bioimplon GmbH

Biotech Innovation Pioneers

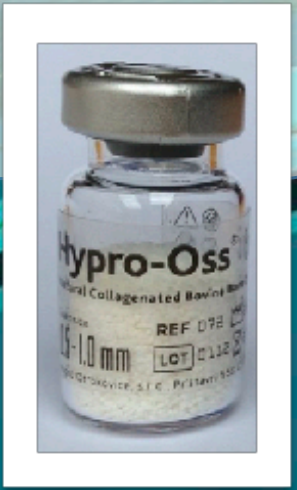
Hypro-Oss

Innovative Bovine Bone Substitution Material

What is Hypro-Oss?

Hypro-Oss is a revolutionary, patented, natural, atelopeptidized and lyophilized bovine bone graft composite.

- a result of 6 years intensive research and development
- a solution for preserving biocompatible collagen within natural bovine bone granules
- enhanced bone formation and integration



Composition of Hypro-Oss

Each single granule consists of approximately:

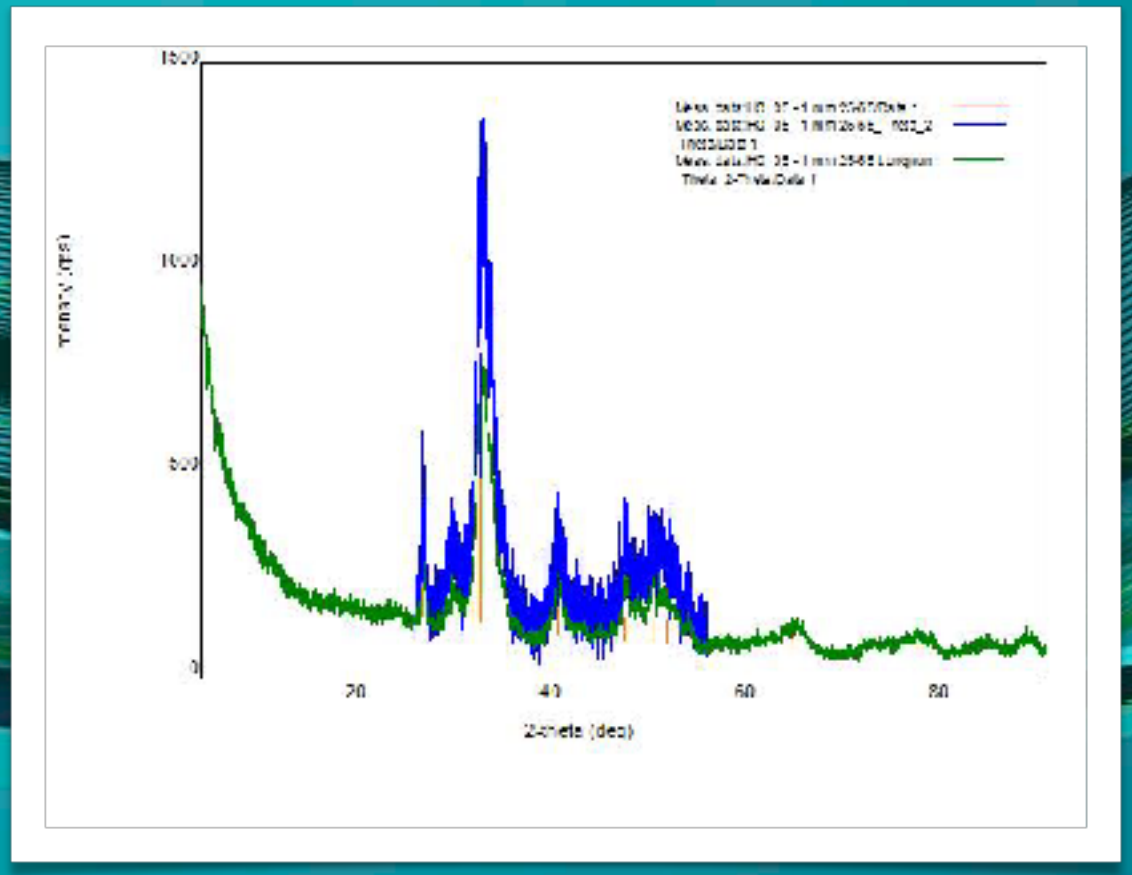
- 30% Atelo-Collagen Type I
- 70% hydroxyapatite

Hypro-Oss is manufactured by using our patented processing technologies of atelopeptidation and lyophilization.

Lyophilization

- it’s a process of freeze-drying that removes water from the material by sublimation
- sublimation is directly converting ice to water vapor, without passing through the intermediary stage of a liquid
- freeze-dried materials become highly absorbent and can be stored at room temperature

X-ray Diffraction Hypro-Oss



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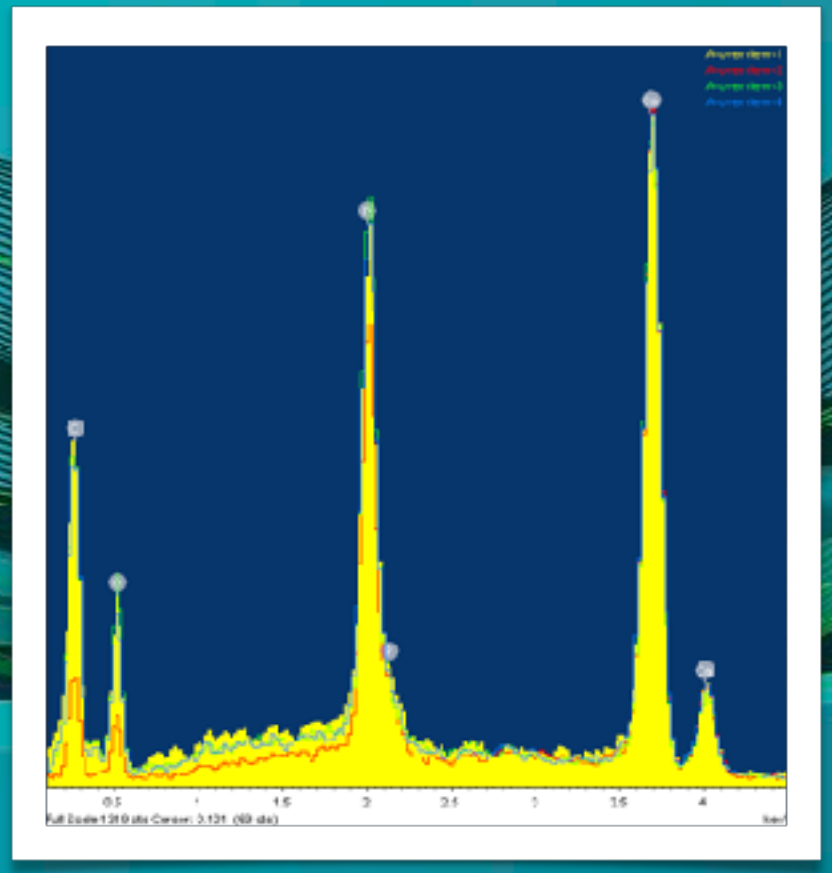
Atelopeptidation

- it’s a term that describes the physicochemical deletion of the antigenic terminal peptide sequence in a collagen molecule
- the resulting modified collagen is called: Atelo-Collagen Type I, a safe non-immunogenic collagen
- the atelopeptidation was performed within the bone granules

EDS-Energy dispersive spectroscopy Hypro-Oss



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Atelo-Collagen Type I

- is the most abundant protein in the extra-cellular matrix of bone
- has a structure that is conducive to promoting mineral deposition and it binds the non collagenous matrix proteins, which initiate and control mineralization by itself
- functions poorly as a graft material, but when coupled with bone morphogenetic proteins, osteoprogenitor precursors, or hydroxyapatite, it enhances incorporation of grafts significantly

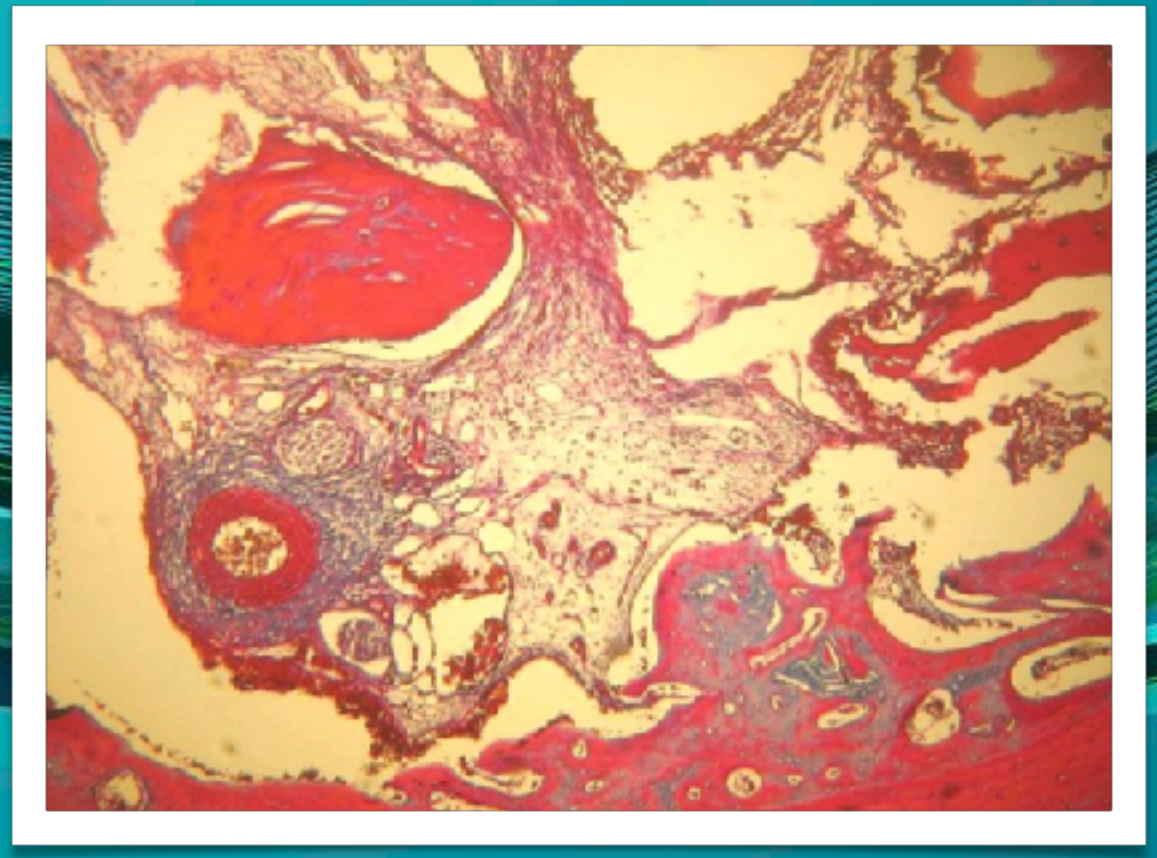
Pure crystalline Atelo-Collagen Type I components

- effective hydrophilic property, optimal cell adhesion and blood absorption
- natural crystalline structure and optimal porosity guarantees longterm dimensional stability

Vital Role of Atelo-Collagen Type I in bone regeneration

- Atelo-Collagen Type I forms the structural protein framework of bone
- Atelo-Collagen Type I takes part in the interaction between osteoblasts and osteoclasts
- Atelo-Collagen Type I activates platelet aggregation and release of growth peptides, such as PDGF, IGF 1, IGF 2 and TGF beta
- growth peptides stimulate bone formation within shortest period of time

Histology after 4 weeks



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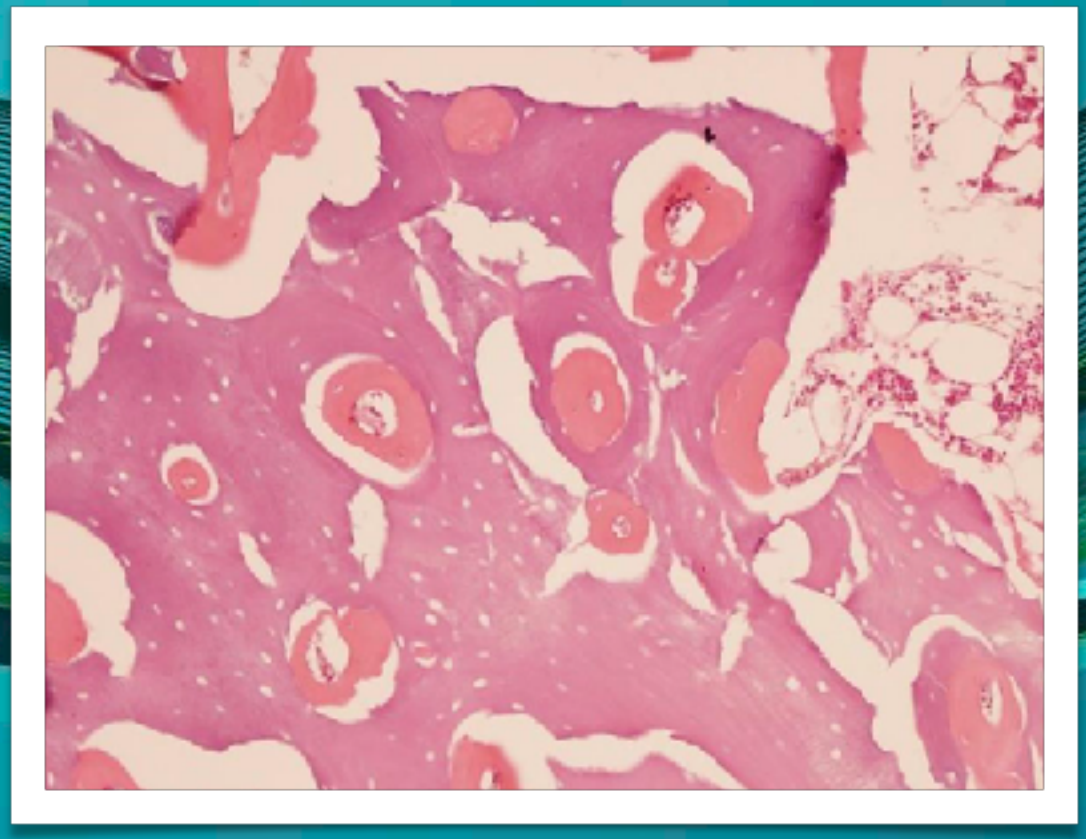
Histology after 14 weeks



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Haemostatic and Bacteriostatic

- powerful haemostatic and bacteriostatic effect thanks to native Atelo-Collagen Type I components
- no swelling or hematoma complications after sinus lifting or surgical procedures
- safe and sterile for four years after production
- easy handling

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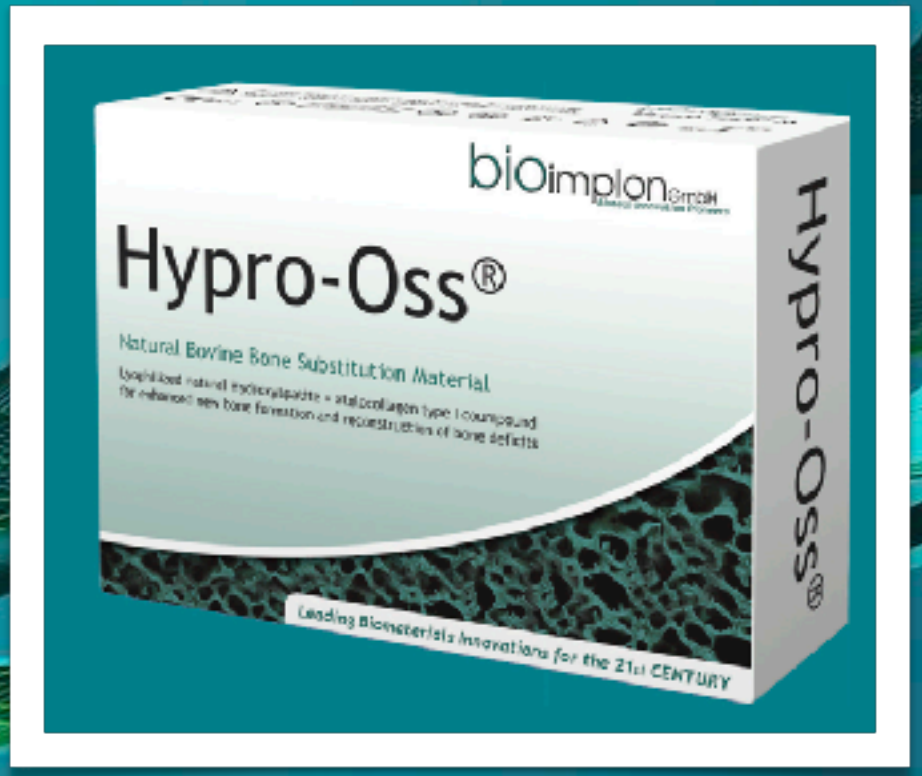
All these properties are combined in just one bone graft composite

The tremendous responsibility to develop bone graft alternative that will enhances the functional capabilities of the bone graft substitute, and potentially reduce or eliminate the need for autograft. A bone composite that combines scaffolding properties with biological elements to stimulate cell proliferation, differentiation and osteogenesis.



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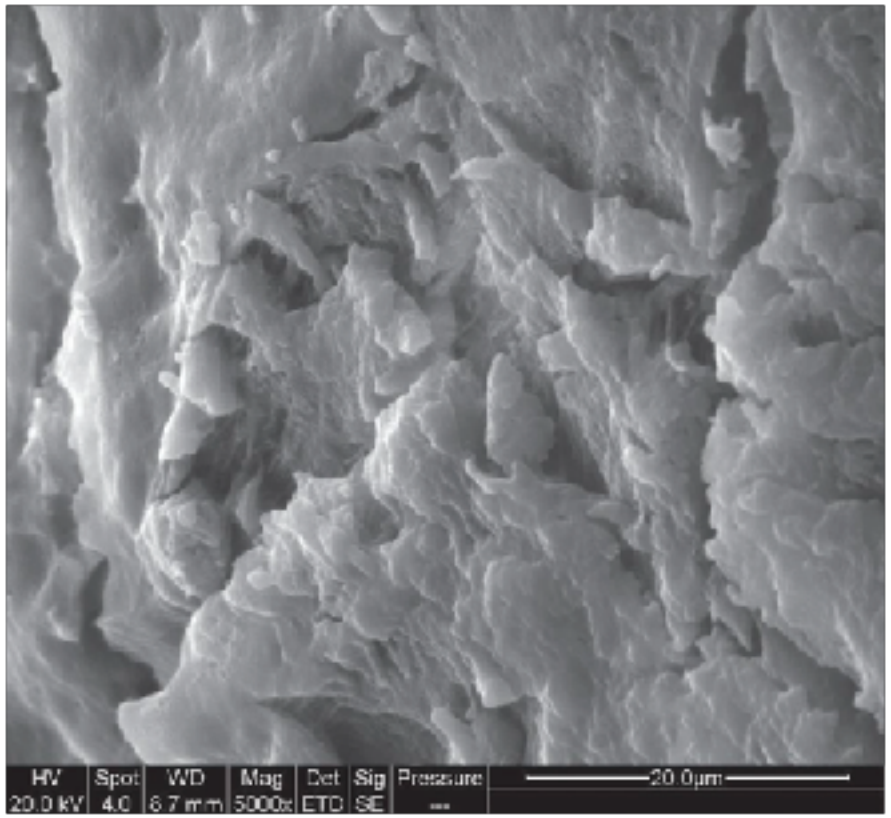
Why bovine bone material



- chemical and physical similarity to human bone
- availability
- cost effective

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Chemical analasys of lyophilised bones human vs. bovine bone

Readings	Human (%)	CI* 95%	Bovine (%)	CI* 95%
Fat	0.06	0.1	0.1	0.1
Nitrogen	4.3	0.1	4.3	0.1
Proteins	27.5	0.2	27.2	0.2
Phosphorus	11.9	0.1	11.9	0.2
Total P2O5	27.1	0.2	27.2	0.7
Calcium	24.6	0.7	23.7	0.6
Total sodium	0.57	0.01	0.46	0.01
Ashes	64.8	0.6	64.3	0.1
Chlorides	1.3	0.06	1.3	0.2
Water	7.93	-	7.75	-
Ca/P	2.06	-	1.99	-

Sterilisation & BSE safety prophylaxis

- control of animal feeding, no meat, bone and protein products, norm EN 12442-2
- historical documentation and decent traceability of cattle
- cattle younger than 3 years, appropriate for human nutrition
- cattle under veterinary control, BSE tested

Sterilisation & BSE safety prophylaxis
Infectious agents elimination

- the raw materials are treated with bactericidal solutions of sodium chloride, peracetic acid, saturated solution of calcium hydroxide with alkaline PH12.5 in order to control the risk of contamination with bacteria, viruses and yeasts
- these procedures induce structural changes such asdecrystallization of prion protein which results in irreversible, non-toxic conformation of the prion protein
- Gamma Irradiation

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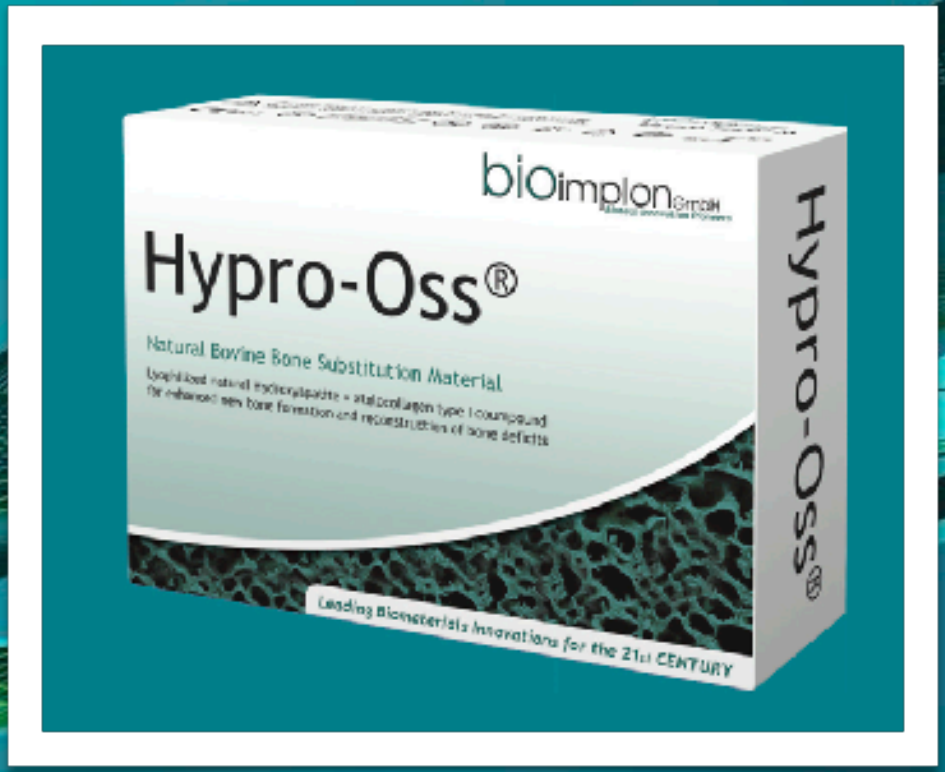
Thank you



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