

Bioactive



OssiMend[®] Bioactive

MOLDABLE Bone Graft Matrix



COLLAGEN MATRIX
SCIENCE • TECHNOLOGY • INNOVATION

Science • Technology • Innovation

At Collagen Matrix we are passionate about advancing the science of tissue repair and regeneration. That's why we're the driving force in the design, development and manufacturing of advanced collagen and mineral based medical devices that support the body's natural ability to regenerate.

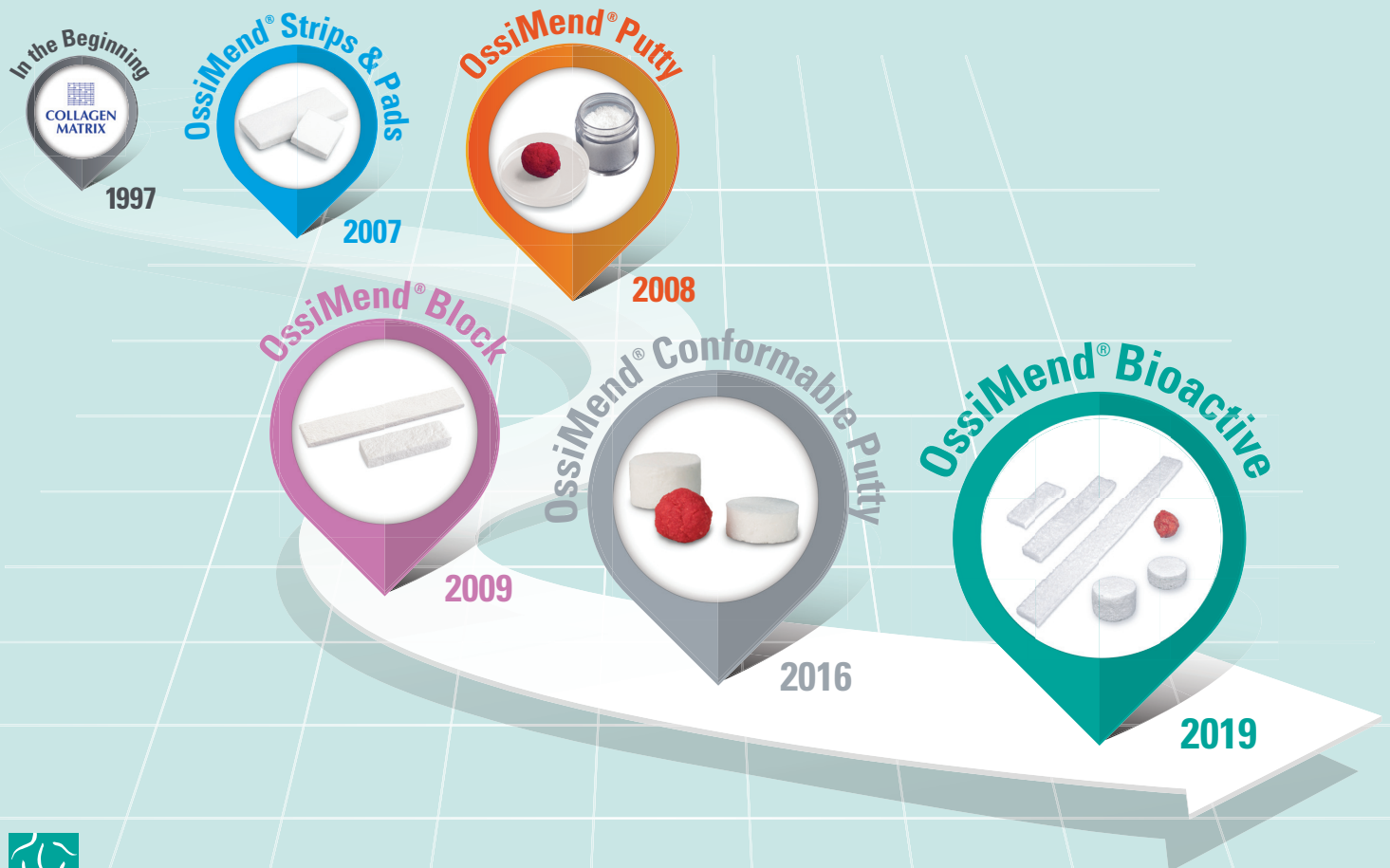
Over our 20+ years of proven performance, we have focused our proprietary technologies and innovative products to meet clinical needs through five key business units – Dental, Spine, Orthopaedic, Dural Repair and Nerve Repair.



7.5 million

Our products have helped patients worldwide with over 7.5 million medical devices that have been produced across all five key business units.

Evolution of Our OssiMend® Products



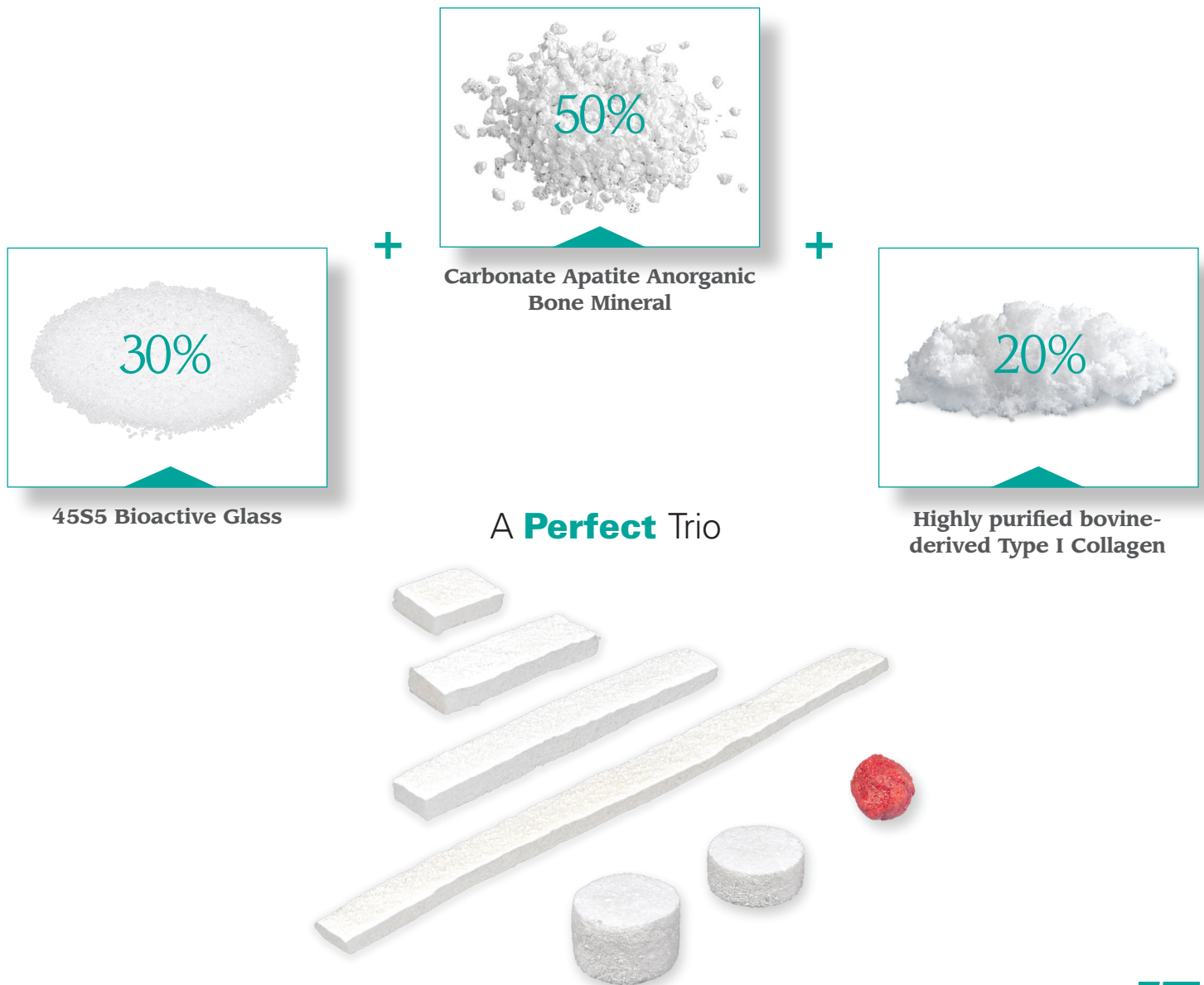
OssiMend® Bioactive **MOLDABLE**

Our **Bioactive** Solutions

The evolution of our mineral and collagen composite bone grafts has advanced with the development and launch of our unique bioactive glass, mineral, and collagen composite bone graft solutions. We have developed a wide range of mineral and collagen composite bone grafts over the last 12 years with a wide range of adjustable characteristics, and we have expanded even further to offer bioactive moldable bone graft solutions.

Our **Composition**

Our bioactive composite bone graft matrices are a combination of three components: carbonate apatite anorganic bovine bone mineral, 45S5 bioactive glass, and Type I Collagen. When combined, they provide an optimal scaffold to support the body's natural ability to regenerate new bone.



OssiMend® Bioactive

MOLDABLE BONE GRAFT MATRIX

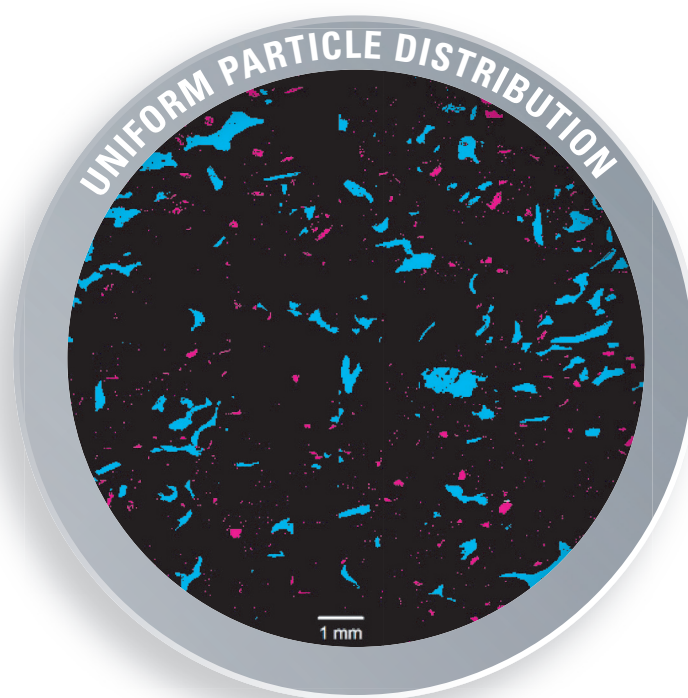
OssiMend® Bioactive Moldable Bone Graft Matrix is composed of carbonate apatite anorganic bone mineral, bioactive glass, and Type I collagen that can be molded to fit the bone defect. It is an osteoconductive, bioactive, porous implant that allows for bony ingrowth across the graft site. The bone graft matrix is slowly resorbed and replaced by new bone tissue during the natural healing process.

Why OssiMend® Bioactive Moldable?

- ❖ **A Perfect Trio of Components—50%**
Carbonate Apatite anorganic bone mineral, 30% 45S5 Bioactive Glass, 20% Type I Collagen
- ❖ **Uniform distribution** of bioactive glass and mineral particles throughout the matrix, achieved through our proprietary manufacturing process¹

OssiMend® Bioactive Glass Component

- ❖ **30% is Optimal:** Less is more. Bioactive glass is incorporated into OssiMend® within a suggested critical range of 5-40% for optimal osteoblast growth and calcium phosphate formation in a composite²
- ❖ **Ideal Particle Range:** A narrow particle size distribution limited to 100-300µm to provide a more controlled rate of ion dissolution & surface reactivity, and a more consistent rate of bone bonding & proliferation^{3,4}
- ❖ **Exemplary Particle Size (100-300µm):**
Larger sized particles may not fully resorb. Smaller particles may resorb away quickly and impede the upregulation of osteoprogenitor cells^{4,5}



An SEM/EDX Analysis of OssiMend® Bioactive Moldable polished cross sections showing mineral and bioactive glass

- 45S5 Bioactive Glass Particles
- Carbonate Apatite Anorganic Bone Mineral
- Porous Type I Collagen Matrix



Moldable Advantage

- ❖ **2 for 1 versatility**—Upon hydration, the strip conformation can be used in its original shape or optionally molded into alternative shapes to address the unique contours of each defect
- ❖ Combined with **either** autogenous bone marrow or autograft with saline
- ❖ Can also be used with autograft as a bone graft extender
- ❖ Puck conformation option is ideal for molding
- ❖ Moldable, flexible, absorbent, resists migration upon irrigation
- ❖ A lengthy 40cc size option unlike any other bioactive moldable bone graft

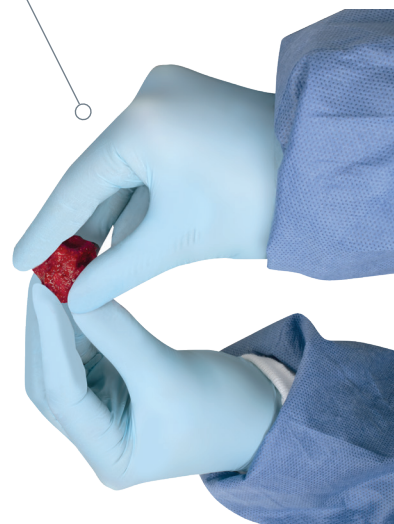
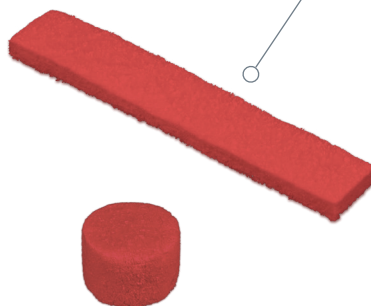
Almost **2x more absorbent** than Vitoss® Bioactive Foam¹ –

- Delivers stem cell rich BMA to fusion site

	ABSORBENCY (ml/g)
OssiMend® Bioactive Moldable	4.59 ± 0.76
Vitoss® Bioactive Foam	2.70 ± 0.35



2 for 1
Versatility



Why Carbonate Apatite Bone Mineral?

1

Optimal **Resorption & Remodeling**^{6,7}

2

Natural Mineral Structure

Similar to Human Bone Mineral

3

More **Calcium Phosphate Deposition** than β -TCP⁸

4

Half the crystallinity than HA,
More Soluble⁹

5

Independent Studies have shown
Higher **Osteoclastic & Osteoblastic**
Activity than β -TCP & HA¹⁰



Why 45S5 Bioactive Glass?

Over **30 Years** of Presence in **Tissue Engineering**^{11,12}



- ❖ **Favorable Environment** for bone regeneration and osteoblast attachment¹³
- ❖ **Ion Exchange & Release**—including soluble tetrahedral silica, which may promote rapid bone formation²
- ❖ **Cell Proliferation & Differentiation**—45S5 Bioactive glass has the ability to stimulate the growth & osteogenic differentiation of human primary osteoblasts¹⁴

Composition of **45S5 Bioactive Glass**

45%	Silicon Dioxide	SiO ₂
24.5%	Calcium Oxide	Ca ₂ O
24.5%	Sodium Oxide	Na ₂ O
6%	Phosphorus Pentoxide	P ₂ O ₅

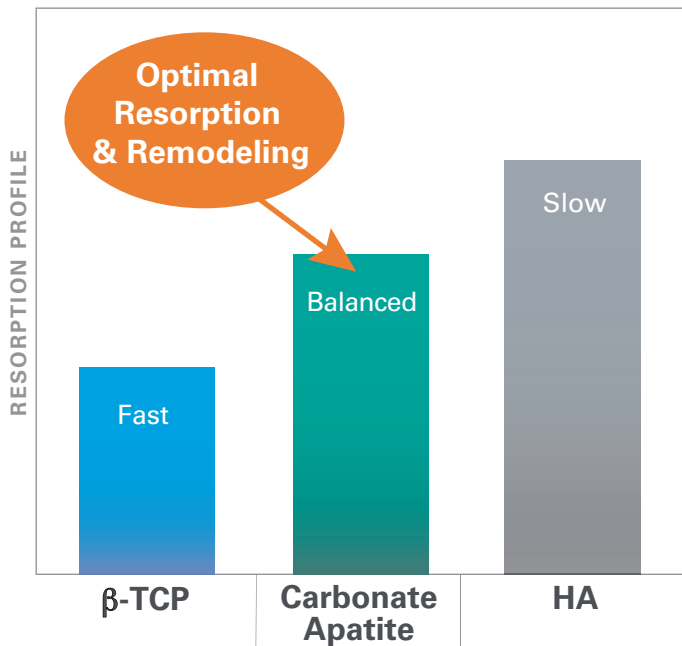
Why Type I Collagen?

Homologous Molecular Structure to Human Collagen¹⁵

- ❖ Highly purified for biocompatibility
- ❖ 100% resorbable through normal metabolic pathways¹⁶
- ❖ Intrinsic hemostatic properties control minor bleeding^{16,17}
- ❖ Well-established long clinical history¹⁶
- ❖ Binds proteins and cells and retains biological factors¹⁸
- ❖ Single most abundant protein in the human body¹⁹



Five Reasons Why Carbonate Apatite is Superior

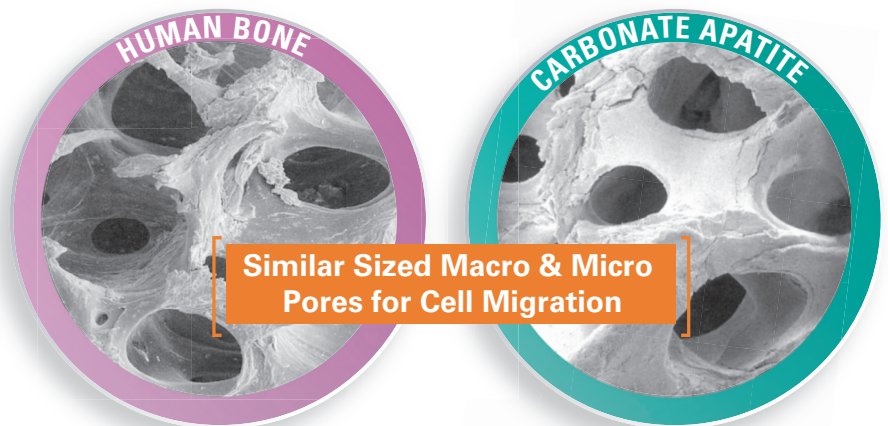


1 Optimal **Resorption & Remodeling**^{6,7}

- ❖ Not fast like beta-tricalcium phosphate (β -TCP)
- ❖ Not slow like hydroxyapatite (HA)
- ❖ Ideally, the rate of the bone graft resorption is balanced to the rate of bone remodeling
- ❖ Carbonate apatite resorption and remodeling are similar to human bone^{6,7}

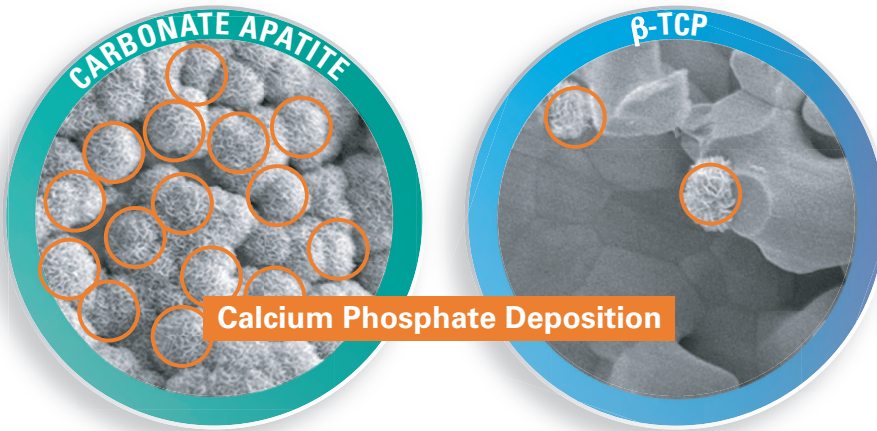
2 **Natural Mineral Structure** Similar to Human Bone Mineral

- ❖ Pores provide pathways for cell migration and attachment to lay down new bone
- ❖ Carbonate apatite is a better osteoconductive material than HA²⁰



3

More **Calcium Phosphate Deposition** than β -TCP⁸



❖ More calcium phosphate is deposited on the carbonate apatite surface as compared to β -TCP⁸

❖ Osteoblasts prefer attaching to calcium phosphate to lay down new bone

4

Half the Crystallinity than HA, **More Soluble**⁹

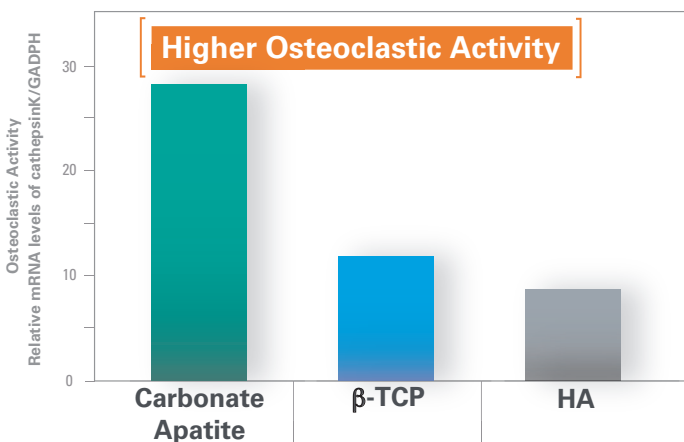
❖ Carbonate apatite has half the crystallinity than HA, which enables optimal resorption and remodeling because it more easily resorbs⁹



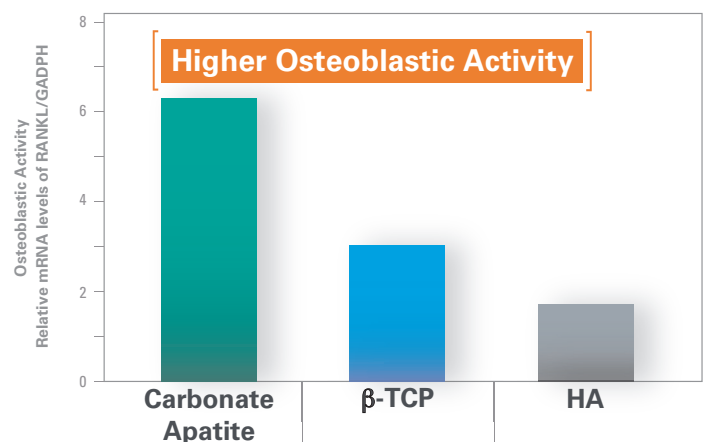
5

Independent Studies have shown Higher **Osteoclastic & Osteoblastic Activity** than β -TCP & HA¹⁰

❖ Osteoclasts break down bone
❖ Carbonate apatite shows higher levels of osteoclastic activity than β -TCP & HA¹⁰

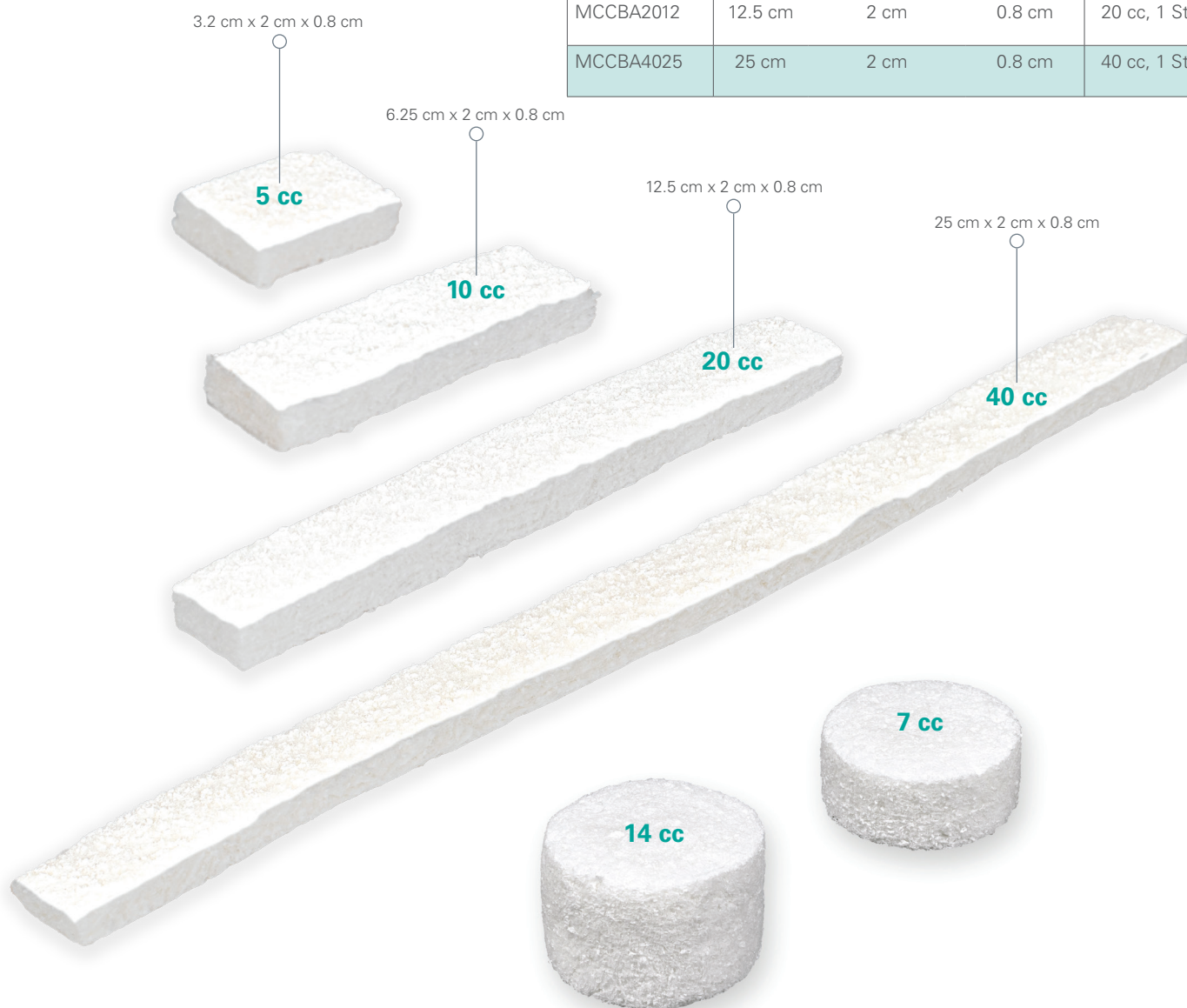


❖ Osteoblasts secrete new bone
❖ Osteoblast proteins are most upregulated with carbonate apatite than β -TCP & HA¹⁰



OssiMend® Bioactive Moldable Strips

CATALOG NO.	DIMENSIONS			QUANTITY
	Length	Width	Thickness	
MCCBA0503	3.2 cm	2 cm	0.8 cm	5 cc, 1 Strip
MCCBA1006	6.25 cm	2 cm	0.8 cm	10 cc, 1 Strip
MCCBA2012	12.5 cm	2 cm	0.8 cm	20 cc, 1 Strip
MCCBA4025	25 cm	2 cm	0.8 cm	40 cc, 1 Strip



OssiMend® Bioactive Moldable Pucks

CATALOG NO.	QUANTITY
MCCBA025	7 cc, 1 Puck
MCCBA05	14 cc, 1 Puck



OssiMend® Bioactive Moldable:

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MS732 Rev 3 10/15/20



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