

strictly confidential

# AestheFill®

**New Generation Facial Wrinkle Filler**  
**DISPOSABLE MEDICAL DEVICE**

For Natural Beauty  
**AestheFill®**

 **REGEN Biotech**

*[www.aesthefill.com](http://www.aesthefill.com)*

**AestheFill<sup>®</sup>**

**AestheFill<sup>®</sup>, a longer-lasting neocollagenesis filler to restore  
volume in facial areas, approved by the KFDA**

# AestheFill®



Product Name	AestheFill®
Component	PLA(Poly-Lactic-Acid)
Packaging Unit	1 VIAL/BOX
Treatment Frequency	1 to 3 times
Lasting Effect	18 to 24 months

## Features

- Patented domestic and overseas(biodegradable polymer microparticles and manufacturing methods)
  - Collagen regenerated between and inside porous microparticles
  - Patent : Korea, U.S.A., China and Australia
  - Patent Applications (in process): PCT, Europe, Canada, etc.
- Real-time treatment by shortening treatment time (10 to 30 minutes) with quick suspension compared with other PLLA products
- No residue in the body after certain periods because of biodegradable and bioresorbable particles
- AestheFill materials approved by U.S. FDA

# What is a high-quality filler?

- Safety
- Naturalness
- Long-lasting effect
- Simple treatment procedures
- No side effects
- Biodegradable, Bioresorbable
- Low price

# What materials for dermal fillers?

- **Replacement fillers: collagen/hyaluronic acid(HA) Replacement**
  - To fill the deep dermis or soft tissues contracted due to aging
  - Effective for six to twelve months
- **Bio-stimulator filler to stimulate collagen production: biodegradable polymers; PLLA, PLA, PCL, etc.**
  - To continuously stimulate collagen production at the injection sites for a long time by being slowly degraded or absorbed in the body
  - Effective for two to three years or more
  - Anti-aging effect to increase tensile strength of skin

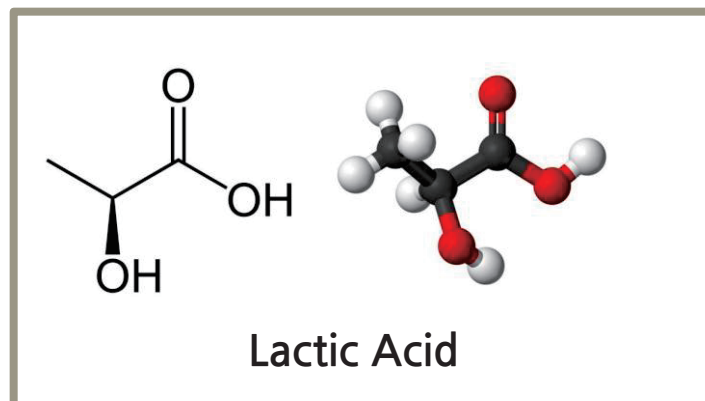
# AestheFill® Components : What is PLA(PolyLactic Acid)?

PLA(PolyLactic Acid, Polylactide) is an aliphatic thermoplastic polymer derived from 100% renewable resources, such as corn and potato starch. Through polymerization, PLA results in Poly (L-lactic acid) (PLLA) and Poly (D-lactic acid) (PDLA). PLLA is the generally commercialized PLA in the market. The chemical and physical properties of PLA are completely same.

Medical substances with biodegradable PLA can be decomposed in the body after completing their function.

Since no surgery needs to take out biodegradable PLA from the body, PLA prevents chronic problems of non-degradable polymers of which foreign objects are left in the body.

Lactic acid's chemical formula :  $C_3H_6O_3$



## Lactic acid

- Produced by fermentation process
- Widely used in food, medical industry
- Recently utilized as monomer for bio PLA

# AestheFill® Components : What is PLA(PolyLactic Acid)?

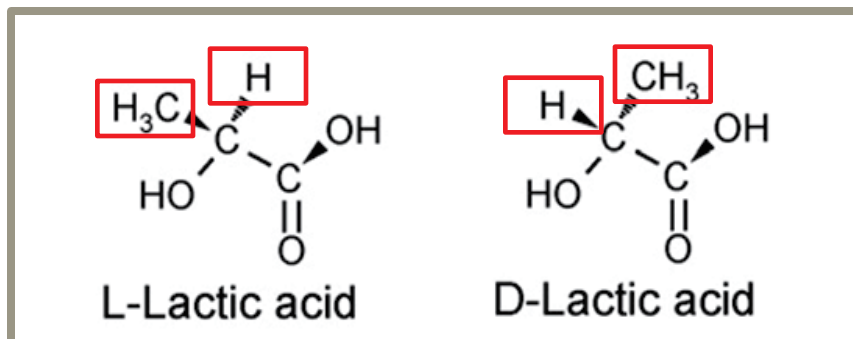
## What is AestheFill?

A new concept filler using globular PLA particles developed

## PLA(PolyLactic Acid)

Lactic acid has two optical isomers, L-lactic acid and D-lactic acid, with same chemical and physical properties

\* Lactic Acid Chemical Formula :  $C_3H_6O_3$



## Lactic Acid Optical Monomers

### Optical isomers (enantiomer)

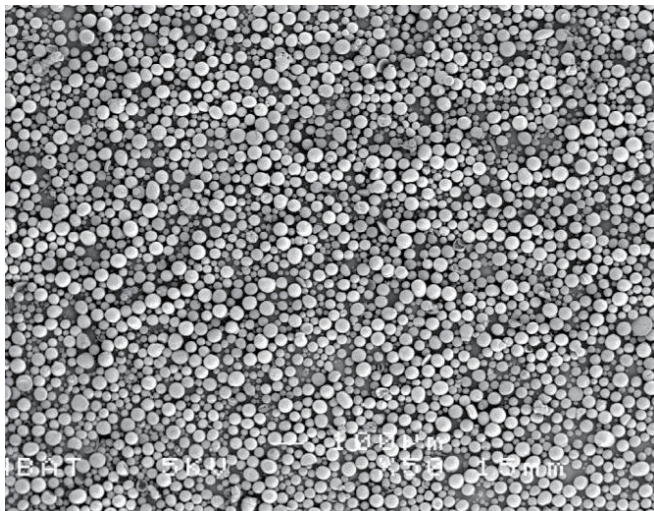
Isomers, with the right- and left-handed mirror images of a chiral molecule, have the same molecular formula, but have a different arrangement of the atoms.

### Monomer

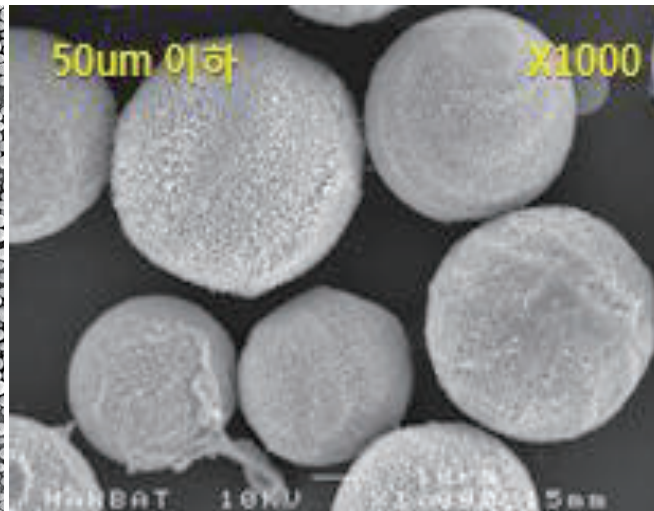
A monomer is a molecule of low molecular weight to form a polymer.  
A polymer can be made up of linking many monomers.

# AestheFill® Structure

## Porous Microsphere



× 50  
(a microscope of 50 magnification)



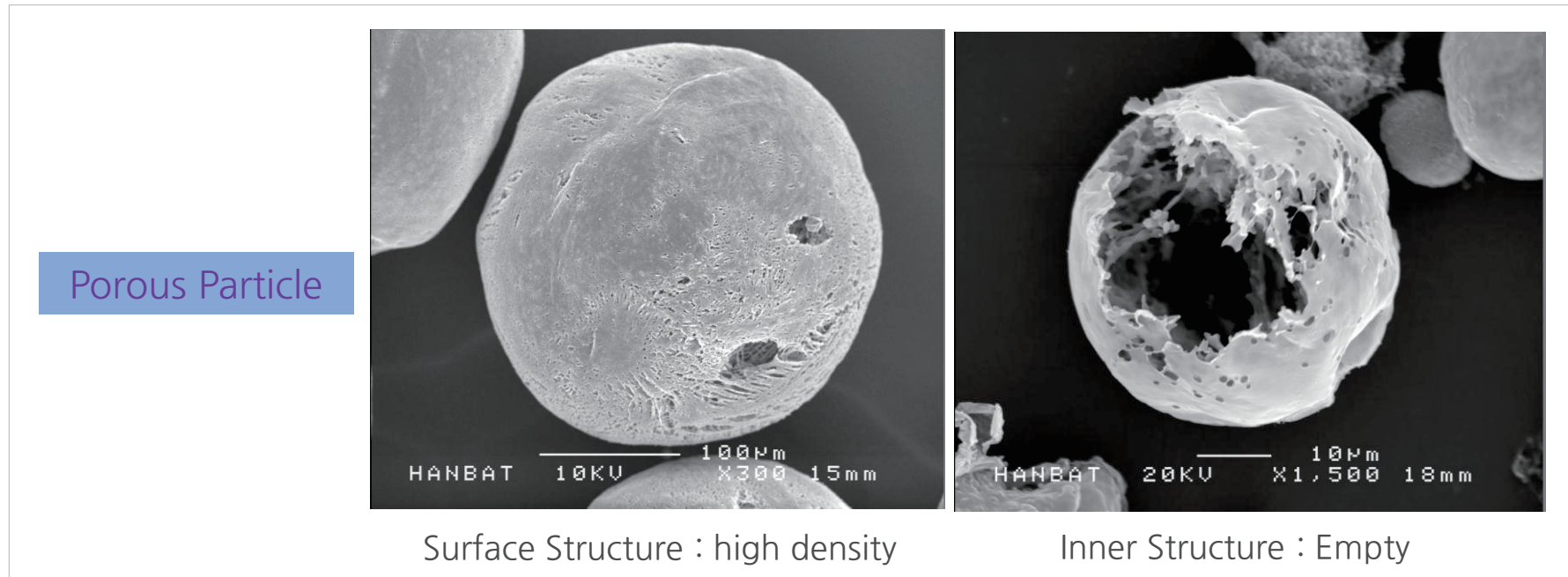
× 1,000  
(a microscope of 1,000 magnification)

- Globular porous particles
- Effective tissue regeneration and collagen creation with small amounts of particles



# AestheFill® Structure

## Porous Microsphere



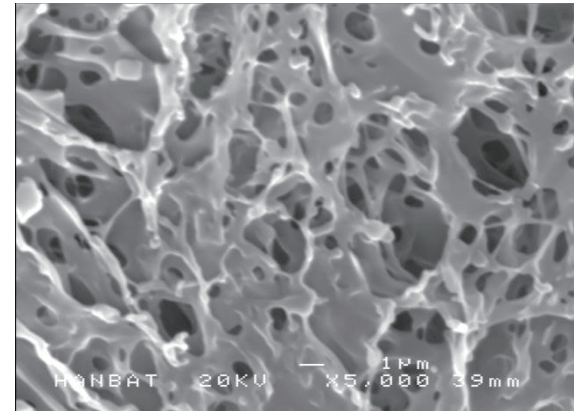
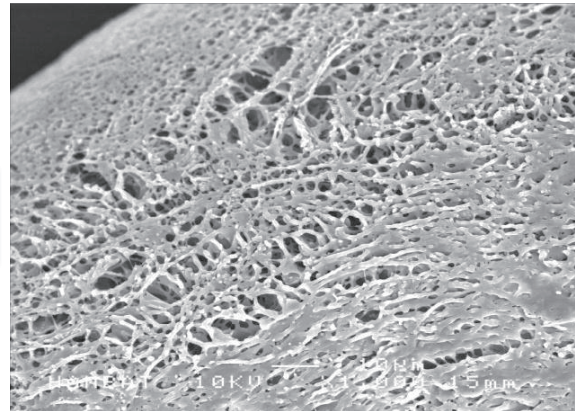
Collagen expression as cells migrate between and inside porous PLA particles

# AestheFill® Structure

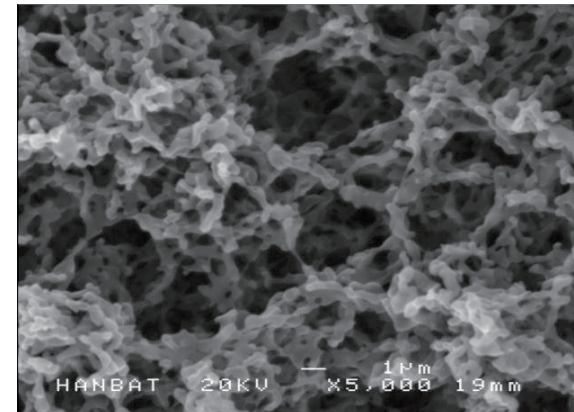
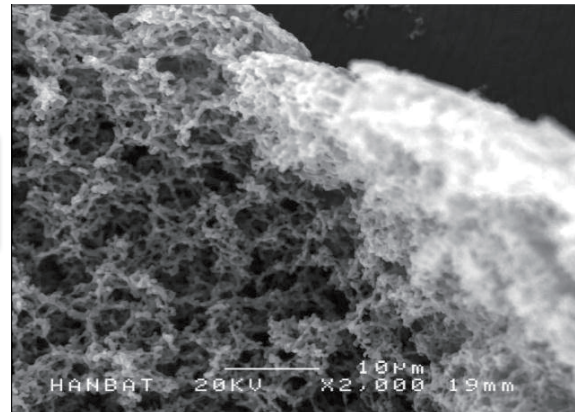
## Porous Microsphere

(Microsphere Structure)

Surface structure



Inner structure

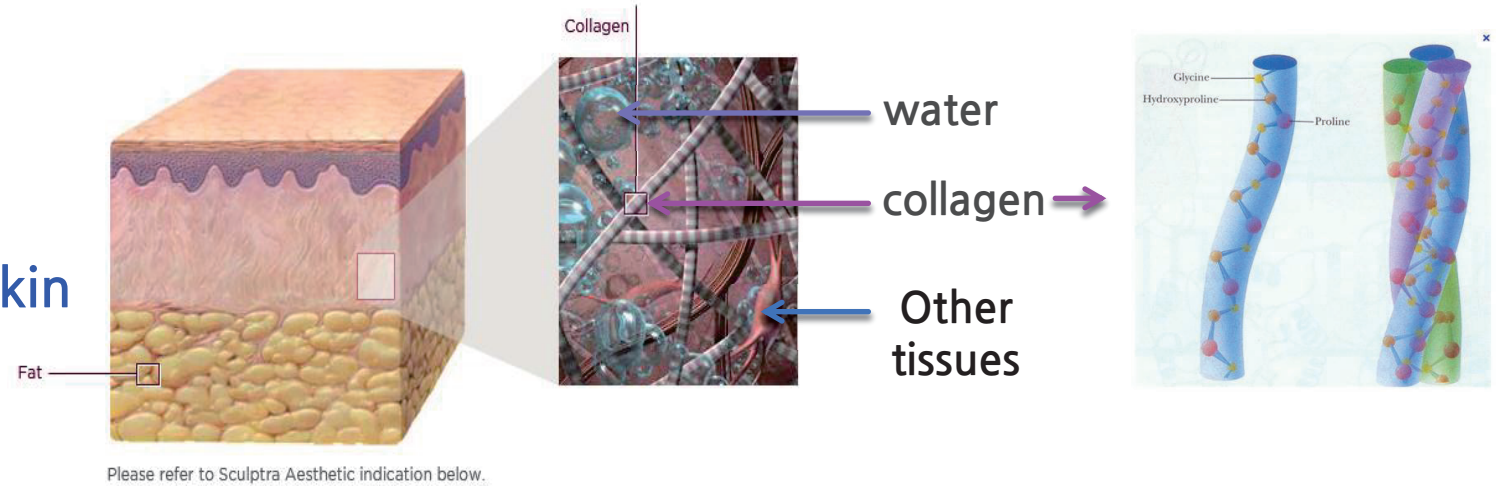


# Mechanism of AestheFill®

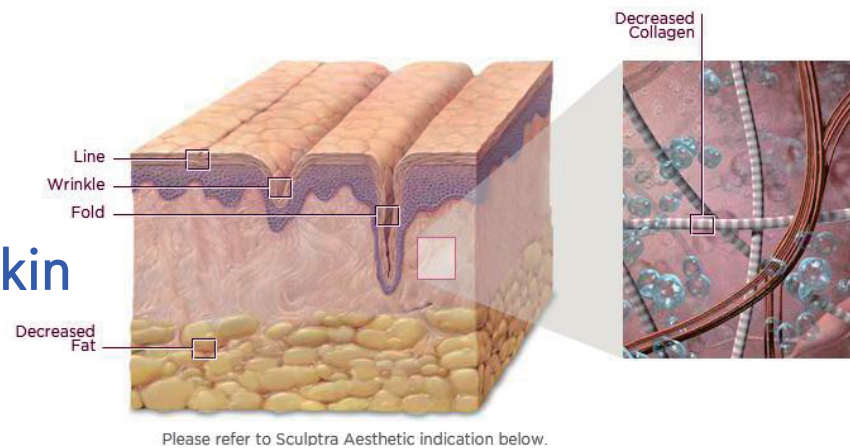
## Role of AestheFill

- Volumizing
- Stimulating new tissues and collagen creation
- Keeping natural volume

## Young Skin



## Old Skin



Detraction of collagen, water, and other tissues as getting older /

PLA fillers to volumize the face and to stimulate creation of collagen and other tissues

# Mechanism of AestheFill®

**Mechanism 1-1.** Filling marbles in empty pockets (Volume increase by injecting PLA fillers in the dermis to restore lost volume)



Skin



Injection globular PLA particles

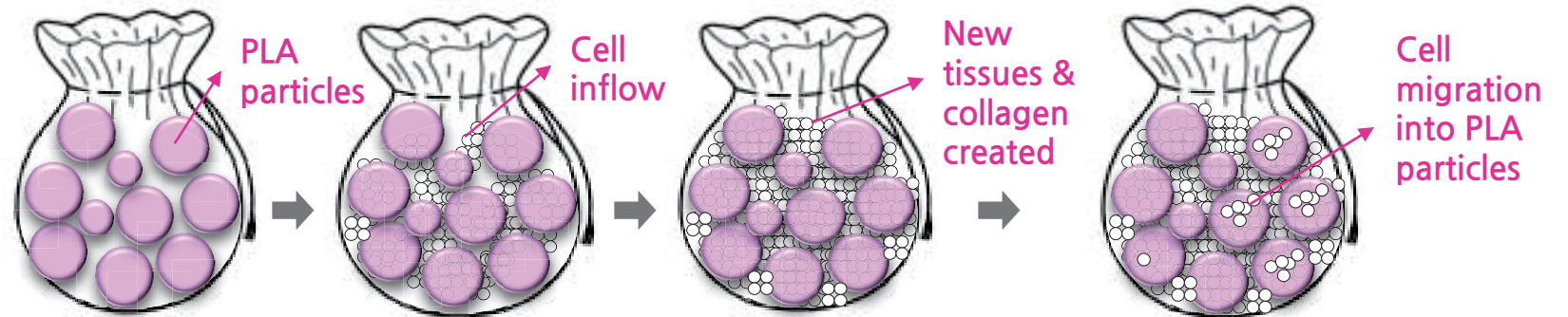


Filling empty spaces

## Role of AestheFill

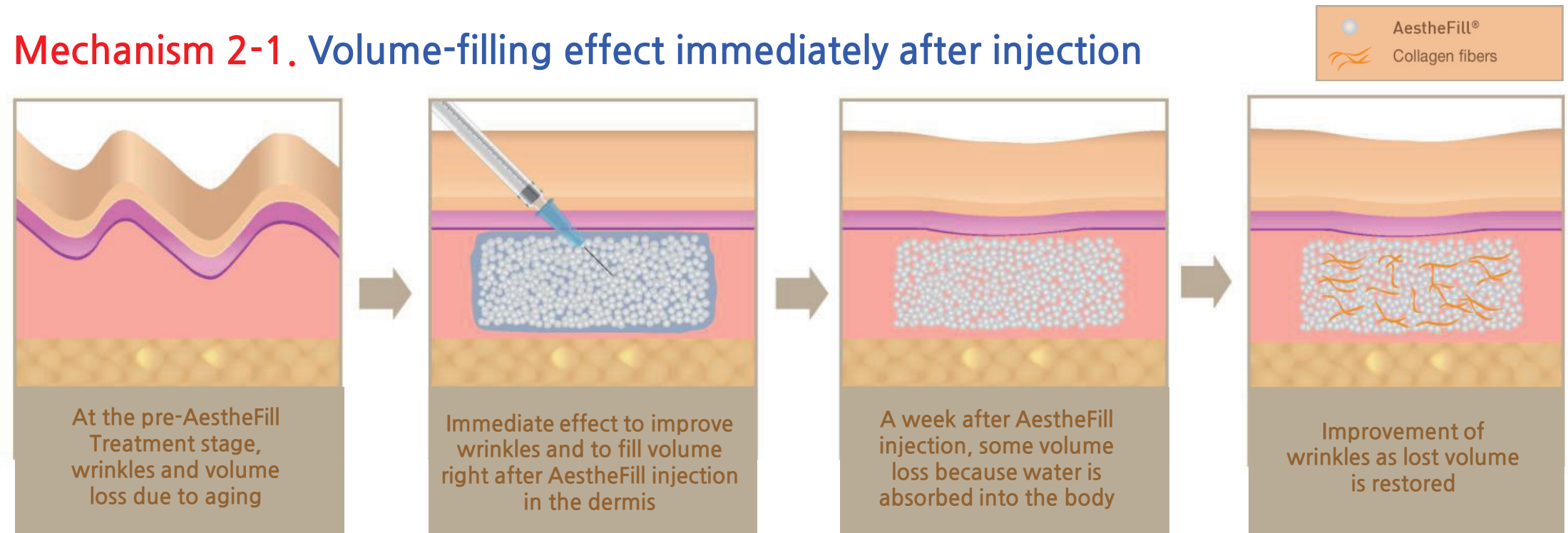
- Volumizing
- Stimulating new tissues and collagen creation
- Keeping natural volume

**Mechanism 1-2.** Small sand grains filled between marbles (Formation of new tissues and collagen with cell inflow between PLA particles)



# Mechanism of AestheFill®

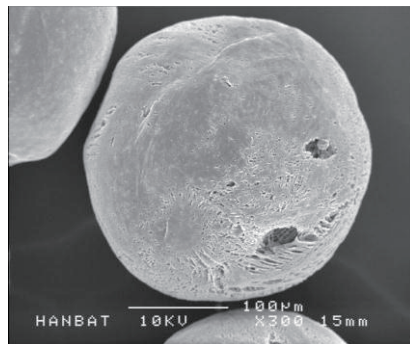
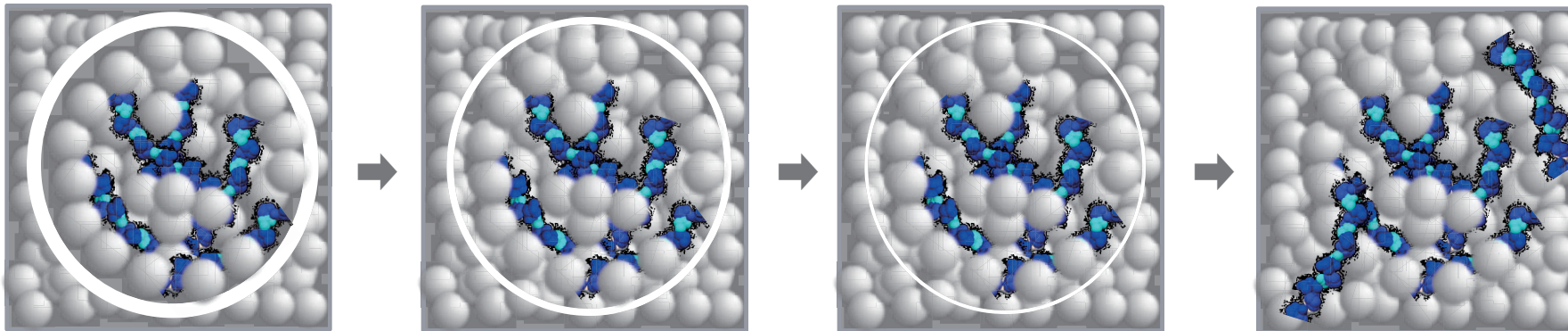
## Mechanism 2-1. Volume-filling effect immediately after injection



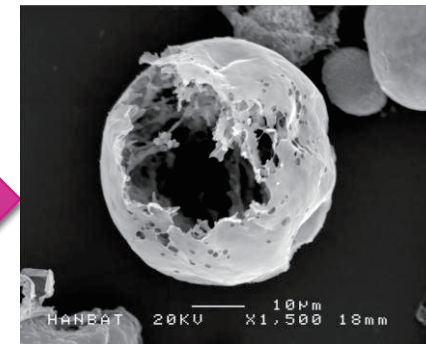
- ✓ At Week 1 to 2 after injection, volume loss occurs, but at Week 4 to 8, the production of cell and collagen restores lost volume.
- ✓ Collagen is gradually produced over time as cells flow into porous PLA particles.

# Mechanism of AestheFill®

**Mechanism 2-2.** Scaffolds (or PLA particles) disappear after being filled or replaced by cells and other substances in the scaffolds.



PLA is degraded into lactic acid and glycogen in the body through hydrolysis ; Later PLA is excreted outside the body with the form of water and CO<sub>2</sub>.

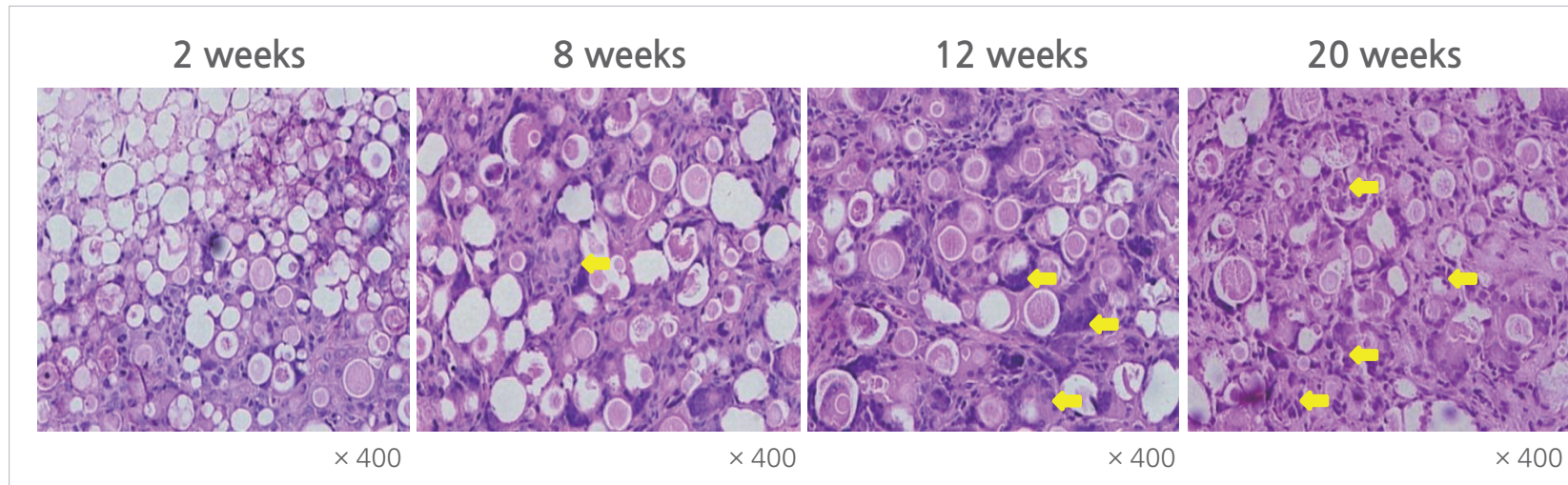


**Safe:** Replacing the spaces of PLA particles with collagen as the particles disappear

# AestheFill® : Strength

## Efficacy : Stimulation of new tissues and collagen production

- Production of new tissues confirmed by histological analysis



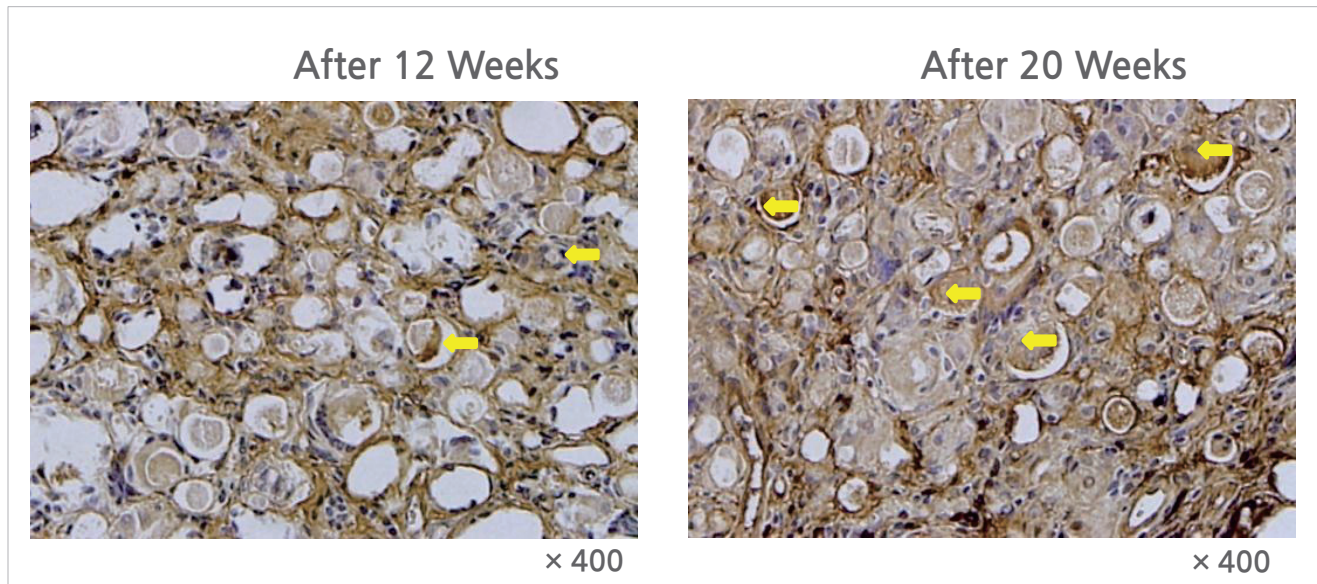
- ✓ Pink(cytoplasm); Dark pink or Blue(nucleus)
- ✓ Arrows: Cells migrated into inside PLA particles

- At Week 2 after injection, cells have been growing attached to the surface of PLA particles and to spaces between particles. The empty spaces between particles have been filled with cells.
- At Week 8, there are no empty spaces between PLA particles, by being filled with cells which start to migrate into porous PLA particles.(yellow arrow)
- At Week 12 and 20, cells have migrated into the inner parts of PLA particles, and fill the inside of and spaces between the particles.

# AestheFill® : Strength

Verified regeneration of new dermal tissues by histological examination

Histological analysis - IHC staining for actin and Type1 collagen



Dark blue (nucleus of cells); Brown (new tissues (cells) with collagen expression)

The formation of collagen is to form new tissues. From Week 4, new collagen production has been generated by the cells settled in the PLA.

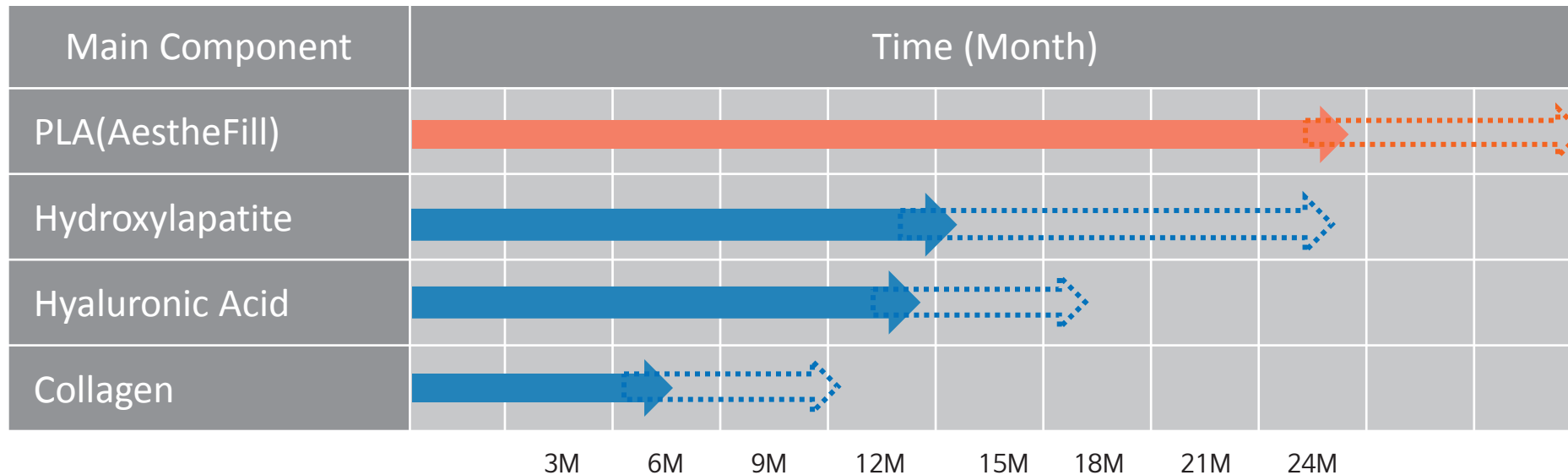
At Week 12 and 20, collagen expression has been increased between porous PLA particles and inside the particles(yellow arrows)



# AestheFill® : Strength

## LONG-LASTING EFFECT

- Natural volume lasting for a long time



AestheFill, a next generation filler, is different from other existing fillers only to correct folds in certain areas. By actively inducing production of new collagen and tissues, AestheFill can correct wrinkles and folds, volumize the overall facial areas, and keep more natural volume for a long time.

# AestheFill® : Strength

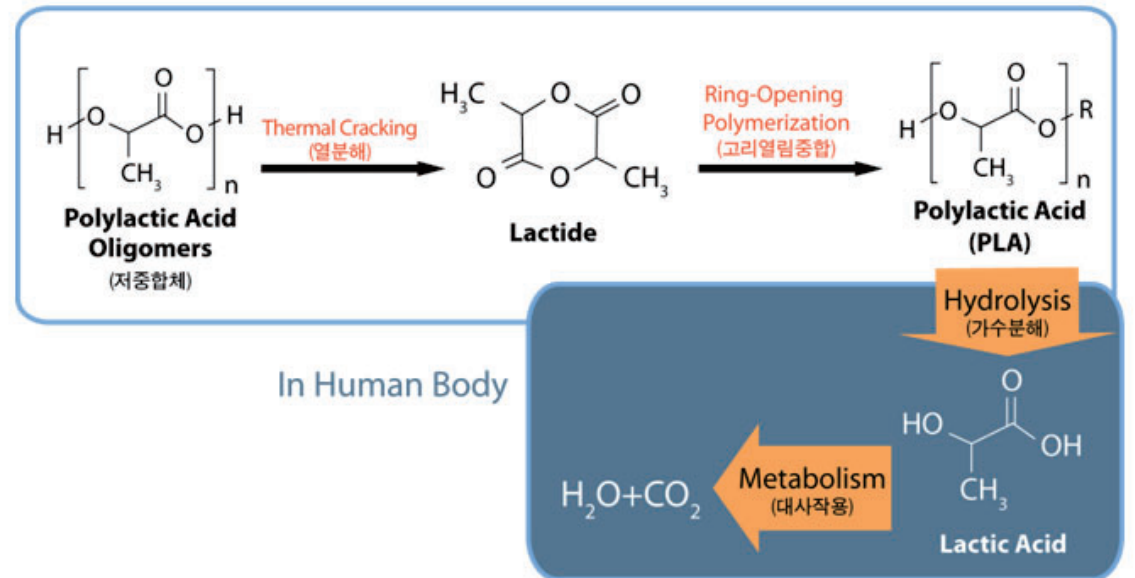
## Safety : Biodegradability

### 1) Completely gone after hydrolysis

- PLA, the main component of PowerFill, is a biodegradable, biocompatible polymer used for medical devices for decades.
- Safe and nontoxic PLA: PLA is degraded in the body through hydrolysis to lactic acid and glycogen. Then by metabolizing, PLA is decomposed into carbon dioxide and water, and is excreted outside the body.

PLA is a safe and US FDA-approved substance under its GRAS(Generally Recognized as Safe) registration since 1984.

PLA is excreted outside the body after being decomposed with H<sub>2</sub>O and CO<sub>2</sub>.



Mechanism of Action of PLA [Poly(DL-lactide)]

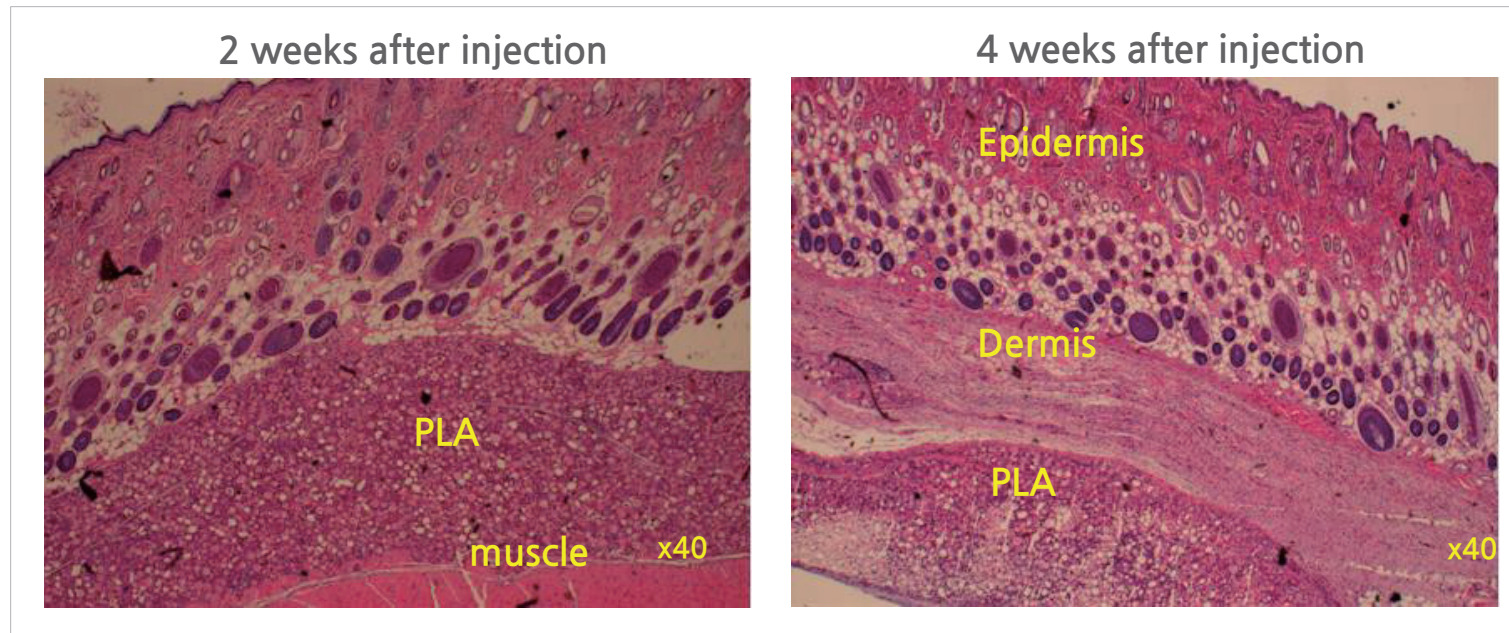
# AestheFill® : Strength

## Safety : No migration into other tissues

### 2) No migration of PLA particles to correct folds and keep volume in the injected areas

Once PLA particles are injected in the dermis, the particles stay in the same layer without moving into other tissue or areas as observed below at Week 2 and 4 after injection.

### Location of PLA particles in the injected sites



Sources: A study on effectiveness and safety of biodegradable polymer particles, MPLF, as injectable fillers for the dermis, Kangdong Sungsim Hospital, Hallym Univ., 2011

# Safety: Materials

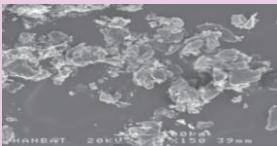
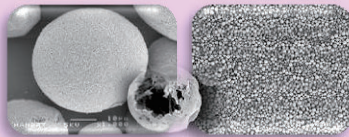


PLA is safe as registered in the U.S. FDA's GRAS since 1984

GRAS (Generally Recognized As Safe)? → a designation that a chemical or substance added to food is considered safe


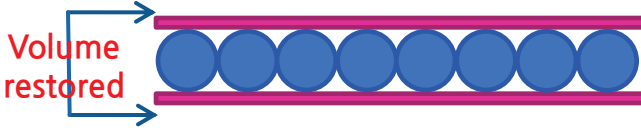
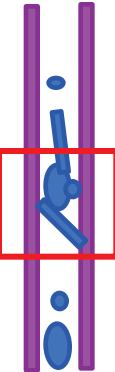
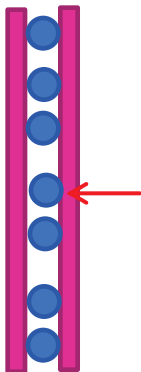
The image shows two side-by-side screenshots of government websites. The left screenshot is from the U.S. Food and Drug Administration (FDA) website, specifically the 'Generally Recognized as Safe (GRAS)' page. It includes a navigation menu, a search bar, and a main content area with sections for 'Overview', 'Related Content', and 'Contact FDA'. The 'Overview' section lists key points about the GRAS program, such as the requirement for scientific evidence and the history of the program. The right screenshot is from the U.S. Government Printing Office (GPO) website, showing the 'ELECTRONIC CODE OF FEDERAL REGULATIONS' (e-CFR) page. It features a search bar, navigation options, and a list of regulations under 'PART 184—DIRECT FOOD SUBSTANCES AFFIRMED AS GENERALLY RECOGNIZED AS SAFE'. A prominent red banner indicates that the e-CFR data is current as of December 18, 2013.

- GRAS-NO (U.S. FDA) : **184.1061** (registered on Sept. 7, 1984)

# Competitors: AestheFill vs Sculptra

Entry	Sculptra	AestheFill®
Major components	Poly L-lactic Acid (PLLA)	PolyLactic Acid (PLA)
Treatment Frequency	One to five vials per treatment with 4 to 6 intervals Average 2 to 3 or 3 to 4 treatment frequencies	One to five vials per treatment with 4 to 6 intervals Average 1 to 3 or 3 to 4 treatment frequencies
Effect Results	4 to 6 weeks after injection	Immediate results after injection or 4 to 6 after injection
Effect Lasting	1.5 to 2 years	1.5 to 2 years
Photo of Microparticle Structure (filler particles)	 <p>form-less, no shape causing needle injection blockage</p>	 <p>globular porous shape → soft injection, easy treatment</p>
Suspension Time	2 to 20 Hours	<b>10 to 30 minutes</b> <b>Faster treatment with quick suspension</b>
Particle Concentration	 <p>150mg / 1Vial Packed in Vial</p>	 <p>200mg / 1Vial Packed in Vial</p>
Product Characteristics	Safety and Effectiveness -approved materials (PLLA/US-FDA approved/Used in 46 countries )	Safety and Effectiveness- approved materials (PLA/US FDA approved)
Storage after Suspension	72 hours after suspension (3 days)	Immediately used after suspension

# Competitors: AestheFill vs Sculptra

Entry	Sculptra	AestheFill®
Effect after treatment	 <p>&lt;form-less Sculptra&gt;</p> <p>Form-less particles positioned between skin layers without order</p>	 <p>&lt;globular AestheFill&gt;</p> <p>Volume production between skin layers with globular particles</p>
During Treatment	 <p>Causing needle injection blockage due to irregular shaped particles</p> <p>&lt;form-less Sculptra &gt;</p>	 <p>No needle injection blockage due to regular shaped particles</p> <p>&lt;globular AestheFill&gt;</p>

Fibroblasts to produce collagen in the deep dermis

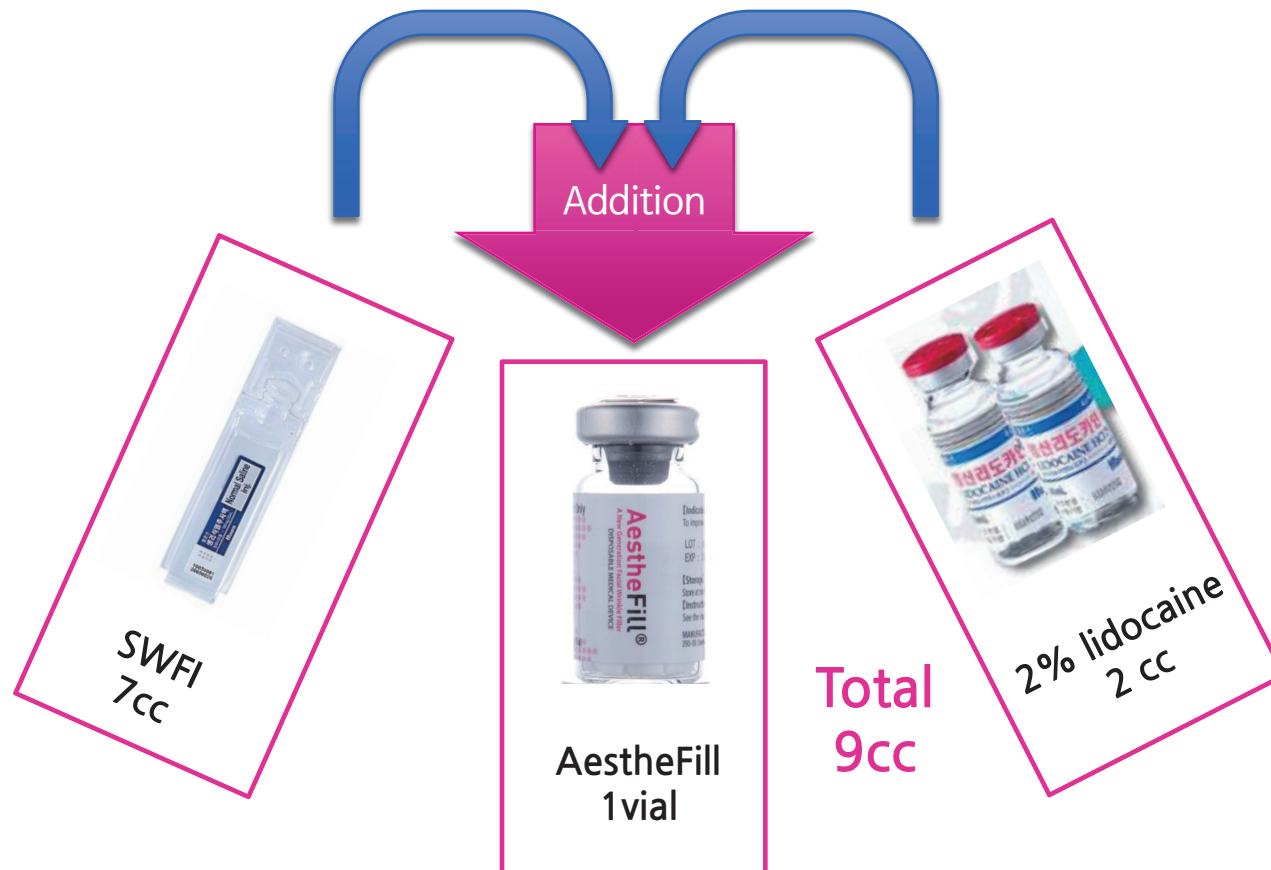
- Without scaffolds or surfaces to settle, fibroblasts migrate into other place.
- The wider space, the more fibroblasts are settled and the more collagen production are induced.

Comparing surfaces with same weight, AestheFill is better to provide wider spaces and creates new tissues and induces collagen production within limited spaces.

# Competitors: AestheFill vs Sculptra

Entry	Sculptra	AestheFill	Strength of AestheFill
Component	PLLA (Poly-L-Lactic-Acid)	PLA (Poly-Lactic-Acid)	Safe components
Effect lasting	18 to 24 months	18 to 24 months	Long-lasting effect
Treatment Frequency	3 to 4 times (4 week interval)	Once w/ 2 to 3 cc dilution 2 to 3 times w/ 6 to 9 cc dilution (4 week interval)	Patient friendly
Effect Results	After 4 to 6 weeks	Immediate results after injection or 4 to 6 after injection	Effectiveness
Suspension Time	2 to 20 hours	10 to 30 minutes	Convenience
Features		Porous globular microparticles	
Particle Shape	formless	globular	Effective; Injectable

# How to Use : Suspension



## AestheFill Suspension

Thirty minutes prior to treatment, make a total of 9cc suspension by adding 7cc Sterile Water For Injection (SWFI) and 2cc lidocaine into the AestheFill vial.

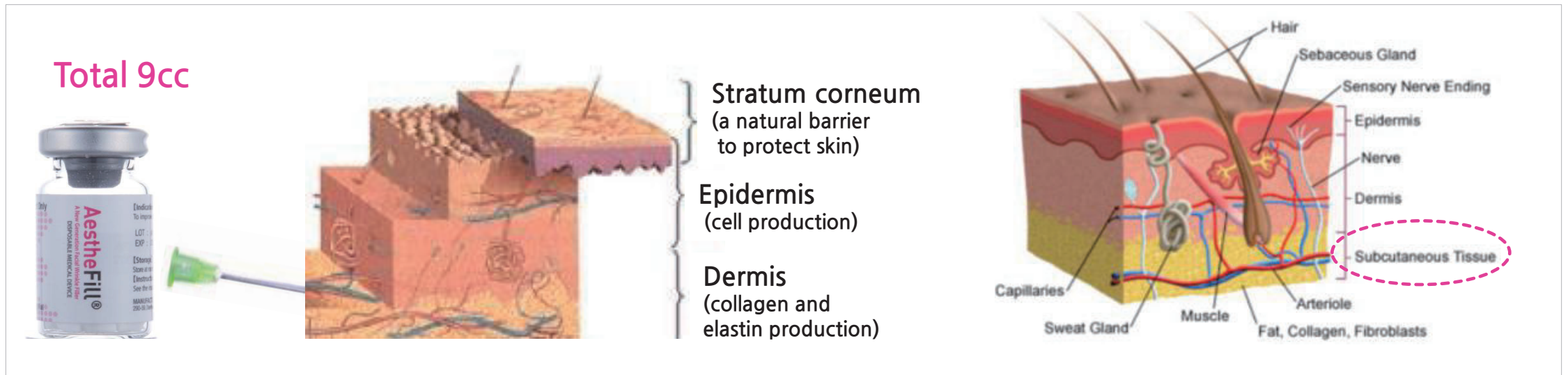
AestheFill 1 vial + SWFI 7mL  
+ 0.2% lidocaine 2mL

※ Various protocols possible by adjusting the amount of Non-HA and SWFI



# How to Use : Injection

- Take the appropriate amount of suspended solution with a 18 G sterile needle, and recommend to use with a 25 G to 26 G sterile cannula needle to perform treatment.
- Inject into the subcutaneous layer to enhance lifting effect and to thicken dermal tissue.
- Perform treatment with 1cc per injection site.



Inject into the deep dermis, where collagen production is actively stimulated, than other normal fillers.

# Treatment Application

## ■ Target

- Primary target: dry, thin skin with fine wrinkles
- Secondary target: crow's feet, nasolabial folds

## ■ Effect

- Overall volume increase in facial areas through neocollagenesis, the creation and inducement of new collagen within the skin.

**AestheFill®**

For Shiny Sparkling Skin



Thank you for your attention

