

# ReproBone®

Synthetic Bone Graft Substitutes  
for **Orthopaedic Applications**

Stimulate

Integrate

Regenerate

 | ceramisys

[www.ceramisisys.com](http://www.ceramisisys.com)

 MADE IN SHEFFIELD

**ReproBone®'s advanced properties provide the ideal supporting matrices for the regeneration of bone.**

**ReproBone®** is an innovative range of synthetic bone grafts that stimulate, integrate and regenerate natural bone. With a composition very similar to that of human cancellous bone **ReproBone®** acts as an ideal scaffold for new bone formation. **ReproBone®** is available in a variety of convenient forms to suit the challenges that surgeons face in orthopaedic and trauma surgery.

**Synthetic**

Innovative products that offer sterile and reliable alternatives to allograft, autograft or xenograft with no risk of disease transmission or limited supply.

**Reduced morbidity**

With healing times comparable to autologous bone graft, **ReproBone®** in many cases reduces the need for bone harvesting and therefore eliminates donor site morbidity.

**Safe and reliable**

Manufacturing to international standards ensures high quality and reliable products. A composition similar to human bone provides confidence in safety and efficacy.

Stimulate

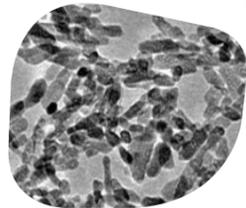
Integrate

Regenerate

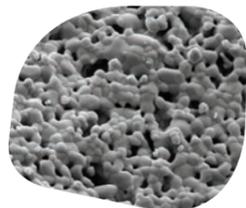
# ReproBone® fusion

Injectable Granular Paste

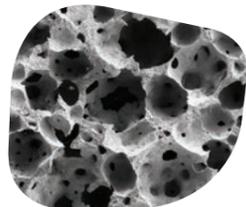
Unique innovative injectable matrix combining the activity of an osteostimulative carrier with longer term support of porous micro-scaffolds.



High surface area of nano-hydroxyapatite attracts and adsorbs the biomolecules essential for the stimulation of the regenerative process.



Micro-porous topography assists capillary action for the flow of biological fluids and the adsorption of proteins supporting cell attachment.



Macro-porous structure provides an optimal osteoconductive environment supporting bone formation and maintaining bone volume until full regeneration is achieved.

## Ready to use

Easy to inject with no pre-mixing or preparation required. Simply remove the cap and apply directly into the defect. Optional cannulas are provided.

## Indications

ReproBone® fusion is indicated for use as a bone graft substitute for the repair of non-load bearing aseptic osseous defects. Its mouldable and firm texture is especially suitable for the filling of bone defects that require longer term support and volume stability.

## Injectable granulated paste

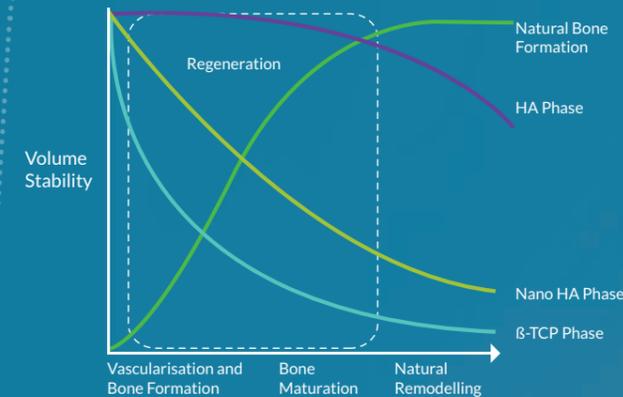
Volume stable viscosity allows easy and accurate application of the granulated paste. Excellent contact with the viable bone surface maximises the bone implant interface. The sticky non-setting formula supports bone regeneration by encouraging rapid cell ingrowth throughout the healing process.

## Multiphasic regenerative activity

An enhanced activity profile from the unique multiphase composition of nano, micro and macro structured material supports and encourages formation of new bone whilst maintaining volume. Over time the material is gradually replaced by mature bone.

## Osteostimulative

The highly active matrix attracts and adsorbs biomolecules onto the surface to create an optimal microenvironment that promotes new bone formation.



# ReproBone® novo

Paste



## Mouldable consistency

Putty-like consistency allows easy positioning and fully adapts to the shape of the defect. Excellent contact with the viable bone surface maximising the bone implant interface.



## Positive osteostimulative effect

The high molecular surface area attracts the biomolecules essential for the regenerative process and along with local elevation of ions, contributes towards its osteostimulative effect. Osteoblast colonisation and vascularisation will occur throughout the implant.

## Ready to use

Easy to inject with no pre-mixing or preparation required. Simply remove the cap and apply directly into defect. Optional cannulas are provided.



## Indications

ReproBone® novo is indicated for use as a bone graft substitute for the repair of non-load bearing aseptic osseous defects. Its mouldable and injectable texture is especially suitable for the filling of small or difficult to access bone defects.

## Nano technology

The high molecular surface area of the hydroxyapatite (approx. 100 m<sup>2</sup>/g) is 50-100 times greater than typical bone graft technologies.

## Resorbable

ReproBone® novo is readily resorbed over several months.

## Cohesive texture

Bridges the gaps between bone surfaces and resists wash-out from bleeding of bone defects.

## Clinical Performance

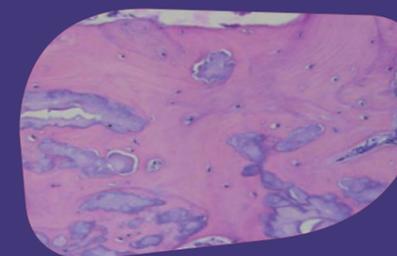
ReproBone® novo has proven biocompatibility as demonstrated by pre-clinical testing<sup>[1]</sup>. The efficacy of ReproBone® novo to stimulate and regenerate bone has been demonstrated over a number of years of clinical use in a variety of indications with no adverse reactions. Studies show that ReproBone® novo implanted into bone defects provides an excellent stimulatory environment to promote and support new bone formation<sup>[2]</sup>. Integration of bone and vascularisation occurs throughout the implant and ReproBone® novo is fully resorbed over time.

## Activity

ReproBone® novo adsorbs and attracts biomolecules and along with the dissolution of ions acts to stimulate the proliferation and differentiation of healthy progenitor cells.

## Bone formation

Osteoblasts lay down new bone throughout the graft matrix. Cell mediated resorption of ReproBone® novo occurs over time alongside the formation of mature bone.



Histological evaluation of human bone biopsy showing ReproBone® novo surrounded by new bone<sup>[3]</sup>.



Pre-op

6 months post-op

x-ray showing fusion of the metatarsophalangeal joint<sup>[4]</sup>.

# ReproBone®

## Granules & Blocks

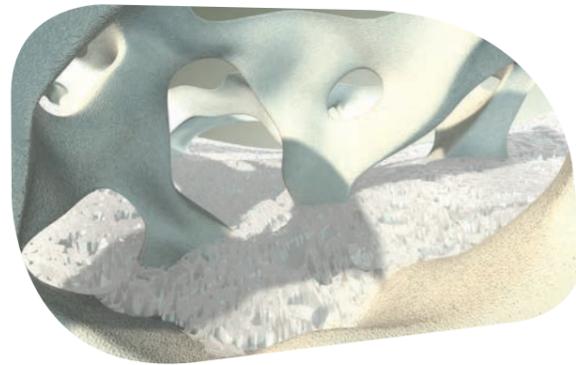


### Ultra high porosity

Over 80% porosity allows rapid bone ingrowth throughout the interconnected porous structure. The product provides support without significantly limiting natural bone density. Microporosity within the HA/β-TCP structure assists the transfer of essential nutrients.

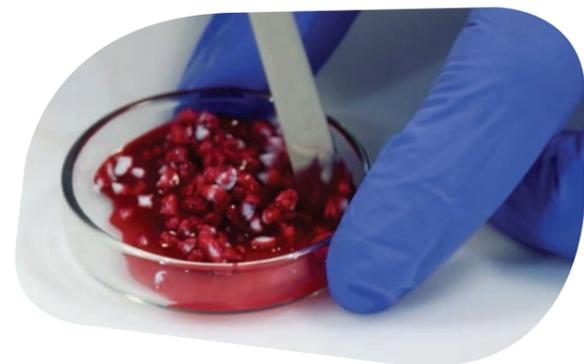
### Osteoconductive

Osteoconductive scaffold supports early vascularisation and rapid bone regeneration throughout the implant.



### Easy application

ReproBone® granules when mixed with blood, bone marrow aspirate or platelet concentrate form a cohesive mixture that is easily handled. Granules can be mixed with autograft as a bone graft extender if required. Blocks can be easily shaped to more closely fit the bone defect.



### Indications

ReproBone® Granules and Blocks are indicated for use as bone graft substitutes for the repair of non-load bearing aseptic osseous defects.

### Resorbable

With a composition similar to the mineral component of human bone ReproBone® undergoes complete resorption at a controlled rate.

### Volume stable

Maintains bone volume throughout the whole repair and regeneration process.

### Wide variety

Granules, blocks, wedges, cylinders and discs available in a large range of convenient sizes.

### Clinical Performance

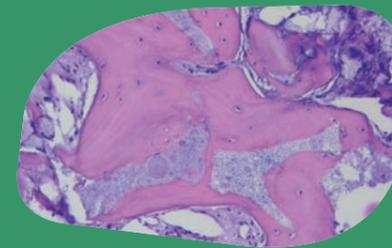
ReproBone® has proven biocompatibility<sup>[1]</sup>. Its performance as an osteoconductive biomaterial has been demonstrated over many years of successful clinical use with no adverse reactions. Studies show that ReproBone® bone graft substitutes provide excellent osseointegration with rapid vascularisation and bone penetration through to the core of the implant<sup>[5]</sup>.

### Osteoconduction

Biomolecules adsorb onto the porous surface stimulating the regenerative process. Osteoblasts migrate throughout the fully interconnected structure laying down new bone resulting in complete integration of the implant and the formation of a bicontinuous matrix.

### Resorption

Dissolution of ReproBone® occurs releasing ions locally which provides a stimulatory environment for osteoblasts and promotes the deposition of new bone. ReproBone® resorbs over time during which bone remodelling and maturation occurs.



Histological evaluation of human bone biopsy showing ReproBone® surrounded by new bone. Complete integration of the implant was observed<sup>[6]</sup>.



Two-stage ACL repair. Stage 1 involved screw removal from the tibia and filling of the tunnel with bone graft. After 3 months sufficient bone healing was achieved and stage 2 was performed - x-ray post op<sup>[7]</sup>.

## ReproBone<sup>®</sup> fusion

### Granulated bone graft paste

- Osteostimulative
- Mouldable consistency
- Maintains bone volume
- Ready to use
- Resorbable



## ReproBone<sup>®</sup> novo

### Nanocrystalline bone graft paste

- Nano-technology
- Osteostimulative
- Mouldable consistency
- Ready to use
- Resorbable



## ReproBone<sup>®</sup>

### Porous bone graft - granules / blocks / cylinders / wedges

- Osteoconductive
- Ultra-high porosity
- Maintains bone volume
- Easy to use
- Resorbable



Maxillofacial Surgery

Metaphyseal Defects

Spinal Bone Defects and Cage Filling

Iliac Crest Defects from Autograft Procedures

Distal Radius

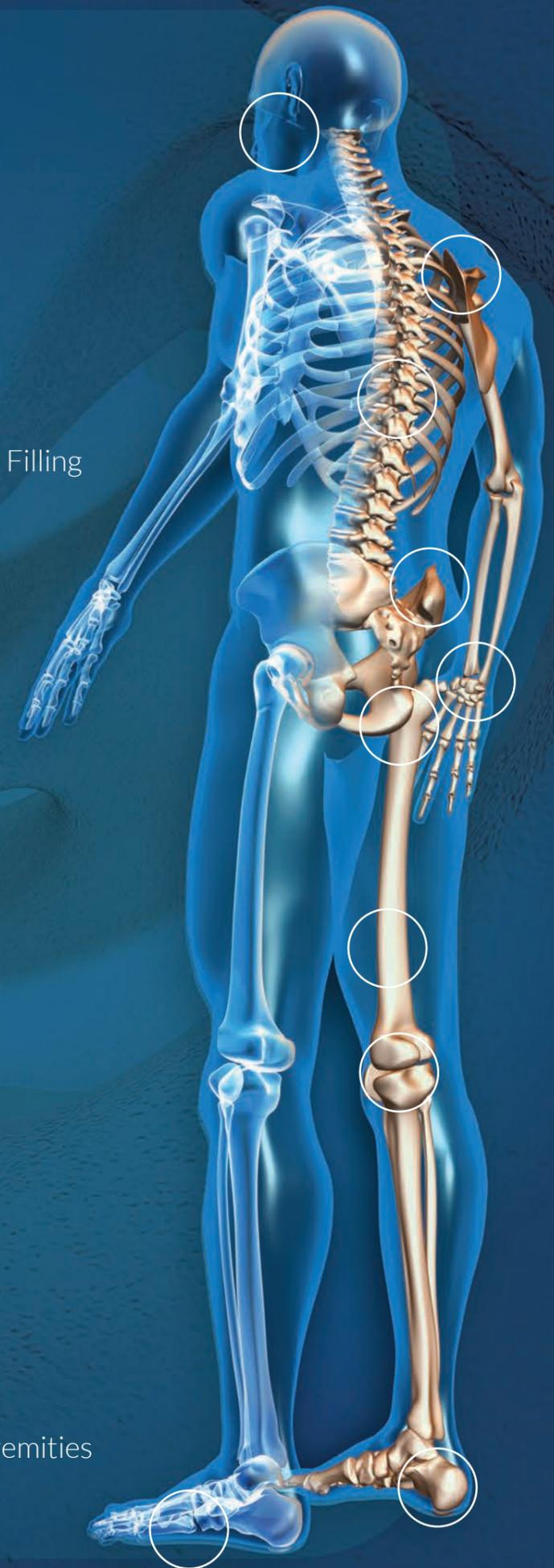
Revision Hip Surgery

Defects in Long Bones

Revision Knee Surgery

Calcaneal Osteotomy

Defects of the Extremities



### ReproBone® fusion

GNP1	1 cc
GNP2.5	2.5 cc
GNP5	5 cc
2GNP5	10 cc
3GNP5	15 cc



### ReproBone® Granules (1-4mm)

RBG5	5 cc
RBG10	10 cc
RBG15	15 cc
RBG20	20 cc
RBG30	30 cc



\* Other sizes of granules available

### ReproBone® novo

PAS1	1 cc
PAS2.5	2.5 cc
PAS5	5 cc
2PAS5	10 cc
3PAS5	15 cc



### ReproBone® Blocks/ Cylinders/Wedges

ReproBone® available in a large variety of different shapes and sizes to suit individual bone defects.



For over 15 years **Ceramisy** has been specialised in the manufacture and development of unique synthetic biomaterials. Working in collaboration with renowned research institutions and manufacturing to international quality standards enables the provision of innovative high quality products to customers globally. **Ceramisy** products are approved in the majority of international markets.

ReproBone® materials have clinically proven efficacy:

- [1] Pre-clinical studies on file at Ceramisy
- [2] Data on file at Ceramisy
- [3] Ceramisy clinical case - 12-GB-CS-07/13
- [4] Ceramisy clinical case - 32-GB-CS-06/14
- [5] Data on file at Ceramisy
- [6] Ceramisy clinical case - 08-GB-CS-07/13
- [7] Ceramisy clinical case - 26-GB-CS-08/13

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