

**Michel C. Wathier**  
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## EXPERTISE/EXPERIENCE:

- *In vivo* and *in vitro* testing of hydrogels/viscoelastic materials for ophthalmic and orthopedic applications
- Physicochemical characterization of hydrogels/polymers
- cross-functional team leader/mentor
- Polymer/macromolecule synthesis
- Novel photo-crosslinkable and self-gelling hydrogels/polymers
- Peptide and carbohydrate chemistry
- Drug delivery systems

## PRODUCT DEVELOPMENT ACCOMPLISHMENTS:

- Succeeded in the synthesis and development of dendritic hydrogels for ophthalmic application this resulted in a patent and start-up company. <http://www.hyperbranch.com/>
- Succeeded in the synthesis and development of viscoelastic materials for orthopedic application this resulted in a patent and start-up company. <http://www.FlexBio.com/>
- Developed a new biocompatible polymer forming hydrogels for biotechnological use. (2 patents)
- Created proprietary bolaamphiphiles for gene delivery.
- Developed cost-effective synthesis for the 3-hydroxy-4-methyl-benzoic acid by diazotation route.

## EMPLOYMENT HISTORY

- 2003-Present: Senior Research Scientist**, Lab. Prof. M. W. Grinstaff, *Boston University*. <http://people.bu.edu/mgrin/>  
Leading a team of chemists and bioengineers who are optimizing the synthesis, and performing physicochemical, *in vitro*, and *in vivo* testing of previously patented materials for ophthalmic and orthopedic applications.
- 2002-2003: Research Chemist**, Lab. of Prof. M. W. Grinstaff, *Duke University*,  
Synthesized new dendrimers with the ability to form hydrogels for use in ophthalmology.
- 2000-2001: Research Chemist**, *Laboratoire LAPHAL*, France (<http://www.labo-laphal.fr/>),  
Synthesized new bolaamphiphile cationic compounds capable of complexation with DNA for gene delivery.
- 1999-2000: Postdoctoral Fellow**, *L.C.B.O.S.M.V* Avignon University, France,  
Conducted research on a new class of polymerizable surfactants to form stable vesicles. Physicochemical study was carried out to characterize their behavior in an aqueous environment, before and after polymerization.

## EDUCATION

- 1999: Ph.D. in Chemistry**, advisor Prof. B. Pucci, Université d'Avignon, France. "Synthesis and study of novel bolaamphiphile and gemini surfactants."
- 1995: M.S. in Chemistry**, advisor Prof. B. Pucci, Université d'Avignon, France. "Biantennary surfactant synthesis."

## PATENTS

- 1) Wathier M.; two additional provisional applications filed (2007).
- 3) Wathier M.; Grinstaff M. W. "Medical Lubricants and gels." PCT filled in 2007.
- 4) Wathier M.; Grinstaff M. W. "Viscoelastic Salts or Ionic Viscoelastics." PCT filled in 2007.
- 5) Grinstaff M. W.; Carnahan M. A.; Kim T.; Luman N.; Morgan M.; Wathier M. "Novel dendritic polymers, crosslinked gels, and their biomedical uses." U.S. Pat. Appl. Publ. #2004086479 (2004).

## PUBLICATIONS

- 1) Degoricija, L.; Johnson, C. S.; Wathier, M.; Kim, T.; Grinstaff, M. W. "Photo-crosslinkable Biodendrimers as Ophthalmic Adhesives for Central Lacerations and Penetrating Keratoplasties." *Invest. Ophthalm. Vis. Sci.*, 2007, **48**, 2037-2042.
- 2) Dominguez, M. M.; Schaus, S. E.; Wathier, M.; Grinstaff, M. W. "Immobilized Hydrogels for High Throughput Screening of Molecular Interactions." *Analytical Chemistry*, 2007, **79**, 3, 1064-1066.
- 3) Morgan, M. T.; Nakanishi, Y.; Kroll, D. J.; Griset, A. P.; Carnahan, M. A.; Wathier, M.; Oberlies, N. H.; Manikumar, G.; Wani, M. H. C.; Grinstaff, M. W.; "Dendrimer-Encapsulated Camptothecins: Increased Solubility, Cellular Uptake, and Cellular Retention Affords Enhanced Anticancer Activity In vitro." *cancer research*, 2006, **66**, 24, 11913-11921.
- 4) Wathier, M.; Johnson, C. S.; Carnahan, M. A.; Grinstaff, M. W.; Kim, T. "A Novel Biodendritic Adhesive for Sutureless Vitreous Surgeries." *ChemMedChem*, 2006, **1**, 8, 821-825.
- 5) Wathier, M.; Johnson, C. S.; Kim, T., Grinstaff, M. W. "Hydrogels Formed by Multiple Peptide Ligation Reactions To Fasten Corneal Transplants." *Bioconjugate Chemistry*, 2006, **17**, 4, 873-876.
- 6) Polidori A., Wathier M., Fabiano A-S., Olivier B., Pucci B. "Synthesis and Aggregation Behaviour of Symmetric Glycosylated Bolaamphiphiles in Water." *ARKIVOC*, 2006, part iv.
- 7) Kang, P. C.; Carnahan, M. A.; Wathier, M.; Grinstaff, M. W.; Kim, T. "Novel Tissue Adhesives to Secure Laser in situ Keratomileusis Flaps." *J Cataract Refract Surg* 2005, **31**, 6, 1208-1212.
- 8) Bahmed, K.; Quilès, F.; Wathier, M.; Bonaly, R.; Benallaoua, S.; Pucci, B.; Coulon, J. "Use of dansyl *N*-acetyl glucosamine as substrate for chitin synthetase activities." *Process Biochemistry*, 2005, **40**, 7, 2523-2529.
- 9) Wathier, M.; Jung, P. J.; Carnahan, M. A.; Kim, T.; Grinstaff, M. W. "Dendritic Macromers as in Situ Polymerizing Biomaterials for Securing Cataract Incisions." *J. Am. Chem. Soc.*, 2004, **126**, 12744-12745.
- 10) Ngondi-Ekome, J.; Thiebault, F.; Strub, J.-M.; Van Dorsselaer, A.; Bonaly, R.; Contino-Pepin, C.; Wathier, M.; Pucci, B.; Coulon, J. "Study on agglutination factors from flocculent *Saccharomyces cerevisiae* strains." *Biochimie*, 2003, **85**, 133-143.
- 11) Wathier, M.; Polidori, A.; Ruiz, K.; Fabiano, A.-S.; Pucci, B. "Stabilization of polymerized vesicular systems: An application of the dynamic molecular shape concept." *Chem. Phys. Lipids*, 2002, **115**, 17-27.
- 12) Bahmed, K.; Bonaly, R.; Wathier, M.; Pucci, B.; Coulon, J. "Change of cell wall chitin content in amphotericine B resistant *Kluyveromyces* strains." *FEMS Microbiology Letters*, 2002, **216**, 99-103.
- 13) Wathier, M.; Polidori, A.; Ruiz, K.; Fabiano, A.-S.; Pucci, B. "Synthesis and study of the behavior of glycosylated gemini surfactants in aqueous media." *New J. Chem.*, 2001, **25**, 1588-1599.

## ORALE PRESENTATIONS

- 1) M. Wathier, S. S. Stoddart, B. D. Snyder, M. W. Grinstaff, "Synthesis, Biocompatibility, and Degradation Studies of Pseudopolysaccharides." 2008 World Biomaterials Congress, Amsterdam, Netherlands, May 28 - June 1, **2008**.
- 2) M. Wathier, J. Berlin, M. W. Grinstaff; "Improvement of Hydrogel Stability by O,N Acyl Rearrangement: A New Approach for Securing Ocular Wounds." *33<sup>th</sup> Biomaterials Annual Meeting, Biomaterials for In Situ Tissue Engineering Symposium*, Chicago, IL, **2007**.
- 3) M. Wathier and M. W. Grinstaff, "Hydrogels as Ophthalmic Tissue Adhesives." *30<sup>th</sup> Biomaterials Annual Meeting, Biomaterials for In Situ Tissue Engineering Symposium*, Memphis, TN, **2005**.
- 4) A. M. Oelker, M. Wathier, M. W. Grinstaff, "Mechanical Properties of Peptide-based Dendron Hydrogels." *30<sup>th</sup> Biomaterials Annual Meeting, Biomaterials for In Situ Tissue Engineering Symposium*, Memphis, TN, **2005**.
- 5) M. Wathier, M. W. Grinstaff, "Self-Gelling Polymers for Repair of Corneal Lacerations." *29<sup>th</sup> Biomaterials Annual Meeting, Biomaterials for In Situ Tissue Engineering Symposium*, Reno, NV, **2003**.

- 6) M. Wathier, M. W. Grinstaff, "Self-Gelling hydrogels for Repair of Corneal Lacerations." *Duke University*, Durham, NC, **2002**.
- 7) M. Wathier, K. Ruiz, A. Polidori, B. Pucci, "Synthèse d'une nouvelle classe de tensioactifs bolaformes glycolipidiques. Etude de leur comportement en milieu aqueux." *RcomI*, Marseille, France, **2000**.
- 8) M. Wathier, K. Ruiz, A. Polidori, B. Pucci, "Synthèse de nouveaux tensioactifs de type Bolaforme, étude de leur comportement en milieu aqueux." *Société Française de Chimie*, Nice, France, **1999**.
- 9) M. Wathier, A. Polidori, B. Pucci, "Formation de petite vésicules pour le transport et le ciblage de principes actifs." *GDR 690 and 692*, Batz sur Mer, France, **1998**.

## NEWS PRESS

- 1) "Dendrimers encapsulate anticancer drug to improve solubility" *Pharmatechnologist*, January 11, **2007**.
- 2) "Dendrimers Improve Cancer Drug Uptake and Antitumor Activity" National cancer institute, January 8, **2007**.
- 3) "News medical Dendrimer-encapsulated camptothecins" *Medical Science News*, January 8, **2007**.
- 4) "New Dendritic Adhesives for Sutureless Surgical Procedures" *American Academy of Ophthalmology*, April, **2006**.
- 5) "Dendritic Macromer Replaces Sutures in Cataract Surgery", *Chemical Education Today*, March, **2005**.
- 6) "Novel polymers show potential as alternative to sutures" *Ophthalmology Times*, Oct 15, **2005**.
- 7) "Branching polymer could heal cataract wound." *Science News*, October 23, **2004**.
- 8) "Eyeball glue." *Nature*, Vol. 431, Oct. 21, **2004**, p. 923.
- 9) "Sealing Corneal Incisions With A Drop Of Chemistry, Boston University Researchers Develop Gel For Cataract Surgery."
- 10) *Science Daily*, October 18, **2004**.
- 11) "Dendritic hydrogels go easy on the eyes." *Chemical and Engineering News*, September 27, **2004**.

## POSTERS, PROCEEDINGS, AND NON-PEER REVIEWED MANUSCRIPTS

- 1) Wathier, M.; Stoddart, S. S.; Grinstaff, M. W. "Synthesis of high molecular weight polymers using ROMP." 234th ACS National Meeting, Boston, MA, United States, August, **2007**.
- 2) Griset, A. P.; Morgan, M. T.; Nakanishi, Y.; Kroll, D. J.; Carnahan, M. A.; Wathier, M.; Oberlies, N. H.; Manikumar, G.; Wani, M. C.; Grinstaff, M. W. "Cytotoxicity and cellular uptake of a dendrimer-encapsulated camptothecin." 234th ACS National Meeting, Boston, MA, United States, August, **2007**.
- 3) Wathier, M.; Dominguez, M. M.; Schaus, S. E.; Grinstaff, M. W. "Immobilized Hydrogels for High Throughput Screening", *IBC's 11<sup>th</sup> Annual World Congress*, Boston, MA, August **2006**.
- 4) M. Wathier, C. S. Johnson, T. Kim, M. W. Grinstaff, "Self-Gelling Polymers to Secure a Penetrating Keratoplasty", *2006 BME retreat*, Portsmouth, NH, June **2006**.
- 5) S. R. Meyers, M. Wathier, J.-Y. Min, P. Oettgen, M. W. Grinstaff, "Dendritic Self-Gelling Aerosolized Cardiac Sleeve", *2006 BME retreat*, Portsmouth, NH, June **2006**.
- 6) V. L. Jullien, M. Wathier, M. M. Dominguez, S. E. Schaus, M. W. Grinstaff, "Screening of Molecular Interactions by Immobilized Hydrogels", *2006 BME retreat*, Portsmouth, NH, June **2006**.
- 7) C. S. Johnson, M. Wathier, M. A. Carnahan, M. W. Grinstaff, T. Kim, "A Novel Biodendritic Adhesive for Sutureless Vitreous Surgeries: In Vitro Studies of Wound Strength." *ARVO 2005 Annual Meeting*, Fort Lauderdale, FL, May **2005**.
- 8) M. Wathier, M. A. Carnahan, P. J. Jung, T. Kim, M. W. Grinstaff, "Dendrimer Hydrogels as New Alternative for the Repair of Clear Corneal incisions." *ARVO 2005 Annual Meeting*, Fort Lauderdale, FL, May **2005**.
- 9) M. W. Grinstaff, M. Wathier, P. C. Kang, M. A. Carnahan, T. Kim, "Dendritic Adhesives to Secure Laser in situ Keratomileusis Flaps." *ARVO 2005 Annual Meeting*, Fort Lauderdale, FL, May **2005**.
- 10) A. Griset, M. Wathier, M. W. Grinstaff, "Hydrogels Composed of Dendritic Macromers for Drug Delivery." *30<sup>th</sup> Biomaterials Annual Meeting*, Memphis, TN, April **2005**.
- 11) A. M. Oelker, M. Wathier, M. W. Grinstaff, "Mechanical properties of Peptide-Based Dendron Hydrogels." *Science & Engineering Day*, Boston, MA, March **2005**.

- 12) M. Wathier, P. J. Jung, T. Kim, M. W. Grinstaff, "Self-Gelling Polymers for Repair of Corneal Lacerations." *228<sup>th</sup> ACS National Meeting*, Philadelphia, PA, August **2004**.
- 13) M. Wathier, A. M. Oelker, M. W. Grinstaff, "Evaluation of Lysine Dendrons for Self-Crosslinking Hydrogel." *228<sup>th</sup> ACS National Meeting*, Philadelphia, PA, August **2004**.
- 14) M. Wathier, M. W. Grinstaff, "Self-Gelling Polymers for Repair of Corneal Lacerations." *Trans. 29th Biomaterials Annual Meeting*, Reno, NV, April **2003**.
- 15) M. W. Grinstaff, M. A. Carnahan, M. Morgan, N. Luman, L. Degoricija, C. E. Immoos, M. Wathier, S. Finkelstein, P. Kang, C. Middleton, A. Velazquez, T. Kim, "Biodendrimers for In Situ Photopolymerization." *Trans. 29th Biomaterials Annual Meeting*, Reno, NV, April **2003**.
- 16) M. Wathier, M. W. Grinstaff, "Transparent Hydrogel for Ophthalmic Surgery." *Materials Research Society*, Boston, MA, December **2003**.
- 17) A. Polidori, M. Wathier, A.-S. Fabiano, N. Mora, P. Barthélemy, B. Pucci, "Copolymerization in Aqueous Solution of Mono or Biantennary Surfactants: Preparation of Stable Vesicular System for Drug Delivery Applications." *Gordon Research conference*, Andover, NH, June **1999**.
- 18) M. Wathier, K. Ruiz, A.-S. Fabiano, A. Polidori, B. Pucci, "Synthèse d'une Nouvelle Classe de Tensioactifs Glycolipidiques de Type Gemini. Etudes de leur Comportement en Milieu Aqueux." *XII<sup>èmes</sup> journée de la Société Française de Chimie*, Marseille, France, mars **1999**.
- 19) M. Wathier, A. Polidori, B. Pucci, "Synthèse d'une Nouvelle Classe de Tensioactifs Bolaformes Glycolipidiques. Etude de leur Comportement en Milieu Aqueux." *XII<sup>èmes</sup> Journées scientifiques du G.T.R.V.*, Bruxelles, Belgique, décembre **1997**.