



Institut national
de la santé et de la recherche médicale

General description: The laboratory for osteoarticular and dental tissue engineering (U791) belongs to INSERM and the University of Nantes. About 45 researchers, including 10 PhD students, veterinarians, dentists and maxillofacial surgeons are developing novel therapeutic concepts for regenerating diseased or damaged bone, cartilage and dental tissues by using patient's own cells associated to advanced biomaterials. Our group publishes around 30 scientific publications per year in the most renowned journals in the field of biomaterials, tissue engineering and biology and has filled 10 patents with several being licensed to industries.

Several technical plateau are devoted to cell and molecular biology particularly dedicated to cell and tissue interaction with scaffolds used in bone, cartilage and other tissue engineering, physico chemical department, analysis and characterization of biological samples, biomaterials, and. The center is devoted to academic and SME R & D project.

Website: load.nantes.inserm.fr

Expertise: Our group is composed of experts in biomaterials and tissue engineering. We are the inventor and pioneer of the Biphasic calcium phosphate concept used in this project and manufactured by Biomatlante, (partner 5). We study the interactions between animal or human adult stem cells and innovative scaffolds made of calcium phosphate bioceramics, cements, hydrogels or titanium. Our laboratory is 1200 m² and furnished with state of the art equipment for the synthesis and physicochemical characterization of biomaterials (furnaces, rheology, micro testing equipment, dynamic mechanical testing, FTIR microscopy, SEM, TEM, Confocal, μ CT) facilities for cell culturing and molecular biology and microtomes for non decalcified histology. Small animal and large pre clinical models are routinely performed in collaboration with the Nantes' School of Veterinary Medicine according to ethical experimental protocols. Our laboratory is closed to the Nantes academic hospital having access to human cells, biopsies and has transferred several innovative therapeutic concepts to medical applications through clinical trials.

Facilities: L2 cell culture laboratory, biochemistry, molecular biology, expertise in technical processing of biological samples, Biomaterials and derived product from tissue engineering. Competency are from electron microscopy, (TEM SEM), nano samples characterization (microFTIR, Electron diffraction, Hr TEM, Electron diffraction, EDS), histomorphometry, light microscopy, Micro CT (qualitative and quantitative). materials testing machine, micro dynamic testing,

Other European projects: REBORNE-Project No. 241879

Role in the project: INSERM will contribute to the GAMBA project by:

- Micro characterization of biphasic calcium phosphate granules as carriers for gene vectors
- developping injectable calcium phosphate ceramics by combination with specific hydrogel, rheological properties
- Biological performance in vitro and in vivo, in vivo biocompatibility normative tests
- carrying out validation in animal models (osteonecrosis in rabbits, radionecrosis in rats)

Workpackages responsibility: In vivo analysis of bone formation

[WP06](#) (WP = Workpackage)

[Key personnel](#)

[Guy Daculsi](#) : (M) Research director INSERM, , ISCM general secretary (International Society for Ceramics in Medicine), has more than 400 publications and 13 patents.

[Thomas Miramont](#) : PhD Doctorate shared with Biomatlante. Pierre Weiss, DDS, Professor University, polymerist, director of the INSERM LIOAD U791.

[Paul Pilet](#) : Engineer, SEM, TEM, Micro CT and image analysis, Thierry Rouillon, Engineer, PhD, physicist, X-Ray and FTIR., CFBD. Caroline Colombeix, Engineer, Confocal microscopy

Publications:

1. Espitalier F, Vinatier C, Lerouxel E, Guicheux J, Pilet P, Moreau F, Daculsi G, Weiss P, Malard O. *Biomaterials*. 2009 Feb;30(5):763-9.
2. G. Daculsi, A.P. Uzel, P. Weiss, E. Goyenvalle, E. Aguado (2009) *Journal of Materials Science: Materials in Medicine* , nov 1:
3. Sohier J, Daculsi G, Sourice S, de Groot K, Layrolle P. (2009) *J Biomed Mater Res A*. 2009 Mar 19
4. Nihouannen DL, Saffarzadeh A, Aguado E, Goyenvalle E, Gauthier O, Moreau F, Pilet P, Spaethe R, Daculsi G, Layrolle P. *J Mater Sci Mater Med*. 2007 Feb;18(2):225-235
5. Daculsi G., , *Advances in Science and Technology* vol 49 (2006) pp 9-13
6. Lerouxel E, Weiss P, Giumelli B, Moreau A, Pilet P, Guicheux J, Corre P, Bouler JM, Daculsi G, Malard O. *Biomaterials*. 2006 Sep;27(26):4566-72
7. Daculsi G, Laboux O, Malard O, Weiss P. *J. Mater. Sci. Mater. Medecine* 2003, 14:195-200
8. Daculsi G, Weiss P, Bouler JM, Gauthier O, Aguado E. *Bone* 1999, 25:59-61
9. Le Guehennec L, Goyenvalle E, Aguado E, Pilet P, Bagot d'Arc M, Bilban M, Spaethe R, Daculsi G. *J. Mater. Sci. Mater. Medecine* 2005, 16:29-35
10. - Arinze TL, Tran T, McAlary J, Daculsi G. *Biomaterials* 2005, 26(17):3631-8

Patents:

1. WO2009053372 (A2), 2009-04-30
2. FR2865939 (A1), 2005-08-12
3. MXPA06009199 (A), 2007-03-07
4. WO 95/21634. GR3034590 (T3), 2001-01-31

5. ES2322343, 2009-06-19
6. US2007212389 (A1), 2007-09-13

Award: FBSE 2008 award (Fellow in Biomaterials Science and Engineering)