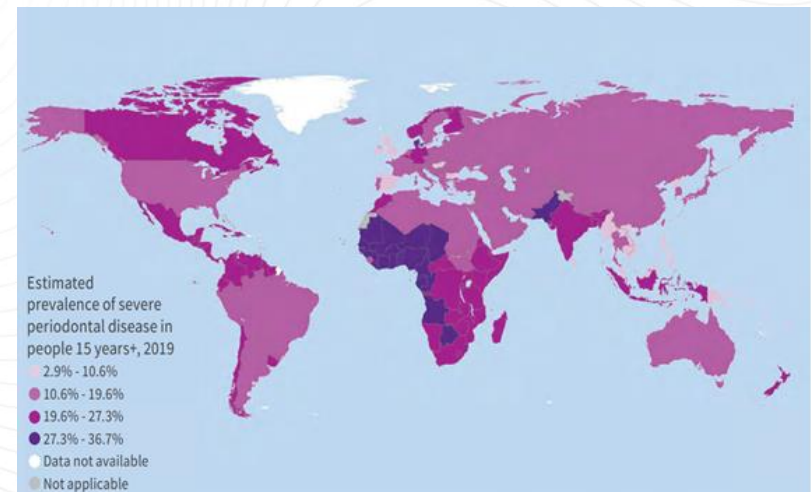
02 Symptom: Swelling and bleeding of the gum due to inflammation, development of periodontal pocket, **tooth loss** due to damage to the periodontal ligament and alveolar bone.

03 Prevalence: Representative dental disease that more than **80%** of the people suffer from, 970M periodontitis patients WW (as of 2017), expected to increase to more than 1.5B by 2050 (WHO, 2019)



Periodontitis Treatment Market Size & Forecast

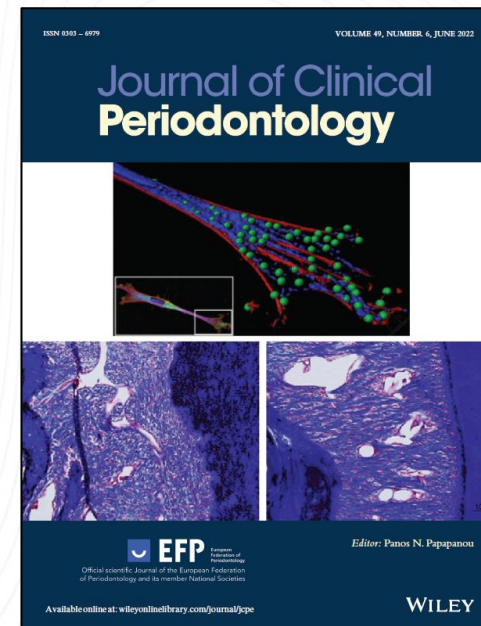
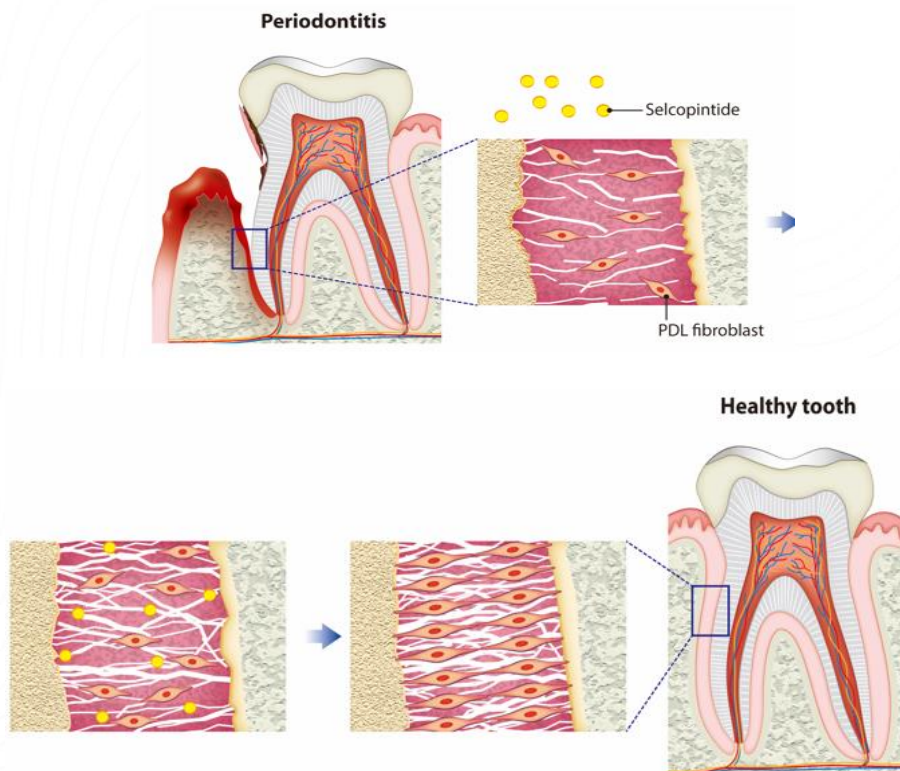
- One of the most common disease that affects **20-50%** of the world's population
- Estimated to increase from 500 million patients in 2010 to about **1.5 billion in 2050** due to aging population
- Periodontal disease is **the leading cause of tooth loss in adults and increases the risk of cardiovascular disease, diabetes, arthritis and pregnancy complications**





MOA of KH-201

- ✓ KH-201 regenerates cementum on the surface of root dentin
- ✓ KH-201 regenerates periodontal ligament(PDL)
- ✓ Newly formed periodontal ligament is vertically aligned and attached to the newly formed cementum layer



- ✓ **Journal of Clinical Periodontology (IF: 8.7, JCR, Dentistry: 1/92)**
Published as the cover paper of the June 2022 issue



(1) Current State of Veterinary Dental Disease

With the increase of pet dogs and cats, their dental disease cases are also on the rise, yet there exists no specialized drug that can prevent or treat such dental disease

Increase of Veterinary Dental Disease

- 01** Etiology: Inflammation of gingiva (gum), periodontal ligament and bone tissue
- 02** Symptom: Swelling and bleeding of the gum due to inflammation, development of periodontal pocket, tooth loss due to damage to the periodontal ligament and alveolar bone. If left untreated, periodontitis could lead to tooth loss, as well as **systemic diseases**.
- 03** Prevalence: By the age of 3, **80%** of pet dogs enter the initial state of periodontal diseases (Dogtimes article, USA)
- 04** The only solution is tooth extraction. Big Pharma's interest in prevention and treatment technology is increasing with excessive treatment cost.



Market Forecast of Global Veterinary Dentistry

- **Increasing number of companion animals and their dental disease cases**
 - ✓ Rapid growth of veterinary dentistry due to increasing number of companion animals (17% growth compared to last year in the US)
 - ✓ Increased periodontal disease cases: Nearly 70% of cats and 87% of dogs over age of 3, Scaling being the fastest growing service in pet dental market (Grand View Research 2018)
- **Rapid growth of veterinary gum disease market**
 - ✓ Global veterinary dental health market: 2.46B USD (2023) to USD 3.61B USD (2030) with a CAGR of 7.75% in the medicine sector

6.4.1 GUM DISEASES MARKET ESTIMATES AND FORECASTS, 2017 – 2030 (USD MILLION)



Source: APPA, FEDIAF, Company Websites, Secondary Research, Primary Interviews, Grand View Research

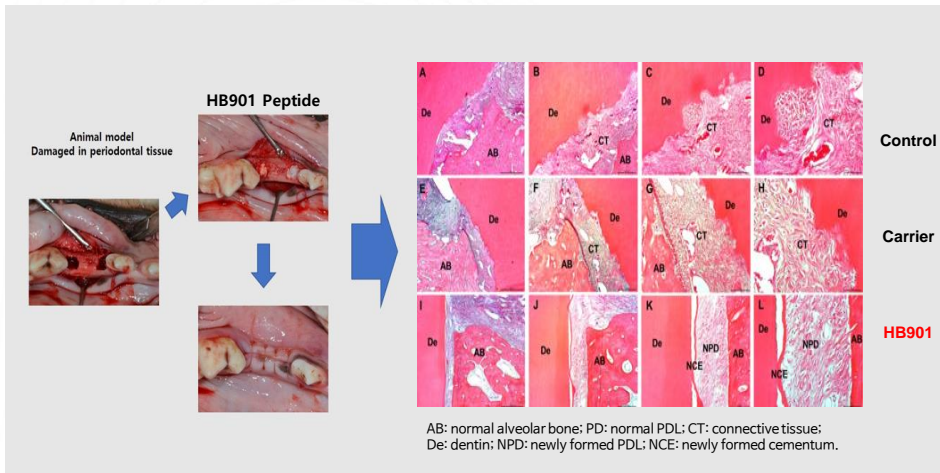


(2) MOA of HB-901

Can be used for prevention and treatment purposes in early stages of periodontal disease in animals

MOA of HB-901

Confirmed periodontal tissue regenerative function of HB901 in nonclinical periodontal disease model



Unmet Needs & Solution of Vet Dental Disease Treatment

Unmet Needs

- Most companion animals visit the veterinary clinic to receive dental treatment after periodontal disease has progressed to stage 3-4
- With poor prognosis, tooth extraction is required

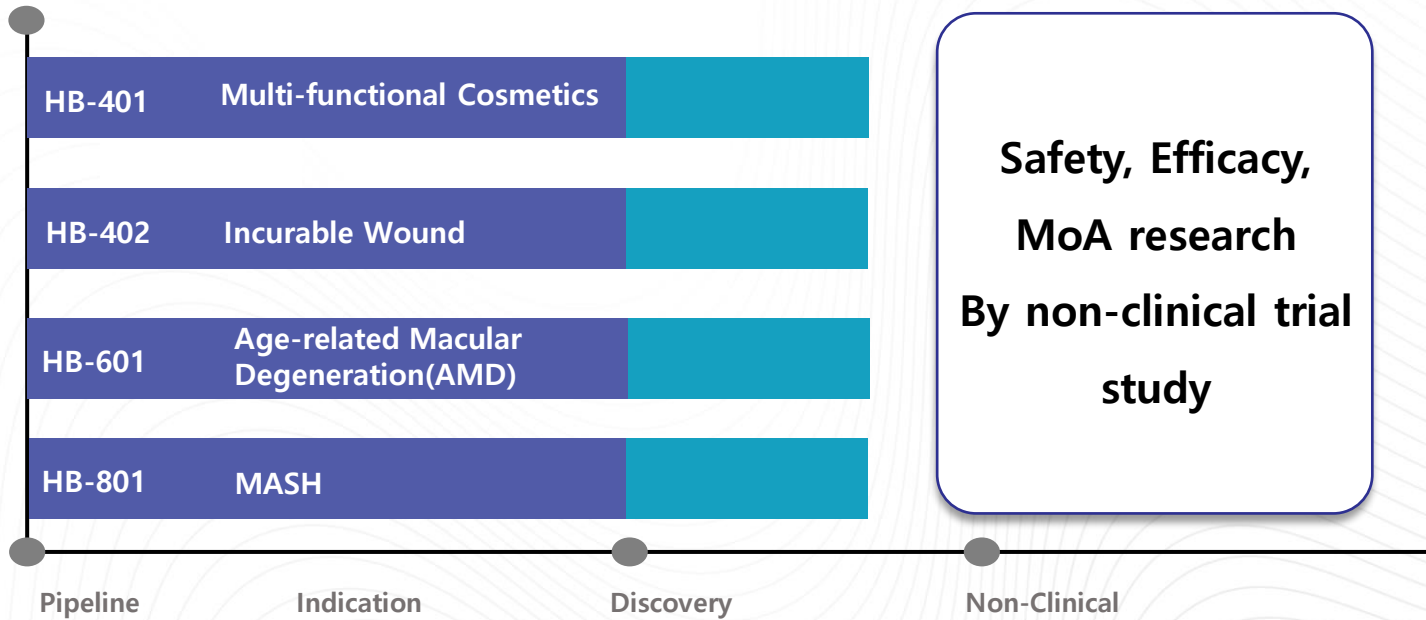
Solution

- Complete preventive treatment at home is possible with prescribed ointment containing HB901 peptide, which differs from functional food or snacks

Other Pipeline



Developing various treatment areas through innovative R&D





Growth Strategy

Global Strategy of Dentopine Pipeline



Optimized licensing out and localized partnering strategy for varying drug classification and dental treatment service environments

Developed Market Korea/North America/EU/Japan, etc.

- **Business strategy:** Establishment of Dentopine's technology and reliability through the simultaneous supply of prescription drugs (hospital treatment + prescription drugs) and consumer products
- **Partnering strategy:** Production, distribution, and supply to partner companies after completion of joint R&D clinical trials via licensing out

Emerging Market China/India/Russia/South America/Southeast Asia

- **Business strategy:** Development of a market in a region with low medical accessibility through the supply of consumer goods followed by prescription drugs
- **Partnering strategy:** Enter the pharmaceutical market after targeting the consumer market through the best partners for each country/region

	Region	Strategy		Research	Development	Clinical	Approval	Production	Distribution
Prescription drug	Korea China/Russia/ Southeast Asia	Business promotion through a joint venture	HysensBio	●	●	●		●	
			Orion Biologics				●		●
	NA/EU	Building a regionally-optimized business model via LO	HysensBio	●	●	●			
			Global partners		●	●	●	●	●
	Emerging countries	Building a regionally-optimized business model via LO	HysensBio	●	●	●		●	
			Global/Regional partners				●	●	●
Consumer/ Quasi-drug	Korea China/Russia/ Southeast Asia	Business promotion through a joint venture	HysensBio	●					
			Orion Biologics		●	●	●	●	●
	NA/EU/ Emerging countries	Building a regionally-optimized business model via LO	HysensBio	●	●		●		
			Global partners		●	●	●	●	●

R&D Partnership



World-wide network with world class partners covering all areas of R&D, from basic research to clinical trials and business development.

CRO



Peptide Production/ QC



Institution Clinical Trial



Formulation

STRATUM MEDICAL Corporation



Consulting



Cooperation Research



Analysis/Delivery



Patent/Law



Non-Clinical Research





Patent applied/registered in 17 countries: 126 (70 registered in 16 countries)

Additional extension of rights protection period utilizing patent and licensing system

- Korea: Applied 9 / Registered 15
- Oversea: Applied 47 / Registered 55
- **Country where Patents are registered:** South Korea, USA, Canada, Australia, Japan, Russia, China, Hong Kong, Taiwan, Indonesia, India, Singapore, Vietnam, Malaysia, Mexico, Brazil



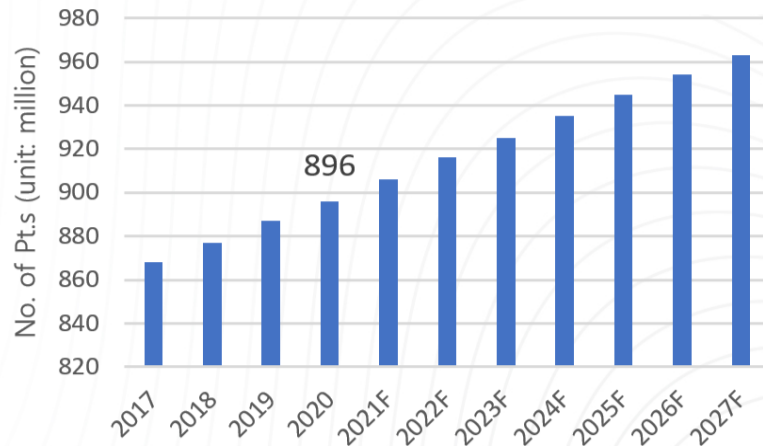


Worldwide number of DH/DC patients is 1 B, 2 B respectively, a huge market
Patient number is expected to continuously increase

DH Global Market

- 12% of world population is affected in 2020
- Constant increase of patients is expected due to aging of population, uptake of sugar, drinking, smoking
- **DH patients increased 10.9%** during 2017 ~ 2027

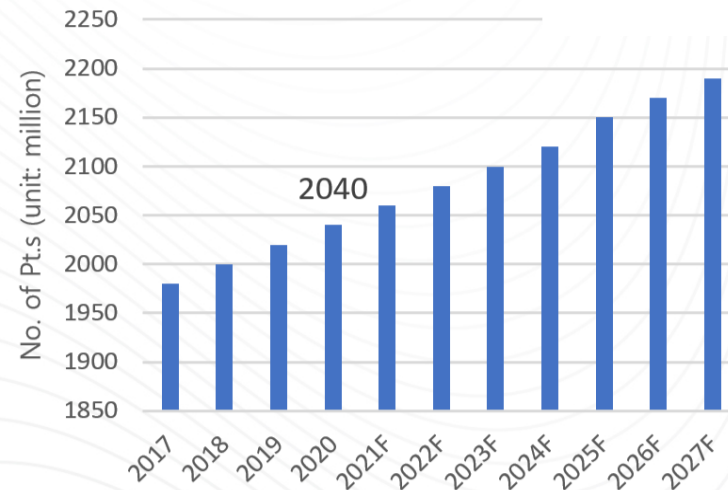
DH patients over 18 yrs old



DC Global Market

- World's most prevalent, with 2B of patients in 2020
- Constant increase of patients regardless of developed or developing country
- **DC patients increased 10.6%** during 2017 ~ 2027

Number of DC patients



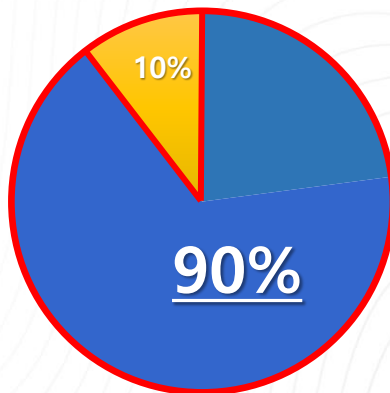
Source: WHO Global Burden of Disease Study 19.08, Frost & Sullivan Dentin Hypersensitivity & Caries Research, 21.05



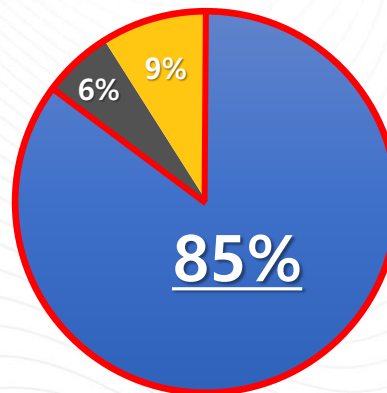
Over 85% of Dental Staffs are willing to use KH001

- **90%** of dentists are willing to use KH001 in 6 countries (USA, UK, France, Germany, Italy, and Spain)
- **85%** of dentist in Korean Academy of Conservative Dentistry, Fall 2021 gave positive feedbacks about use of KH001
- **92%** of dental hygienists working in Korean dental clinics are willing to recommend the use of KH001

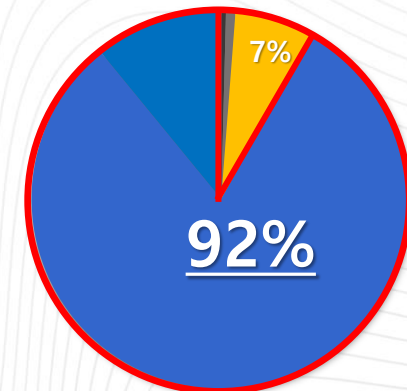
Dentists' Willingness Survey in 6 countries (F&S, 2021, 48 dentists)



Dentists' Willingness Survey in Korea (KACD, 2021, 184 dentists)



Dental hygienist's Willingness to Recommend Survey in Korea (Dental Care Center, NamSeoul Univ, 2021, 247 hygienists)





More than 1 Billion patients with severe periodontitis

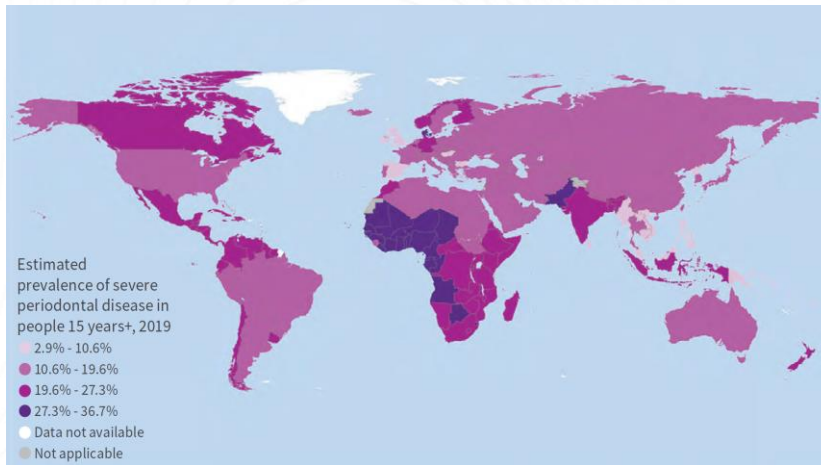
High prevalence of geriatric population, aging demographics → Continued increase in number of periodontal disease patients expected

Periodontal Disease Prevalence

- 18.8% of the adult population has severe periodontitis (over 1 Billion people)
- High prevalence of periodontal disease in older population
- In the US, two-thirds (68%) of people aged 65 or older have chronic periodontitis
- In Germany, 88% of people aged 65-74 have periodontitis
- In the US, 42% of people aged 30+ have periodontitis

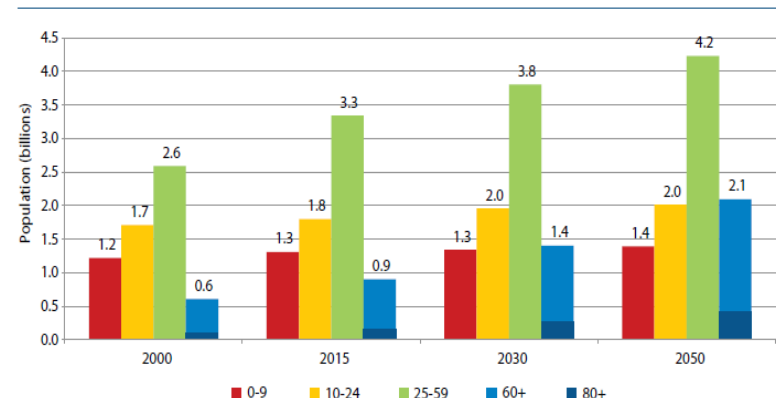
Market Size of Periodontal Treatment

- South Korea: 18.8M patients(2023)
- US Periodontal regeneration market(2023)
 - 4.4M patients
 - Market size: USD 1.5B



Growing adult population and rapidly aging demographics

Figure 3.
Global population by broad age group, 2000-2050



Source: WHO Global oral health status report(2022), Korea Health Insurance Review & Assessment Service(2024), Micheal R.Crane & Associate Ltd.(2023) Kassebaum, Bernabé et al. Global burden of severe periodontitis in 1990-2010: a systematic review and meta-regression. J Dent Res. Nazir, Muhammad et al. "Global Prevalence of Periodontal Disease and Lack of Its Surveillance." TheScientificWorldJournal Eke, Paul I et al. "Periodontitis prevalence in adults ≥ 65 years of age, in the USA." Periodontology 2000 UN World Population Ageing

Product Expansion from ETC to Consumer Goods



Formulation development/product line expansion to prepare for regulations in major countries and expand market demand

- Supply of various prescription drugs through development of optimal formulations: injectable liquid, gel, film, etc.
- Development of paste and mouthwash formulations for prescription drugs and consumer goods
- Expansion into medical devices: composite dental materials





Targeted to prescription drug, consumer products in China, Korea, Russia, SEA, MENA



Orion Bio Receives Hysense's Dental Patent Technology... to be Used in Korea

Lee, Young Sung | 입력 2023.09.20 13:23 | 댓글 0



Technology transfer agreement for dental diseases such as Tooth Sensitivity and Cavities

Through the agreement, Orion will exercise implementation rights to practice the patent in Korea in addition to China, Southeast Asia, and Russia.

The core technology transferred is a dentin regeneration technology by activating dentinoblasts, which was first developed by HysenseBio in 2017.

The technology utilizes 'Selcopintide', a peptide derived from the CPNE7 protein, which was developed by HysenseBio and listed by the World Health Organization (WHO), to reactivate dental dentin cells to seal exposed dentin tubules and regenerate damaged dentin. It can treat tooth sensitivity and halt the progression of cavities.

KH-001, a treatment for tooth sensitivity utilizing this technology, has completed Phase 1 and Phase 2a clinical trials in Korea, confirming safety and tolerability. HysenseBio is preparing for IND approval to begin Phase 2b clinical trials of KH-001 within the year.

"With this agreement, we will proceed with the development of new drugs more stably," said Joo-Cheol Park, CEO of HysenseBio. "The foundation has been laid for the development of various oral health-related products, from specialty drugs to consumer products," Hyungseok Kim, CEO of Orion Biologics added.

<https://www.thebionews.net/news/articleView.html?idxno=491>



HysensBio is developing treatments for intractable dental diseases based on the research from world-class dental researchers. We are increasing the sustainability and competitiveness with high expandability and low development costs. We aim from ETC to consumer products and from treatment to prevention.

Promising field

- Over 3billion patients and 100billion USD potential market
- 85% dentists agree on KH001 and expected high royalty

Low costs

- Low costs for clinical study compared to other novel drugs*
(Oncology \$38M* vs. KH-001 under \$8M) *FDA P1~3 average costs vs. KH-001 P1~3 in Korea, assumption
- Short period of clinical study and product approval

Expandability

- Applicable to ETC, medical devices, consumer products
- Expandable to veterinary drugs and animal product

Sustainability

- Business sustainability via expansion to prevention
- Long-term rights by extending patents, expanding formulations, indications, usages

Thank you for your attention



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