

Team leader name: P. Vicendo
Laboratory/ Service: IMRCP
Title of the team: Colloids and Nanomedicine Project (CNP)

Research staff:

Permanent staff: Fitremann J (CR CNRS); Gauffre F (CR CNRS); Gineste S (IE CNRS); Lauth de Viguerie N (Pr.); Lonetti B (CR CNRS); Marty J-D (MdC); Mingotaud C (DR CNRS); Mingotaud A-F (CR CNRS); Souchard J-P (Pr.); Vicendo P. (CR CNRS)

Non permanent staff: Ehrhart J. (Post-doctoral fellow); Rodriguez Vilches S. (PhD student); Rahal Virginie (PhD student); Chemali Jad (PhD student); Mayap Talom Renée (PhD student)

Principal Investigators (Grant holders):

Fitremann J; Gauffre F; Mingotaud C; Vicendo P.

Research topics:

Photobiology

Self-assembled systems (polymers)

Development of materials for medicine

Nanoparticles and nano-objects in solution

Key words:

Photobiology; Photosensitization; Photodermatology; Nanoparticles; Polymers

Participation in translational research:

Development of a label free detection device for cancer biomarkers using molecular imprinted polymers (collaboration with Institut Claudius Regaud, LAAS-CNRS, INSAT (Toulouse) and Innopsys (Midi-Pyrénées region))

Photodynamic therapy: active targeting towards the cell nucleus, passive targeting using polymer micelles (ANR in collaboration with IPBS (Toulouse), Purpan Engineer School (Toulouse), Laboratoire Acides Nucléiques, Biosciences et Photonique (Paris))

Development of nano-objects from hybrid DNA copolymers or stimuli-responsive systems (ANR in collaboration with LOF (Bordeaux) and Laboratoire Charles Coulomb (Montpellier))

Relevant publications (2005-2011):

"The contribution of calpains in the downregulation of Mdm2 and p53 proteolysis in reconstructed human epidermis in response to solar irradiation." C. Gelis, A. Mavon, P. Vicendo, *Photochem. Photobiol.* **81** (2005) 975-82.

"Photo-Electron Transfer Processes with Ruthenium(II) Polypyridyl Complexes and Cu/Zn Superoxide Dismutase ." L. Bijeire, B. Elias, J.-P. Souchard, E. Gicquel, C. Moucheron, A. Kirsch - De Mesmaeker, P. Vicendo. *Biochemistry* **45** (2006) 6160-9

"Synthesis of estradiol-pheophorbide a conjugates: evidence of nuclear targeting, DNA damage and improved photodynamic activity in human breast cancer and vascular endothelial cells." N. El-Akra, A. Noiro, J.-C. Faye, J.-P. Souchard, *Photochem. Photobiol. Sci.* **5** (2006) 996-9

"Monomeric Pheophorbide(a)-containing Poly(ethyleneglycol-b-ε-caprolactone) micelles for photodynamic therapy" Knop K., Mingotaud A.-F., El-Akra N., Violleau F., Souchard J.-P. *Photochem. Photobiol. Sci.* **8**(3) (2009) 396-404

"Prevention of skin flap necrosis by estradiol involves revascularization of a protect vascular network" C. Toutain, L. Raymond, I. Brouchet-Letron, P. Vicendo, M.-J. Fouque, H. Berges, A. Krunst, P. Chambon, H. Laurell, J.-F. Arnal, F. Lenfant. *Circ Res* **104** (2009) 245-54

"In vitro antioxidant activity and theoretical studies (QSAR, DFT)" C. Prouillac, P. Vicendo, J.-C. Guarrigues, R. Poteau, G. Rima, Evaluation of New Thiadiazoles and Benzothiazoles as potent radioprotectors: *Free Rad Biol Med* **46** (2009) 1139-48

"Ligand selection in Rull complexes for direct one-electron photoxydation of guanine: a combined computational and experimental study." M. Boggio-Pasqua, P. Vicendo, M. Oubal, F. Alary, J.-L. Heully *Chemistry A- European Journal* **15** (2009) 2759-62

"Amphiphilic Block-Copolymers : a Simple and very Efficient Tool to Stabilize Nanoparticles for Applications in Biotechnologies. Stability studies and cellular uptake" K. Rahme, P. Vicendo, C. Ayela, C. Gaillard, B. Payré, C. Mingotaud, F. Gauffre, *Chemistry A- European Journal* **15** (2009) 11151-9.

"Next Generation Molecular Imprinted Polymers: Examples of Liquid Crystalline Materials and Hydrogels for Protein Recognition" Mingotaud A.-F., Fitremann J., Mauzac M., Rodriguez Vilches S., Doucet J.-B., Séverac C., Laurent E., Binet C., Marty J.-D., Palaprat G. and Weyland M. In *Molecular Recognition: Biotechnology, Chemical Engineering and Materials Applications*, (2010) Novascience

"Electron transfer processes induced by the triplet state of pterins in aqueous solutions." M. L. Dántola, M. Vignoni, C. González, C. Lorente, P. Vicendo, E. Oliveros, A. H. Thomas, *Free Rad Biol Med*, **49**, (2010) 1014–22.

"Matrix Architecture Dictates Three-Dimensional Migration Modes of Human Macrophages: Differential Involvement of Proteases and Podosome-Like Structures." E. Van Goethem E, R. Poincloux, F. Gauffre, I. Maridonneau-Parini, V. Le Cabec, *J. Immunol*, **184**, (2010) 1049-61.

"Biohybrid block copolymers: towards functional micelles and vesicles." G. Fuks, R. Mayap Talom, F. Gauffre, *Chemical Society Reviews*, **40**, (2011) Advance Article DOI: 10.1039/C0CS00085J.

"Asymmetrical flow field-flow fractionation with multi-angle light scattering and quasi elastic light scattering for characterization of poly(ethyleneglycol-b-ε-caprolactone) block copolymer self-assemblies used as drug carriers for photodynamic therapy" Ehrhart J., Mingotaud A.-F., Violleau F. *J. Chromatography A* (2011) accepted

Partnerships with industry / development:

1999-2006: Société Pierre Fabre Dermocosmétique, Institut de Recherche Pierre Fabre Laboratoire de Pharmacocinétique dirigé par Mr Alain Mavon " *Effects of UV on skin models, Studies of the skin response*". (coordinator Patricia Vicendo)

Award : 2004, 2nd december: 3^{ième} prix de l'innovation de la Région Midi Pyrénées.

"Design and development of a three dimensional skin model from pig for the study of physiopathological responses, skin aging, cancer processes and evaluation of xenobiotics for dermocosmetic" (Patricia Vicendo; Alain Mavon de la Société Pierre Fabre).

2006-2009: LE CERPER, Société Pierre Fabre,

"Protective effect of estradiol in response to skin ischemia: Study of mechanisms involved in an increased cell survival." (Patricia Vicendo: Responsable de l'Etude sur modèles *ex vivo* de peau maintenue en survie).

2005-2007: Teknimed : "Bone cement formulations for easy injection"

Research Networks :

2006-2010 EST Marie Curie Nanotool (Director C. Mingotaud)

2007- 2011 GDR3049 "Médicaments Photoactivables – Photochimiothérapie" (PHOTOMED) (Directors : D. Brault, P. Vicendo)

2008- Plateform FTP nanomed

2011-2014 GDR3049 "Médicaments Photoactivables - Photochimiothérapie (PHOTOMED)" (Director P. Vicendo)

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