All products are certified by the Italian Higher Health Institute with CE mark (0373).

OX® bone substitutes for guided bone regeneration are taken from heterologous bone tissue using a deantigenation process enzymatically.

The enzymatic method makes it possible to deantigenate the bone tissue, leaving the mineral component and collagen component completely unaltered.

This is why once the **OX®** bone substitutes are grafted, they line up with the physiological remodeling kinetics of the patient's bone tissue, reaching the point of being completely remodeled and replaced by newly formed bone in absolutely physiological time frames and modes.

OX® Collagen Membrane

> BCG-XC30

1 pc 25x30x0,2 mm

HEART® Pericardium Membrane

> HRT-01

1 pc 25x30x0,2 mm

> HRT-02

1 pc 50x30x0,2 mm

OX® Cortical Membrane

> OSP-OX03

1 pc 25x30x0,2 mm

> OSP-OX04

1 pc 50x30x0,2 mm

BIOACTIVA S.r.l
tel. +39 0444 963261
fax +39 0444 285132
info@osteoxenon.com

OSTEOXENON® by BIOACTIVA®

Remodeling the Future

OX® Membranes

OX® Membrane

*The advanced line of **OX®** bone substitutes is distinguished by a common denominator: the presence of bone collagen in its native configuration.*

In addition to the already biologically excellent characteristics due to the particular deantigenation method that *preserves the physiological and total osteoclastic remodeling properties*[1], the bone substitutes of the **OX®** line also have the *pro-regenerative effects wielded by type I bone collagen.*

In fact, type I bone collagen:

> Interacts with the beta1 subunit of the integrins of the cellular surface of the osteoblasts **to foster adhesion of the cells to the grafted material**[2]

> Acts as a coactivator necessary for the action of the morphogenetic proteins (BMPs) **to foster the stimulating action of the endogenous growth factors**[3]

> Binds the soluble growth factors, turning them into insoluble factors: it thus protects them from proteolysis and increases their half-life, **lengthening the duration of regenerative stimulation**[4]

> Controls access of the extracellular factors to the bone crystal being formed, **physiologically modulating bone mineralization**[5]

> Modulates transduction of the proliferation and differentiation signal in the osteoblastic cells, **controlling the remodeling process**[6]

> Interacts with the mesenchymal cells coming from the bone marrow, **inducing their adhesion, proliferation and differentiation in osteoblasts**[7,8]

> Promotes bone regeneration when grafted in bone defects, **wielding a direct pro-regenerative action**[9,10]

> It can even stimulate the expression of the coding genes for receptor II of the BMPs, **making the cells more sensitive to the regenerating signals**[11]

*The bone substitutes of the **OX®** line are today **one of the most biologically advanced answers for effective bone regeneration**, as demonstrated by the in vitro research results and clinical studies*[12,13]

Bibliography

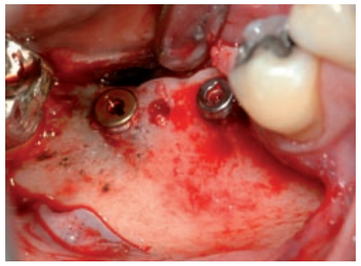
1) Pagnutti S, Maggi S, Di Stefano DA, Ludovichetti M. An enzymatic deantigenation method allows achieving physiological remodeling and even osteopromoting bone grafting materials. Biotechnol. & Biotechnol. Eq. 2007. 21 (4): 491-495
2) Baslé MF, Lesourd M, Grizon F, Pascaretti C, Chappard D. Type I collagen in xenogenic bone material regulates attachment and spreading of osteoblasts over the beta1 integrin subunit. Orthopade. 1998 Feb;27(2):136-42
3) Sampath TK, Reddi AH. Dissociative extraction and reconstitution of extracellular matrix components involved in local bone differentiation. PNAS 1981 Dec;78(12):7599-603
4) Paralkar VM, Nandedkar AK, Pointer RH, Kleinman HK, Reddi AH. Interaction of osteogenin, a heparin binding bone morphogenetic protein, with type IV collagen. J Biol Chem. 1990 Oct 5;265(28):17281-4.
5) Toroian D, Lim JE, Price PA. The size exclusion characteristics of type I collagen: implications for the role of noncollagenous bone constituents in mineralization. J Biol Chem. 2007 Aug 3;282(31):22437-47.
6) Green J, Schotland S, Stauber DJ, Kleeman CR, Clemens TL. Cell-matrix interaction in bone: type I collagen modulates signal transduction in osteoblast-like cells. Am J Physiol. 1995 May;268(5 Pt 1):C1090-103.
7) Liu G, Hu YY, Zhao JN, Wu SJ, Xiong Z, Lu R.Effect of type I collagen on the adhesion, proliferation, and osteoblastic gene expression of bone marrow-derived mesenchymal stem cells.Chin J Traumatol. 2004 Dec;7(6):358-62.
8) Mizuno M, Fujisawa R, Kuboki Y. Type I collagen-induced osteoblastic differentiation of bone-marrow cells mediated by collagen-alpha2beta1 integrin interaction. J Cell Physiol. 2000 Aug;184(2):207-13.
9) Gungormus M. The effect on osteogenesis of type I collagen applied to experimental bone defects. Dent Traumatol. 2004 Dec;20(6):334-7.
10) Gungormus M, Kaya O. Evaluation of the effect of heterologous type I collagen on healing of bone defects. J Oral Maxillofac Surg. 2002 May;60(5):541-5.
11) Regazzoni C, Winterhalter KH, Rohrer L. Type I collagen induces expression of bone morphogenetic protein receptor type II. Biochem Biophys Res Commun. 2001 May 4;283(2):316-22.
12) Perrotti V, Nicholls BM, Piattelli A. Human osteoclasts formation and activity on an equine spongy bone substitute. Clin. Oral Impl. Res. 20, 2009; 17–23.
13) Di Stefano DA, Artese L, Iezzi G, Piattelli A, Pagnutti S, Piccirilli M, and Perrotti V. Alveolar ridge regeneration with equine spongy bone: a clinical, histological and immunohistochemical evaluation . Clin Implant Dent Relat Res. 2008 Sep 9.

OX® Membrane

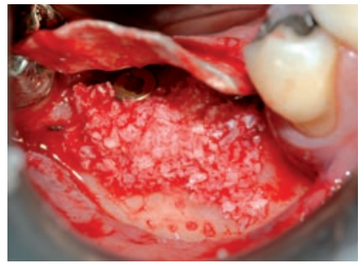
Is a complete line of membranes for any regenerative need. In fact, with regard to bone regeneration, the anatomical and blood supply conditions of the graft site might also considerably affect the speed of the regenerative events. It is therefore essential to protect the grafted site with a membrane that ensures a more adequate time of protection.
This is why the OX® Membrane line includes membranes having protection time periods very different from each other. All of them, however, are distinguished by a common feature: they absolutely do not need to be removed.

OX® Membrane

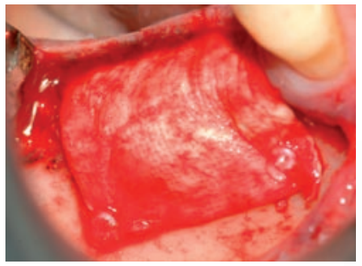
includes a rapidly absorbing collagen membrane – **BCG-XC30** – that protects the grafted site for 4-6 weeks, a membrane in pericardium – **HEART** – with a protection time of 3-4 months, and lastly, a long-lasting **membrane in bone cortical** (>6 months), characterized by the fact that by osteointegrating and sustaining total osteoclastic remodeling, it in actual fact behaves as an integral part of the bone graft itself.



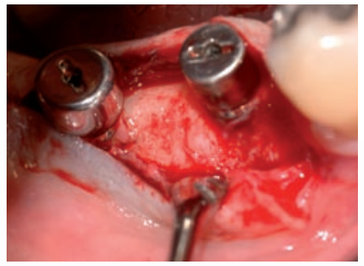
A mandibular ridge showing an evident horizontal defect



The defect is grafted with OX® Granules and covered with a HEART membrane



The membrane covers the graft completely. Stabilization is optional



Healing. Bone regeneration at 6 months

Pictures kindly provided by Prof. Danilo Di Stefano, Milano

The **Membrane OX®** series offers the ideal membrane for every type of graft: from the simple case of regeneration of a small site up to the important and surgically more advanced grafts, as different protection time periods can be chosen.

So since he has the optimum choice of **different OX® membranes** at his disposal, the surgeon can schedule the regeneration operation in the best way possible, by using the most highly indicated membrane for the scheduled surgery. The surgeon is sure he guarantees the patient **the maximum probability of clinical success** together with the peace of mind – even in the most demanding cases from a surgical point of view – **of not having to perform a second operation to remove the membrane used**.