Hypro-Oss®

Innovative Bovine Bone Substitution Material

bio implon GmbH

Biotech Innovation Pioneers

Letter from the General Manager

Dear clinical user,

Bioimplon's focus is to develop, manufacture and distribute unique native bovine biomaterial products in the cutting edge of regenerative medicine. Our extensive product offerings cover the fields of bone and tissue regeneration, tissue engineering and wound healing for all dental, spinal, orthopaedic and dermatologic applications and surgeries. Our products are used by oral and maxillofacial surgeons, periodontists and dental implantologists as well as by orthopedic, spinal surgeons and all surgery disciplines.

Patient safety, ease of use, reliable and predictable treatment results are our first priorities. Our products have proven their success in safety, efficiency, reliability and superior handling characteristics in clinical studies and documented cases, as well as in the daily clinical work with many hundred thousands of patients worldwide.

In addition to our Hypro-Sorb® membranes, matrices and cones, and our Hypro-Oss® bovine bone substitution and regeneration material, the company has developed moldable bone graft blocks, injectable gel forms and putty that we will launch in near future.

We collaborate with several universities and researchers around the globe for maintaining the highest scientific updates. I personally thank our clinical users and collaborating researchers worldwide for the very positive feedback and invite you to share with us your experiences and suggestions for improvements.

Dr. med Sami Watad
General Manager
Bioimplon GmbH

Hypro-Oss®

Hypro-Oss® is a patented lyophilized natural bovine bone graft with integrated Atelo-Collagen Type I. It is the result of a 6 years intensive research and development cooperation between two companies: Bioimplon GmbH and Hypro s.r.o. Both collaborated very closely with several academic institutes and universities. The innovative outcome was the revolutionary bone graft material with superior properties: **Hypro-Oss®**.

Introduction

The skeletal bone of a living human is constantly being remodeled. Osteoblasts and osteoclasts are the cells responsible for the formation and resorbtion of bone. Together they maintain a dynamic equilibrium in the healthy skeleton of humans. Collagen has a vital role in these processes as well, since it forms the structural protein framework of bone and bone tissue. It also takes part in the interaction between osteoblasts and osteoclasts. Skeletal bone tissue basically consists of Collagen Type I organic matrix, which contains low molecular weight proteoglycans and non-collagen proteins, a mineral part (mainly hydroxyapatite, HA) and water, respectively corresponding to 25%, 65% and 10% of the bone weight. Despite the tissue's great ability for self-healing, the bone does not always respond appropriately when affected by extensive trauma or osteolysis. In order to provide millions of patients around the world with an appropriate solution, Hypro-Oss®, the innovative natural bovine bone graft, was developed.

Expertise and proprietary processing technology

Both, Bioimplon GmbH and Hypro s.r.o., have extensive experience in developing and processing unique biocompatible biomaterial products, and are specialized in modifying immunogenic collagen into nonimmunogenic Atelo-Collagen Type I. Thanks to the 20 years experience in manufacturing safe, biocompatible Hypro-Sorb® collagen products and the patented atelopeptidation technology we were able to devise Hypro-Oss®. Especially this unique proprietary technology allows our Hypro-Oss® to obtain the highest levels of collagen biocompatibility, while preserving the natural crystalline, triple helical collagen matrix structure and expanding the macro/micro-porosity surface of the bone granules by means of nonheating of the biomaterial, but by implementing the lyophilization technology.

Our unique concept

Our prime concept for the development of Hypro-Oss® was to create an ideal biomaterial - a material with the highest biocompatibility and affinity to the new endogenous bone. We implemented our proprietary atelopeptidation and lyophilization technologies modifying the collagen components of bone material within bone structure to non-immunogenic Atelo-Collagen Type I preserving the natural properties of natural collagen. Thanks to our innovative proprietary processing technology, Hypro-Oss® has the following important characteristics:

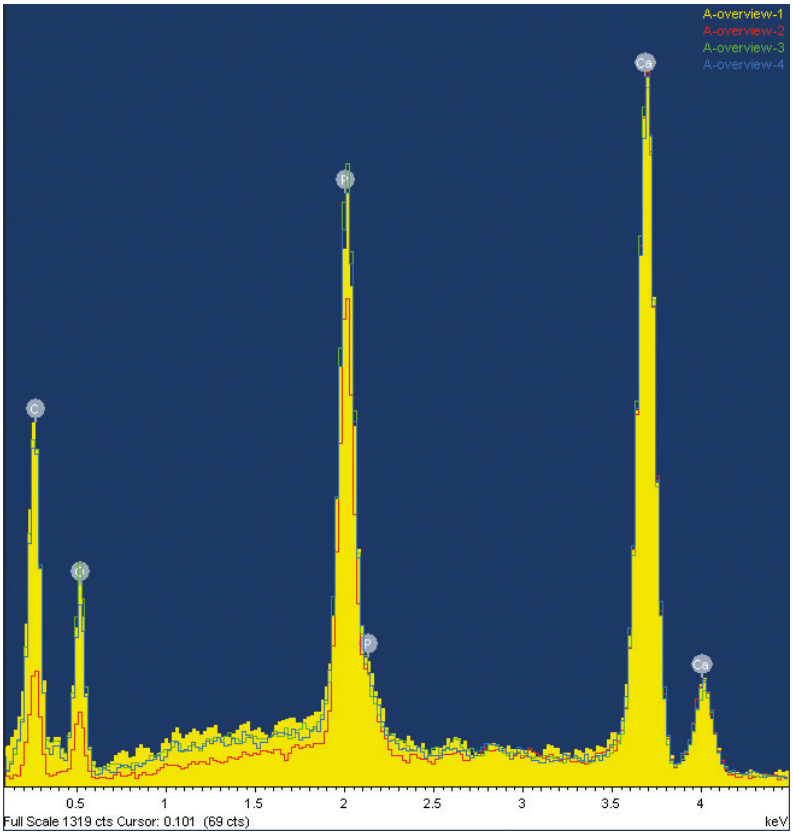
- native bovine graft components for enhanced new bone formation
- telopeptide free collagen components; non-immunogenic peptide
- preserves the natural structures of Atelo-Collagen Type I and hydroxyapatite due to lyophilization processing
- acceleration of physiological tissue healing process
- highest biocompatibility; absence of foreign body response
- protects grafting site from infection (bacteriostatic effect of Atelo-Collagen Type I)
- capability to carry medication to the surgical site

These characteristics allow enhanced and consistent new bone formation as well as persistent integration between mature existing bone tissue and newly formed bone.

The process of atelopeptidation

The protein components of animal tissues are the determinants of individual uniqueness and serve as antigen. Being responsible for activating the immune system's cells by interacting with receptors of the major histocompatibility complex (MHC), the foreign protein causes unwanted immune reactions. The suppression of the antigenic properties of the immunogenic protein component of collagen molecules in bone graft material enables the implantation of mineral bone and collagen matrix in patients without any risk of adverse reactions. Atelopeptidation is a term that describes the physicochemical deletion of the immunogenic/antigenic terminal peptide sequence (telopeptide) in a collagen molecule. The resulting modified collagen is called Atelo-Collagen Type I, a safe non-immunogenic collagen that can be implanted in patients without any adverse reactions. Our patented biological atelopeptidation technology allows us to physicochemically delete the antigenic peptide segment. This way the native collagen matrix structure inside the granules is preserved, making it biocompatible. Moreover, thanks to the unique lyophilization processing technology, the crystalline molecular structures of the natural hydroxyapatite and collagen are preserved without any alteration.

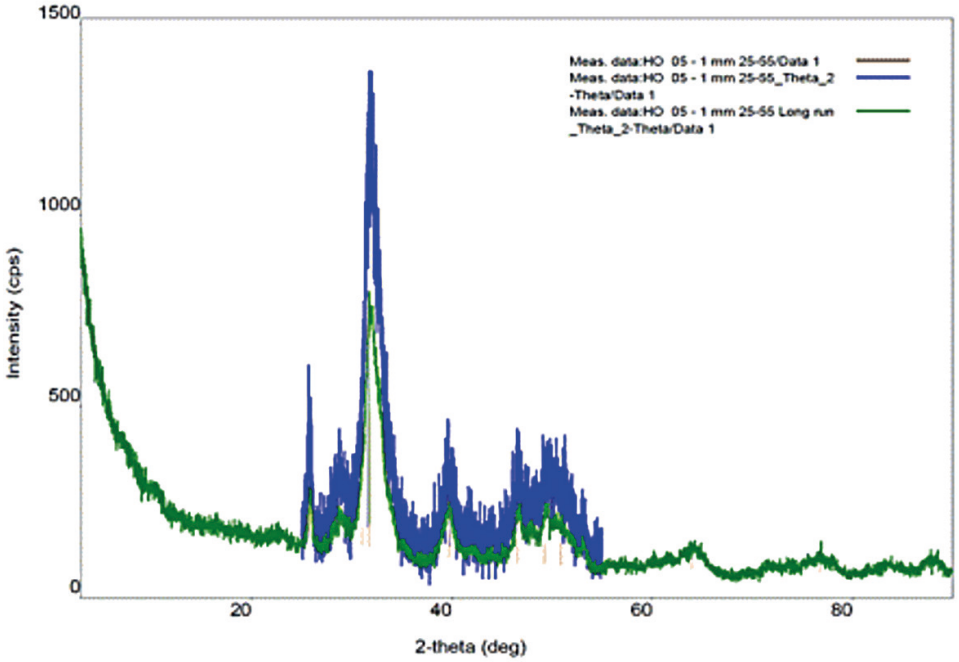
Compared to other manufacturers, **we do not use heat** (thermal processing) when manufacturing our biomaterial products. Heating bone materials negatively affects the natural crystalline micro-structure of hydroxyapatite, causing ceramization and destroying collagen components. Our patented atelo-peptidation technology enables us to preserve the natural properties of the collagen. Thanks to this Atelo-Collagen Type I our Hypro-Oss® is absolutely biocompatible without any risk of adverse reactions.



EDS-Energy dispersive spectroscopy, analysis, Hypro-Oss®, 4th May 2012

The process of lyophilization

Research has shown that lyophilization technique is the optimal choice for processing and storing bone tissue for clinical application. It is a technique that evaporates water contained in a product by sublimation - a previously frozen material is placed in a vacuum, which turns the ice directly to vapor. The presence of lyophilized collagen with lower humidity inside each granule makes Hypro-Oss® bone matrix hydrophilic and facilitates activation of platelets. Its sticky consistency after contact with fluid guarantees friendly handling, fast application and allows an ideal filling of bone defects. It also enables a long-term storage at room temperature.



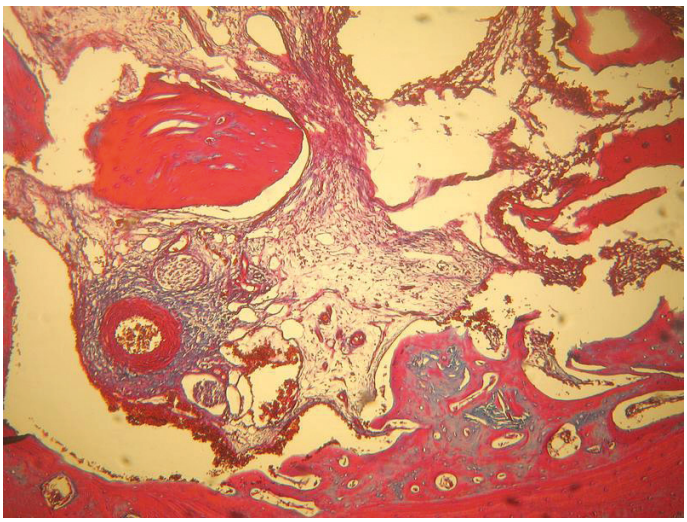
X Ray Diffraction, Hypro-Oss®, 2nd May 2012

Chemical composition of lyophilized bovine bone vs. human bone

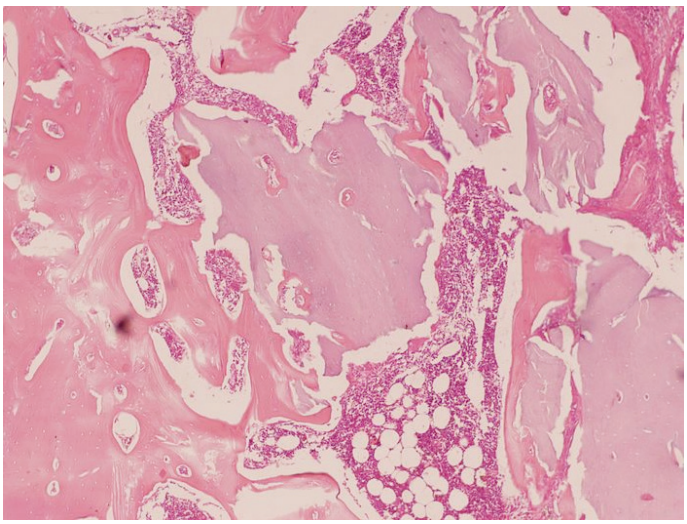
Readings	Human (%)	CI*95%	Bovine (%)	CI*95%
Fat	0.06	0.1	0.1	0.1
Nitrogen	4.3	0.1	4.3	0.1
Proteins	27.5	0.2	27.2	0.2
Phosphorus	11.9	0.1	11.9	0.2
Total P2O5	27.1	0.2	27.2	0.7
Calcium	24.6	0.7	23.7	0.6
Total sodium	0.57	0.01	0.46	0.01
Ashes	64.8	0.6	64.3	0.1
Chlorides	1.3	0.06	1.3	0.2
Water	7.93	–	7.75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

Atelo-Collagen's Type I vital role in bone regeneration process

Atelo-Collagen Type I is the most appropriate carrier for promoting osteoinductive signal activity. In vitro studies show that collagen is capable of inducing differentiation of mesenchymal osteoprogenitor stem cells into osteoblasts and that the association of Atelo-Collagen Type I with a scaffold of natural hydroxyapatite significantly enhances the proliferation rate of osteoblasts. Hypro-Oss® atelocollagenated bone graft provides the natural substrate for correct bone tissue regeneration and repair, facilitating and accelerating the physiological regeneration process and allowing optimal results within a reasonable period of time.



Hypro-Oss® Histology 4 weeks after implantation



Hypro-Oss® Histology 14 weeks after implantation

Atelo-Collagen Type I accelerates bone regeneration

Preserving all properties of native bone collagen, Atelo-Collagen Type I stimulates and accelerates new bone formation by triggering the thrombocytes aggregation and degradation, followed by the release of growth peptides such as beta TGF and PDGF, IGF 1, IGF 2 and VEGF, which are responsible for enhanced bone formation. Atelo-Collagen Type I acts as valid substrate for platelet activation and aggregation.
In addition to its well-known structural effect on connective tissues, collagen/Atelo-Collagen Type I is endowed with the following important properties, which are helpful in bone tissue reparation processes:

A) Hemostasis: collagen/Atelo-Collagen Type I can activate the receptors on cellular membranes of platelets, which are responsible for their aggregation and degradation processes.

B) Debridement: collagen/Atelo-Collagen Type I acts chemo-tactically on monocyte/macrophage cell lines from which osteoclasts derive. These cells, through their activity on mineral component resorbtion of both bone tissue and Hypro-Oss® biomaterials, activate and collaborate with osteoblasts in bone rearranging and remodeling.

C) Neovascularization: in their turn, the monocytes/macrophages stimulate both osteoplastic activity and an angiogenesis process in grafting site.

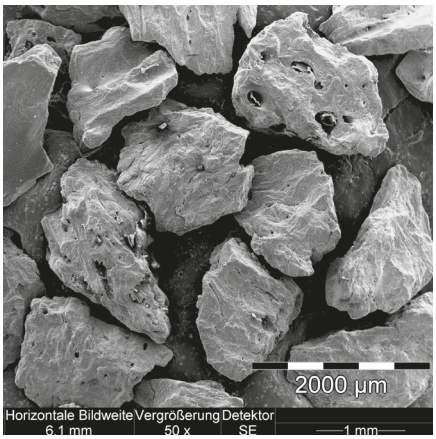
D) Osteblastic activity: collagen/Atelo-Collagen Type I, binding to fibronectin, promotes the anchor of mesenchy mal progenitor cells, on which it exerts its chemotactic effect and induces differentiation into osteoblasts.

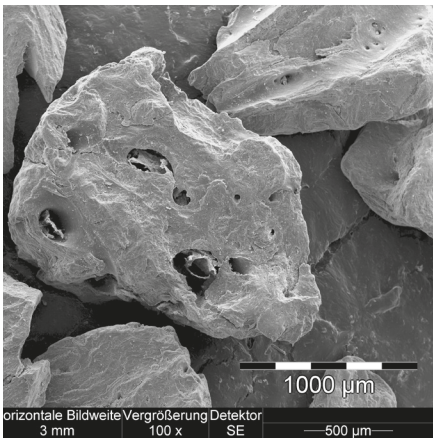
Hypro-Oss® bio-functionality

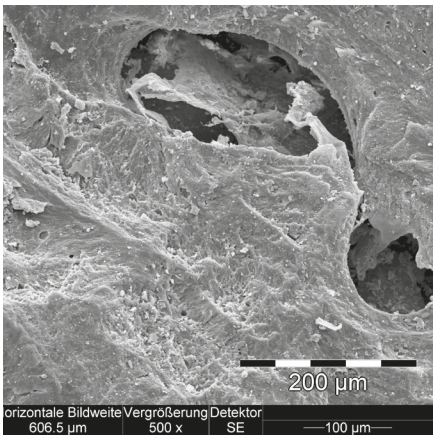
The excellent acceptance and biocompatibility of natural bovine bone graft of Hypro-Oss® derive from its material processing properties. The non-organic phase content of Hypro-Oss, as measured by X-ray diffracton, shows pure hydroxyapatite. The Energy Dispersive Spectroscopy (EDS) analysis confirms homogenic compound of hydroxyapatite and Atelo-Collagen Type I. Hypro-Oss® is pure, sterile and 100% BSE safe. Thus Hypro-Oss® does not contain any phase constituents that impair the healing process. Because the structure of the starting material is not altered during the manufacturing process, our Hypro-Oss® has identical biological characteristics like the physiological structure of the human body. Hypro-Oss® macroporous structure is ideal in its osteoconductive function and promotes the ingrowth of blood vessels. The adhesion and spreading of osteoblasts over the Hypro-Oss® interconnecting pore structured and open surface prompts a bioactive reaction followed by bone tissue formation, bone tissue strengthening and bone tissue interlinking. This leads to the restoration of the bone and its function. The osteoconductive properties of hydroxyapatite and the osteopromotive properties of the Atelo-Collagen Type I act together in harmony for enhanced, high quality bone formation for the patient's benefit.

Hypro-Oss® in GBR

Hypro-Oss® is used for Oral Guided Bone Regeneration (GBR) in the management of simple and complicated defects to build up the bone bed. Clinical routine shows that stability plays an important role during the early stages of implantology treatment. The quicker and more intensive the osseointegration process, the higher the stability of the implant. The structure of the mineral component as well as the structure of the integrated biocompatible Atelo-Collagen Type I of Hypro-Oss® are very similar to those of the human body. Therefore, after the integration of the material, the same elasticity, strength and stability as of the patient's own bone are achieved. Hypro-Oss® is eminently suitable for all augmentation techniques, for building up a strong implant bed and for treating periodontal defects. The very good reception of Hypro-Oss® is evident in its efficacy. Hydroxyapatite of bovine origin has been successfully used in clinical medicine since 1958. Radiological follow-ups showed con-solidation of the defects consistent with the healing phase. Biopsies retrieved from clinical grafts showed that the hydroxyapatite had almost completely been surrounded by bone and that newly formed bone had also been deposited inside the granule pores. The long-term results were also confirmed by clinical applications. Hypro-Oss® implantation tests and the results of histological studies confirm enhanced new bone formation effect of the Atelo-Collagen Type I component within the bovine bone graft in Hypro-Oss®. It is the material of choice for functional and aesthetic reconstructions, for natural, reliable, simple and economic bone regeneration. Hypro-Oss® is an incomparably stable, highly purified and well established HA/Atelo-Collagen Type I bone graft material of bovine origin. It goes further towards satisfying the requirements for increased safety, enhanced new bone formation and integration, plus better predictability.



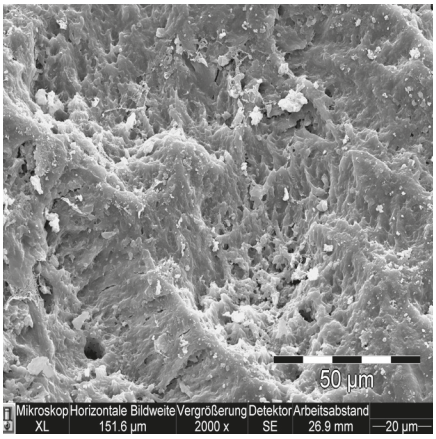


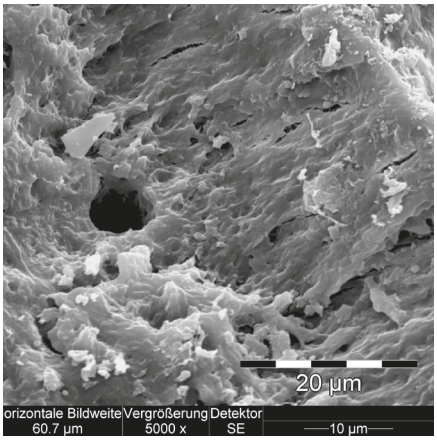


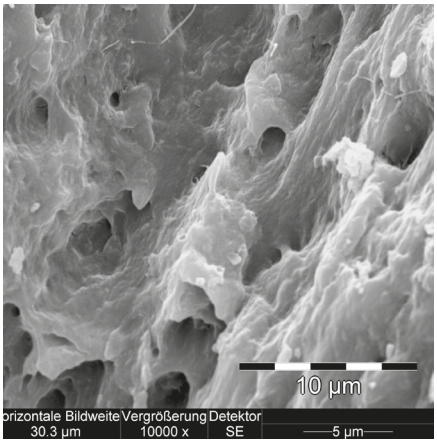
Hypro-Oss® bacteriostatic effect

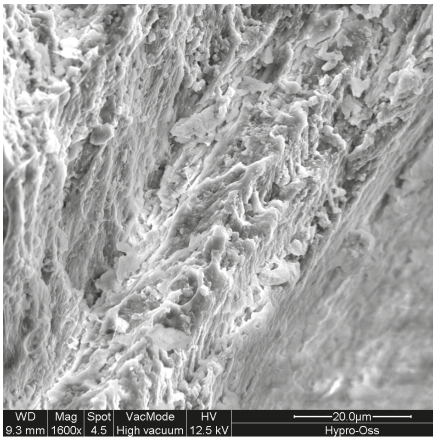
Hypro-Oss® is non-immunigenic, sterile and does not support the growth of infectious microorganisms due to the crystalline tripple helix structure of the Atelo-Collagen Type I components. Moreover, Hypro-Oss® exhibits a mild antimicrobial effect as it binds to and inactivates the enzymes necessary for the metabolism of the microorganisms. This property conferes Hypro-Oss® its bacteriostatic effect and contributes to an uninterrupted wound healing and accelerated bone formation as well.

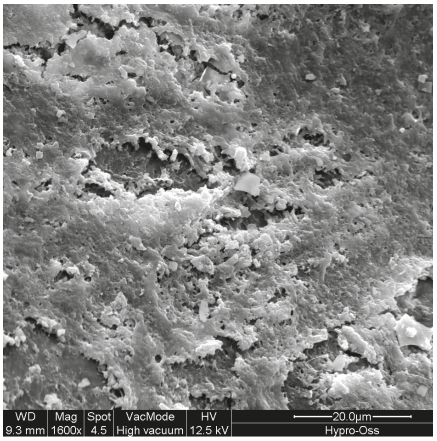
The study by **Grace A. Carlson et al.** published in Biochemical and Biophysical Research Communications 321 (2004) 472–478, shows the bacteriostatic effect as they stated in the following text:
Tissue-engineered grafts for tissue regeneration include either mature or progenitor cells seeded onto biomatrices that provide shape and support for developing tissue. Popular biomaterials used in orthopaedic surgery include collagen type I, hyaluronic acid, hydroxyapatite, and polylactic polyglycolic acid (PLGA). Biomatrices with bacteriostatic properties may be beneficial in promoting tissue-engineered graft survival in patients susceptible to infection. We evaluated the bacteriostatic effects of these biomaterials on the growth of the four most common orthopaedic bacterial pathogens: Staphylococcus aureus, Staphylococcus epidermidis, b-hemolytic Streptococcus, and Pseudomonas aeruginosa. Hyaluronic acid demonstrated the largest bacteriostatic effect on these pathogens by inhibiting bacterial growth by an average of 76.8% (p = 0.0005). Hydroxyapatite and collagen inhibited growth on average by 49.7% (p = 0.011) and 37.5% (p = 0.102), respectively. PLGA exhibited the least bacteriostasis with an average inhibition of 9.8% (NS) and actually accelerated the growth of b-hemolytic Streptococcus and P. aeruginosa.

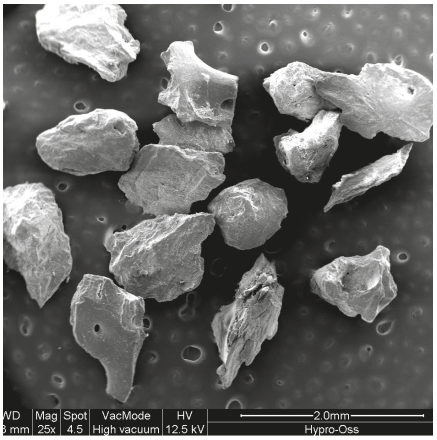












Hypro-Oss® tolerability

Hypro-Oss® bone graft material is extremely well tolerated. Its pH matches the physiological levels, which is particularly important during the early stages of implantation. Hypro-Oss® does not contain any pharmacologically active constituents that could cause any risk to patients. A great number of patients have confirmed the biocompatibility of Hypro-Sorb® products that consist of the same Atelo-Collagen Type I as Hypro-Oss®. Not one single adverse reaction has been reported for many years.

Hypro-Oss® properties

- natural bovine bone grafting material integrated with biocompatible collagen
- pure bone mineral and pure Atelo-Collagen Type I composition
- directed integration and enhanced new bone formation
- hydrophilic, optimal cell adhesion and blood absorption
- native crystalline structure and interconnective porosity
- easy handling due to sticky Atelo-Collagen Type I properties
- atelo-collagenated and lyophilized grafting material
- oestoinductive Atelo-Collagen Type I components
- osteoconductive hydroxyapatite components
- no foreign body or inflammatory reaction
- long-term dimensional stability
- safe and sterile

Hypro-Oss® indications for dental & maxillofacial

- implantology, periodontology and oral surgery
- horizontal augmentation
- peri-implant defects
- vertical augmentation
- filling of cyst
- sinus lift
- intraosseous defects
- extraction sockets
- furcation defects
- periodontal defect

Hypro-Oss® indications for orthopaedics & spine

- bone defects in juxta-articular fractures
- bone defects at donor sites after harvest of autogenous bone
- defects of the acetabulum on change of cysts prosthesis
- bone cysts
- bone defects after excision of beginn tumors
- tissue defects in cartilage and bone transplants

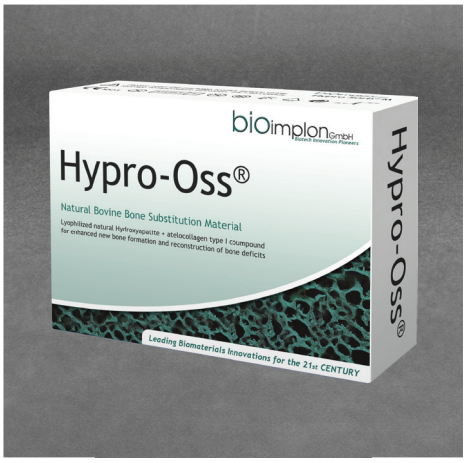
Hypro-Oss® handling

Hypro-Oss® is extremly hydrophilic. It can be easily mixed with the patient's blood or sterile saline before insertion which induces the unique stickiness properties of Atelo-Collagen Type I. This enables remarkably accurate placement into bone defects. Hypro-Oss® has a long shelf life of 4 years.

Hypro-Oss® available packaging for dental & maxillofacial

Cat. no.	Grain size	Volume
070	0.5 – 1.0 mm	0.5 ml
071	0.5 – 1.0 mm	1 ml
072	0.5 – 1.0 mm	3 ml
073	0.5 – 1.0 mm	5 ml
090	0.5 – 1.0 mm	25 ml
074	1.0 – 2.0 mm	0.5 ml
075	1.0 – 2.0 mm	1 ml
076	1.0 – 2.0 mm	3 ml
077	1.0 – 2.0 mm	5 ml
091	1.0 – 2.0 mm	25 ml

Hypro-Oss® 0.5 – 1.0mm

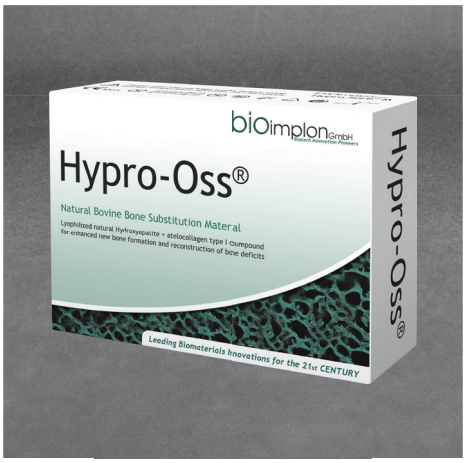


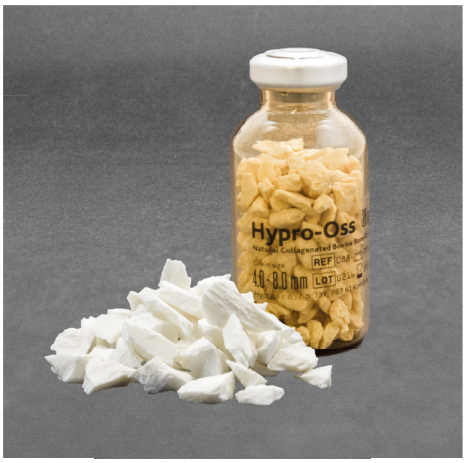
Hypro-Oss® 1.0 – 2.0mm

Hypro-Oss® available packaging for orthopaedics & spine

Cat. no.	Grain size	Volume
078	3.0 – 6.0 mm	1 ml
079	3.0 – 6.0 mm	5 ml
080	3.0 – 6.0 mm	10 ml
081	3.0 – 6.0 mm	20 ml
082	3.0 – 6.0 mm	25 ml
083	3.0 – 6.0 mm	30 ml
084	4.0 – 8.0 mm	1 ml
085	4.0 – 8.0 mm	5 ml
086	4.0 – 8.0 mm	10 ml
087	4.0 – 8.0 mm	20 ml
088	4.0 – 8.0 mm	25 ml
089	4.0 – 8.0 mm	30 ml

Hypro-Oss® 3.0 – 6.0mm





Hypro-Oss® 4.0 – 8.0mm

Hypro-Oss® BSE safety & sterilization

The raw material comes from EU animal farms, selected and certified under the strict control of the Czech National Veterinary Health Service. All manufacturing processes are executed in conformity with the quality management systems under the control of the Higher Health Institute, which verifies compliance with current CE regulations, approves and authorizes the marketing of the products. Hypro-Oss® is a natural hydroxyapatite/Atelo-Collagen Type I composite that consists entirely of homogenic material that is available as granules of various sizes or pre-formed shapes. Due to its non-altered hydroxyapatite/Atelo-Collagen Type I composition and particularly high degree of purity, its physiological pH, its homogenity of hydroxyapatite and Atelo-Collagen Type I structures and its interconnecting macropores, Hypro-Oss® is superior to any other bovine bone graft material. Hypro-Oss® chemical composition, porosity, size, shape and biological behavior are similar to its human counterparts. In addition to these features, Hypro-Oss® provides structural support, osteoconduction and osteoinduction properties and a high content of calcium and phosphorus, all of which are essential factors for the newly formed bone tissue.

BSE prevention regulations

The manufacturer has documents at its disposal confirming that the country has established compulsory notification of BSE and that all slaughtered animals older than 36 months are subject to obligatory examination based on the notices of the Department of Agriculture no. 287/1999, Coll. of Laws and DOA no. 309/2011, Coll. of Laws. The manufacturer monitors and reacts to current requirements or directives issued by the European Union, including the OIE notice Terrestrial Animal Health Code.

Control of animal feeding

The country of origin and countries, from which the importation of cattle is allowed, must implement strict procedures in order to minimize the possibility of BSE transmission. The country of origin has prohibited the feeding of meat/bone powder obtained from ruminants. This material has been banned for feeding for 21 years, thus complying with the requirements of the norm EN 12442-2. Furthermore, pursuant to laws that have been in effect since 1992, it is also prohibited to use animal protein from mammals for feeding cattle in the Czech Republic. Moreover, it is prohibited to import cattle that were fed with animal protein.

Historical documentation and traceability

The raw material is obtained exclusively from healthy cattle, younger than 3 years. Each individual animal must be tested for BSE, its breeding documented and its descent must be traceable. It is not allowed to obtain the raw material from high risk animals, such as perished or compulsorily destroyed animals or animals with suspected TSE (Annex no. 12 NV no. 336/2004). The occurrence rate of BSE is continuously monitored using the latest information from OIE, taking into account the latest information from the Czech State Veterinary Service. The tissues are obtained from contractual slaughter factories in the Czech Republic and are predominantly of domestic origin. In cases where slaughtered animals are imported, it is always necessary that these animals are suitable for human nutrition, which includes all requirements imposed by state and European legislation regarding safety in terms of the risk of BSE similar to domestic breeding.

Risk of contamination with viruses or infectious agents

The current state of knowledge on transmissible spongiform encephalopathies, particularly the sporadic occurrence rate of the BSE in the Czech Republic, warrant more detailed consideration of this risk and consequently (the health ministry) recommended strict measurements for better controlling of the BSE disease.

Principles of bacterial infection elimination

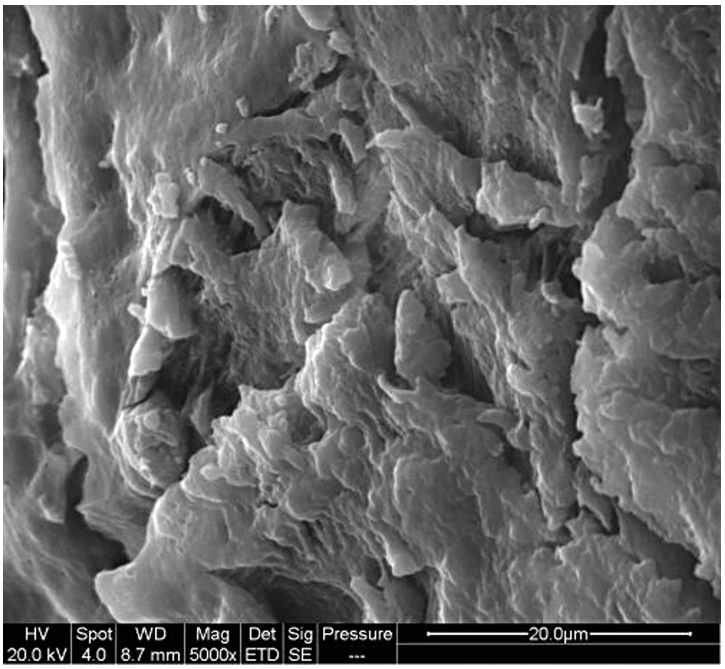
The raw material source of Hypro-Oss® is the bovine bone. The selected raw materials are stored in frozen state in plastic package by temperatures of at least minus 18°C. The risk of contamination by microorganisms is controlled by storage at minus 18°C, which is regularly checked and documented. In the course of production, the raw materials are treated with bactericidal solutions of sodium chloride, peracetic acid and saturated solution of calcium hydroxide in order to control the risk of conta-mination with bacteria, viruses and yeasts.

Methods used for inactivation of viruses and infectious agents

During the last years, important progress has been achieved in the methodology of prion inactivation. These procedures depend on synergic effect of tensides and alkaline liquids or on glycans in alkaline medium and probably on catalyzed photolysis. These procedures induce structural changes such as decrystallization of prion protein (sensitive to proteolysis), which results in irreversible, non-toxic conformation of the prion protein. This procedure is similar to the non-reversible structural transformation of collagen to gelatine. Collagen treated this way and used in the production of Hypro-Oss® consists of prion-free tissues, which are fully safe as TSE is concerned.

Deactivation or removal of infectious agents

The method of collagen treatment includes several repeated extractions, using a high osmotic pressure and alternating low/high pH values, that are employed to remove non-collagen globular proteins from the connecti-ve tissue, since prion (the infectious agent of BSE) belongs to the category of globular proteins. The extraction process is an additional safeguarding procedure that results in reduced prion content, in case there is any in the tissue. Another technological process that is appropriate in view of deactivation of prions is the action of a saturated calcium hydroxide solution with pH value of 12.5. The prion protein (globular protein) contains an elongated conformation (non-infectious) through the action of hydrotropic substances (saturated calcium hydro-xides with pH 12.5). The action of hydroxides is recommended in the EMEA/410/01 rev. 3 as an effective measu-re to reduce the risk of TSE transfer through medical devices.



Hypro-Oss, SEM, scanning electron microscopy, 2nd May 2012

Observance of procedures in respect of crucial elimination parameters

The manufacturer must be able to provide documentation (production protocol) for each batch of the produced medical device Hypro-Oss®, demonstrating that all decisive parameters identified in the general principles for elimination have been monitored and controlled during production. The manufacturer, however, is bound to continue monitoring all new changes and new information, so that any possible previously undetected risk is discovered.

Gamma irradiation

After final packaging of Hypro-Oss® glass bottles in a double blister box, Hypro-Oss® undergoes gamma irradiation as final sterilization step. Gamma radiation sterilization is a process that effectively kills or eliminates almost all microorganisms like fungi, bacteria, viruses and spore forms. Gamma irradiation is a physical means of decontamination, because it kills bacteria by breaking down bacterial DNA, thus inhibiting bacterial division.

Meeting international regulatory standards

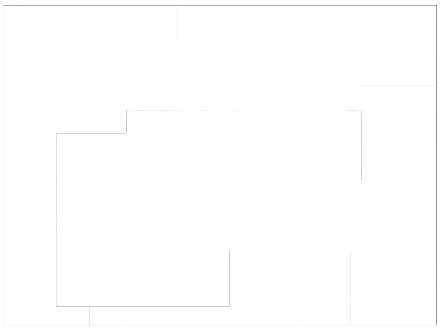
Tests and analysis were performed by accredited institutes

- cytotoxicity and irritation tests
- mutagenicity tests
- biocompatibility tests
- animal implantation tests
- histological studies
- sterilization and BSE tests
- Scanning Electron Microscopy (SEM)
- Energy Dispersive Spectroscopy (EDS)
- X-Ray Diffraction (XRD)
- stability tests
- bioburden
- chemical analysis and purity tests
- clinical evaluation

The product satisfy the requirements of a quality management system in accordance with EN ISO 13485:2003 and EN ISO 9001:2000 and fulfil the requirements specified in Annex II.4 of Directive 93/42/EEC and Directive 2003/32/EC.

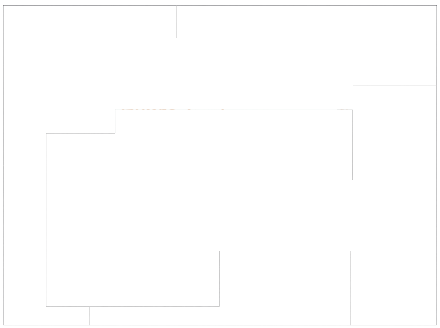
Additional products

Hypro-Sorb® F Membrane



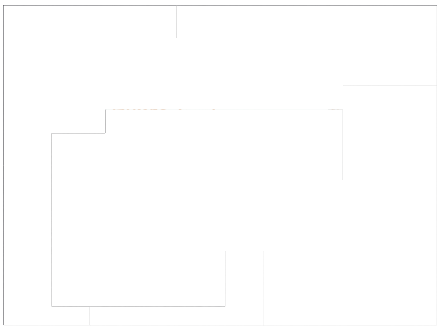
rigid, bilayer membrane,
pure crystalline Atelo-Collagen Type I,
resorption time 6 months

Hypro-Sorb® M Membrane 0.3 mm



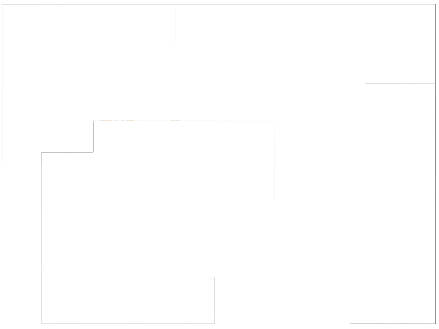
biphasic, bilayer membrane,
pure crystalline Atelo-Collagen Type I
resorption time 6 months

Hypro-Sorb® M Membrane 0.8 mm



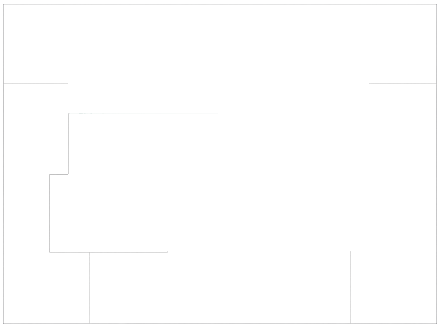
biphasic, bilayer membrane,
pure crystalline Atelo-Collagen Type I
resorption time 6 months

Hypro-Sorb® M Matrix dental



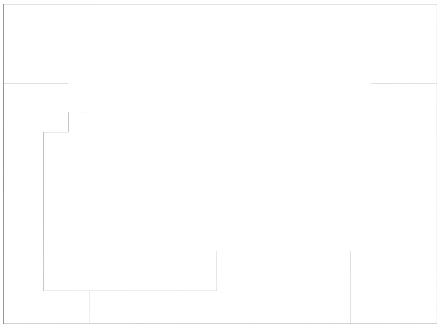
multilayer tissue matrix,
pure crystalline Atelo-Collagen Type I
resorption time 6 months

Hypro-Sorb® R dental



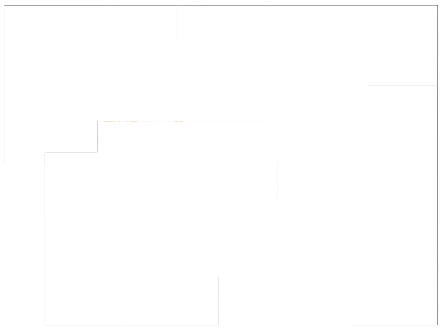
haemostatic fleece,
pure crystalline Atelo-Collagen Type I
resorption time 2–4 weeks

Hypro-Sorb® R orthopaedic



haemostatic sponge,
pure crystalline Atelo-Collagen Type I
resorption time 2–4 weeks

Hypro-Sorb® M Matrix orthopaedic

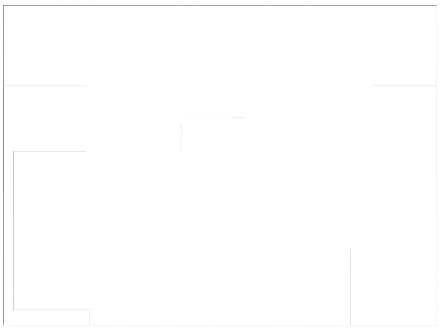


multilayer tissue matrix,
pure crystalline Atelo-Collagen Type I
resorption time 6 months

Hypro-Sorb® X

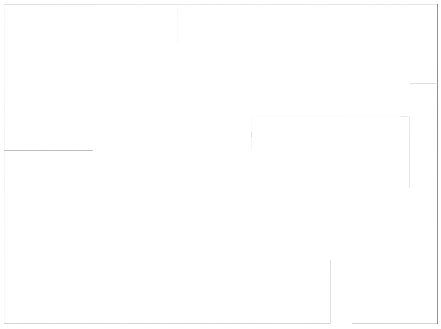
cone formed,
pure crystalline Atelo-Collagen Type I
resorption time 2–4 weeks

Hypro-Sorb® Z



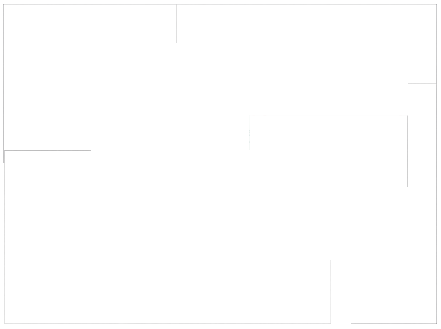
root-shaped form,
pure crystalline Atelo-Collagen Type I
resorption time 2–4 weeks

Hypro-Sorb® Flex



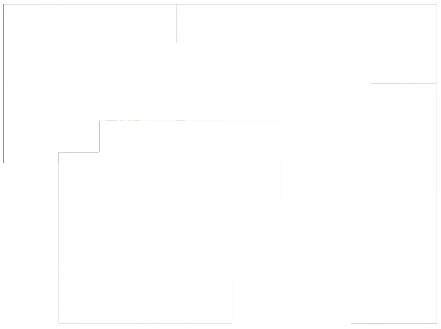
dermatological wound dressing,
pure crystalline Atelo-Collagen Type I,
resorption time 2–7 weeks

Hypro-Sorb® R surgical



haemostatic sponge,
pure crystalline Atelo-Collagen Type I
resorption time 2–4 weeks

Hypro-Sorb® M surgical



biphasic, bilayer matrix,
pure crystalline Atelo-Collagen Type I
resorption time 6 months

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