Designed by nature, developed for clinicians

creos xenogain and creos xenoprotect
A comprehensive range of regenerative solutions

A reliable foundation of sufficient bone is key to improving patients’ quality of life with dental implant treatment. With creos, we offer an outstanding regenerative solutions portfolio.

The creos xenogenic assortment features an extensive range of options for a wide variety of clinical indications and preferences. For your peace of mind, our creos xenogenic products are manufactured according to Medical Device Quality System Standards\(^1\), resulting in quality products that enable effective and reliable GBR and GTR procedures.\(^2\)

**creos xenogain**

Deproteinized bovine bone mineral matrix with a low crystalline structure and a large specific surface area.\(^3\,4\,5\)

**creos xenogain bowl**

A new form of application that eliminates the need for an additional sterile dappen dish.

- Two granule sizes: small and large.
- Three different forms of application: bowl, vial or syringe.
- Up to four volume options: 0.25 g, 0.50 g, 1 g, 2 g.

**creos xenogain collagen**

A composite of creos xenogain and 10% porcine collagen type 1 for easy graft application, in extraction sockets, for example.

- Two different forms of application: block or syringe.
- Up to three volume options: 100 mg, 250 mg, 500 mg.

A comprehensive range of regenerative solutions

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creos xenoprotect

Natural, resorbable and non-chemically cross-linked membrane. It’s composed of a network of interwoven, highly purified porcine collagen and elastin fibers.

**Three sizes**

<table>
<thead>
<tr>
<th>Size</th>
<th>Image</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 x 20 mm</td>
<td><img src="image1.png" alt="Image" /></td>
</tr>
<tr>
<td>25 x 30 mm</td>
<td><img src="image2.png" alt="Image" /></td>
</tr>
<tr>
<td>30 x 40 mm</td>
<td><img src="image3.png" alt="Image" /></td>
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</tbody>
</table>

Whether for larger bone augmentations or smaller periodontal defects, the optimal fit can be found without extensive trimming, limiting waste and minimizing costs for you and your patients.
creos™ xenogain – the natural framework for bone formation

The creos xenogain portfolio comprises an extensive range of bovine bone substitutes for guided bone regeneration (GBR) and guided tissue regeneration (GTR) procedures.

1. Easy handling
   - Available in a vial, a syringe or a bowl for fast and easy application.
   - Two granule sizes and a variety of volumes.

2. Treat your patients with confidence
   - Biocompatible.5–9
   - Unique processing methods remove bovine proteins and lipids.3,10
   - Ca/P ratio similar to human bone.3,6,11

3. The scaffold for successful regeneration
   - Non-sintered, characterized by micro- and macrostructures.3,10
   - Interconnected macropores.3,6,7
   - Hydrophilic graft.

4. A solid foundation for implant treatment
   - Slowly resorbing scaffold.7
   - Maintains space for bone regeneration.7
   - Integrates with the newly formed bone, building a basis for successful implant placement.
“What impressed me about this product was the variety of sizes and dosage forms, each offering very good handling properties.”

Dr. Bastian Wessing, Aachen (Germany)

Biocompatible

The creos xenogain bone substitute is biocompatible\textsuperscript{6–9} and unique processing methods remove the bovine proteins and lipids.\textsuperscript{3,10} With a calcium phosphate ratio that reflects the composition in human bone and a low crystalline structure, creos xenogain is accepted by the body as a suitable framework for bone formation.\textsuperscript{3,5,11}

Human osteoblast attachment

SEM image of human osteoblasts seeded on creos xenogain spreading and attaching to the material surface in the characteristic filopodia formation. Magnification 350x.

Ca/P ratio similar to human bone

text

creos xenogain is proven to have a similar calcium-phosphorus ratio (Mol/Mol) to human bone.

References

3 Data on file Nobel Biocare Material properties of creos xenogain / biomaterials.
4 Data on file NIBEC Porosity Analysis (BET measurement).
5 Data on file NIBEC Atomic emission spectrometry analysis.

Suitable framework for new bone formation

creos xenogain is a non-sintered xenogenic bone substitute, characterized by micro- and interconnected macropore structures and a large specific surface area.\textsuperscript{3,4,10}

A scaffold for successful regeneration
creos xenogain offers a suitable environment for new bone formation.\textsuperscript{3,6,7}

Promotes rapid hydration
creos xenogain absorbs 1.75 x its weight of water mass.

Analysis of biochemical markers shows that creos xenogain supports the new bone formation process in-vitro.\textsuperscript{13}

Capillary kinetics measured by the Washburn method, displaying the wettability potential of creos xenogain.\textsuperscript{16}

References
9 Data on file NIBEC Biocompatibility tests: OCS-B and OCS-B Collagen.
10 Data on file NIBEC.
12 Data on file NIBEC Cell Morphology on the bone graft observed by SEM.
13 Data on file NIBEC ALP activity & pro-collagen expression of bone graft, matrix mineralization detected by calcium contents.
“After using the non-sintered creos xenogain bone substitute, I appreciated its handling properties and I see its high hydrophilicity as a biological advantage in peri-implant defect regeneration and sinus grafting.”

Univ.-Prof. DDr. Werner Zechner, Vienna (Austria)

Preserved macro- and micropore structures

Micropores support liquid uptake due to capillary forces. Mesenchymal stem cells, osteoblasts and capillaries are able to enter macropores of a bone substitute particle.

Unique processing methods remove bovine protein and lipids and preserve the natural bone matrix.

SEM image of a creos xenogain granule. Magnification 30x.

SEM image of creos xenogain nano-structured surface. Magnification 50,000x.
creos xenogain acts as a slowly resorbing scaffold and maintains space for bone regeneration. The graft integrates with the newly formed bone, building a basis for successful implant placement.

New bone formation visible nine months after grafting procedure in the sinus

Human histology based on undecalcified sample taken with a trephine bur in the posterior maxilla prior to implant insertion. Embedded in formalin solution, multiple staining, photographed with optical microscope.
Right upper first premolar of a 60-year-old male patient is extracted due to chronic periodontitis. One month after extraction, GBR surgery with a creos xenogain collagen block and a resorbable collagen membrane is performed to support the regeneration of the bony defect and re-establish necessary bone volume for implant placement. After nine months of uneventful healing, a dental implant is placed in an optimized position in the regenerated bone.

**Clinical case**

Radiographic view before surgery.

Extraction socket when raising the flap. Note the buccal defect.

Grafting using creos xenogain collagen and collagen membrane application.

Re-entry nine months after grafting with creos xenogain collagen.

Implant placement.

Radiographic view after implant placement.

Case courtesy of Prof. Seung Yun Shin, Seoul (South Korea)
creos™ xenoprotect –
the natural barrier

creos xenoprotect is a resorbable non-cross-linked collagen membrane for guided bone regeneration (GBR) and guided tissue regeneration (GTR) procedures.

1 Outstanding handling
- Easy to reposition and unfold.
- Rehydrates in seconds and adheres well to the defect shape.
- Minimal increase in size when hydrated.\(^\text{14}\)

2 High mechanical stability
- Outstanding mechanical strength properties.\(^\text{15}\)
- Resistant to stress.\(^\text{16}\)

3 Extended barrier function
- Highly resistant to degradation for prolonged protection of the graft site.\(^\text{15}\)

4 Excellent tissue integration
- Excellent vascularization behavior and tissue compatibility.\(^\text{15}\)
Overhead view showing a dense meshwork, primarily composed of highly interwoven collagen fibers. The enlarged circular detail reveals collagen fibrils in their typical cross-striated appearance. Magnification 10,000 x. (SEM image © Schupbach Ltd, Switzerland)

Lateral view showing a dense meshwork, primarily composed of highly interwoven collagen fibers. Magnification 482 x. (SEM image © Schupbach Ltd, Switzerland)

Outstanding handling properties

Once moistened, creos xenoprotect does not stick to the graft site or instruments, meaning repositioning or unfolding is easy. The change in size after hydration is minimal, enabling a good fit to the defect when the membrane is trimmed in a dry state. It can be stretched over the bone augmentation site and fixated with pins to stabilize the bone graft material in major horizontal augmentations.

“I really like the handling of this material. The fact that it does not lose all of its shape when you place it in conjunction with the tissue is a great benefit. It gives you the possibility to remove the membrane for trimming. After a minute or so, when it is soaked, it attaches very nicely to the bone.”

Prof. Christer Dahlin, Gothenburg (Sweden)

References
Slower degradation for longer site protection

The unique manufacturing process for creos xenoprotect preserves the natural collagen fiber network and respective natural links, resulting in high mechanical strength and resistance to degradation.\textsuperscript{15,16}

**Superior to Bio-Gide\textsuperscript{a}**

creos xenoprotect degrades significantly more slowly than Bio-Gide\textsuperscript{a}.\textsuperscript{19–21} Slower degradation is proven to protect the grafted site longer.\textsuperscript{19–21}

Resistance to denaturation similar to chemically cross-linked membranes

In-vitro tests have shown that creos xenoprotect denaturates at temperatures similar to chemically cross-linked membranes and at higher temperatures than most non-cross-linked membranes including Bio-Gide\textsuperscript{a}.\textsuperscript{22}

Greater bone formation

Significantly greater bone formation in the center portion of the defect at day 21 with creos xenoprotect in vivo.\textsuperscript{23}

References


\textsuperscript{22} Data on file Matricel.

Excellent tissue integration

Superior tissue integration of natural membranes compared with chemically cross-linked membranes

Studies show that purified natural membranes allow for better tissue integration than chemically cross-linked membranes, resulting in:

- Fast vascularization.\textsuperscript{24–26}
- Excellent tissue compatibility with no foreign body reactions.\textsuperscript{24}
- Lower risk of dehiscence / membrane exposure.\textsuperscript{24–27}

Lower dehiscence risk with natural membranes

Histological section (Toluidine blue stain) after 20 weeks healing time in rats (subcutaneous implantation). Numerous blood vessels penetrate the membrane (circles). Enlarged detail reveals a blood vessel with entrapped erythrocytes. (Light microscopic picture © Schupbach Ltd, Switzerland)

Lower dehiscence rate with creos xenoprotect compared with chemically cross-linked as well as other non-chemically cross-linked membranes in vivo.\textsuperscript{18}

12% creos xenoprotect
22–32% 39–64%

Lower dehiscence rate with creos xenoprotect compared with chemically cross-linked and non-chemically cross-linked collagen membranes.

Excellent revascularization behavior

"I was pleasantly surprised to still find remnants of the creos xenoprotect membrane after six months. This long degradation time provides a greater chance of success."

Dr. Hadi Antoun, Paris (France)


High mechanical stability

creos xenoprotect is the strongest membrane after hydration compared with other non-cross-linked and chemically cross-linked membranes in vitro.¹⁶

- Highest mechanical strength.
- Highest resistance to stress.
- Best suture retention thanks to highest pull-out force.

¹¹ Highest force at break¹⁶

¹² Highest stress at break¹⁶

¹³ Highest suture retention¹⁶

Non-cross-linked collagen membranes
- CX: creos xenoprotect [Nobel Biocare]
- CO: CopiOs® [Zimmer Biomet]
- JS: Jason® [botiss]
- OF: Osseoguard Flex™ [Zimmer Biomet]
- BG: Bio-Gide® [Geistlich]

Cross-linked collagen membranes
- BE: BioMend® Extend [Zimmer Biomet]
- ML: Mem-Lok® [BioHorizons]
- OP: Ossix® Plus [Datum Dental]
- BM: BioMend® [Zimmer Biomet]
- CY: Cytoplast™ RTM [Osteogenics]

* Statistically significant difference compared with creos xenoprotect.
A 54-year-old male patient presents at the clinic with a periapical infection and an open fistulous track toward the root of tooth #21. A perio-endo lesion is identified and tooth extraction is indicated. During careful extraction, loss of the buccal bone plate is evident and a lateral bone augmentation procedure is needed.

As a scaffold, deproteinized bovine bone matrix (DBBM) is used, and the creos xenoprotect collagen membrane is placed as a protective barrier. After six months of uneventful healing, a dental implant is placed in the optimal position in the regenerated bone.

Clinical case

At the initial visit, the patient presents with a periapical infection.

The tooth is carefully extracted.

The bone defect is revealed after extraction. The entire buccal bone plate has been lost.

The bone defect is filled with deproteinized bovine bone matrix and covered with a collagen membrane (creos xenoprotect).

Six months later, an implant is placed in its optimized position.

Final restoration four months after implant placement.

Case courtesy of Dr Mariano Sanz, Madrid (Spain)
# Order today

**creos xenoprotect collagen membrane**

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**creos xenogain bone substitute**

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<tr>
<td></td>
<td>Large (1.0–2.0 mm)</td>
<td>Small 0.55 cc 1.00 cc 1.90 cc 3.80 cc</td>
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<td></td>
<td>Bowl</td>
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**creos xenogain bone substitute with 10 % collagen**

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