



## Solum IV FAQs

**1. *What is the composition of Solum IV?***

The granular component of Solum IV is pure hydroxyapatite (HA) and the carrier is gelatin.

**2. *What is HA? Why is it a good substrate for bone?***

HA is a crystalline version of calcium phosphate very similar to the inorganic part of natural bone.

**3. *What is a gelatin?***

Gelatin is a fragment of collagen which comprises the organic part of natural bone. Because it is a smaller protein than collagen, it absorbs fluid quickly and is easily remodeled by the cells.

**4. *What percentage of SOLUM IV is HA? Is the gelatin carrier? And how was this mixture determined?***

Solum IV is a 1:1 ratio by volume of HA and gelatin. The ratio was chosen because of its' superior handling characteristics.

**5. *How long does it take for the HA to absorb?***

Because HA is more crystalline than beta-tricalcium phosphate (bTCP), it takes longer for cells to resorb and remodel. However, the porosity of Solum IV allows for remodeling between 1 and 3 months.

**6. *How long does it take for the gelatin to resorb?***

Gelatin is immediately hydrated upon the addition of bone marrow and is digested by natural enzymes within a few days of implantation.

**7. *What is the pore size of Solum IV?***

Solum IV has a porosity of 70-90% (trabecular bone has a porosity of 50-95%) with a macroporosity of  $300 \pm 100 \mu\text{m}$  and microporosity  $25 \pm 10 \mu\text{m}$ .

**8. *Why would you use Solum IV over BTCP?***

HA more closely mimics natural bone mineral and is a longer lasting scaffold for bone regeneration in vivo.

**9. *Why would you use Solum IV over a putty?***

DBM putties are demineralized, meaning the calcium phosphate component, which serves as an osteoconductive scaffold, has been removed. DBM putties are quickly resorbed after implantation and many on the market are acidic.



**10. What does biomimetic mean?**

Biomimetic means the material is representative of natural structure of a tissue. Solum IV is biomimetic because it mimics the biochemical (HA) and architectural structure of trabecular bone.

**11. What is nano crystalline?**

Solum IV is produced by the fusion of HA nanoparticles which provide nanoscale surface features for cell attachment, proliferation, and differentiation.

**12. What makes Solum IV a better substrate for cells?**

Solum IV serves as an osteoconductive scaffold for new bone growth that is not easily resorbed (like DBM, collagen, or bTCP) but can be remodeled faster than cancellous bone chips. Solum IV induces osteogenic gene expression of mesenchymal stem cells including alkaline phosphatase, Runx2, and collagen type I.

**13. When speaking of Solum IV, what is the difference between micro and macro structure?**

Microporosity refers to Solum IV's pores greater than 1 micron (surface porosity) up to 500 microns (interconnected pores). Macroporosity refers to the larger cavities on the surface of the particles.

**14. What is the importance of the interconnected porosity of Solum IV?**

Traditional calcium phosphate granules or cancellous bone chips require cells, tissue, and blood vessels to grow around them. The interconnected pores of Solum IV promote growth through the individual particles while decreasing the total mass of material implanted for a required graft volume (greatest surface area to volume ratio).