María Vallet-Regí

Full Professor
Department of Chemistry in Pharmaceutical Sciences at Universidad Complutense de Madrid (UCM), Spain
Leader of the Smart Biomaterials Research Group
Group leader of the Biomedical Research Networking centre in Bioengineering, Biomaterials and Nanomedicine (CIBER-BBN), and of the Research Institute of the Hospital 12 de Octubre (i+12), Madrid. Spain
Recipient of an **ERC Advanced Grant**: *Polyvalent mesoporous nanosystem for bone diseases*.

Contact:

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Researcher Identifiers:

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ORCID: 0000-0002-6104-4889
Google Scholar: http://scholar.google.es/citations?user=viPyI4EAAAAJ&hl=es&oi=ao
Highly Cited Researchers 2018

Current Research:

- Bioceramics based bone grafting materials and scaffolds for regenerative biomedicine.
- Production and study of bioceramic systems for controlled release of biotechnological and antitumoral species.
- Nanoparticles and biocompatible matrices for biotechnological applications.
- Silica based ordered mesoporous materials as release systems of biologically active species, cell encapsulation in silica porous materials, mesoporous materials for gene therapy and transfection, organic-inorganic hybrid materials.

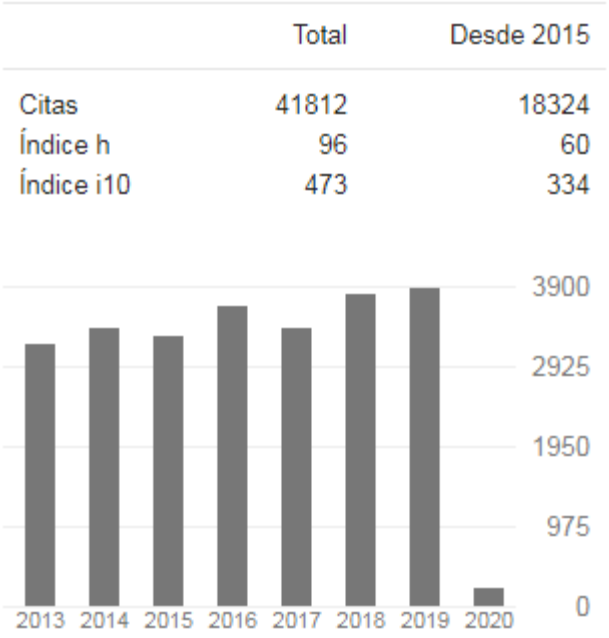
Other interests:

- Dissemination of Science to society: more than 100 activities.
- International cooperation: numerous projects and Courses taught with Developing Countries and the free assignment of a patent for water purification.

Biographical sketch

Prof. Vallet-Regi is a recognized pioneer in the field of mesoporous ceramic materials applied to biomedicine. Her work pointed towards potential biomedical use of these materials, particularly in the field of bone tissue regeneration. Moreover, she was also a leading innovator in showing the capacity of these systems to act as "drug delivery systems"; these materials can be loaded with biological active molecules, such as drugs, peptides, proteins and growth factors, to achieve a controlled drug release of these molecules. Her first publication describing these achievements (Chem Mater 13,308-311, 2001; 1818 cites) opened a new therapeutic window, which has ended up in the launching of a novel profitable research field. This paper meant her incorporation to the 1K club of Chem Mater (I.F.= 9.407), which devoted an editorial to her including sentences like: "M. Vallet-Regí and her team published in 2001 an extremely influential article which showed for the first time that MCM mesoporous materials could be used as drug delivery devices". "The motivation behind this effort is remarkable and highlights the importance of multidisciplinary science as a source of creativity and ideas". "This paper is a fine example of innovative and timely research, which has shaped and shaken up the field of materials science in the last few years". In the last years, she redirected her research towards nanocarriers in stimuli-responsive systems, making converge bioceramics for bone regeneration and drug delivery, with the fight against infection. From October 2016 she obtained the five years ERC Advanced Grant: ***Polyvalent mesoporous nanosystem for bone diseases.*** **Some facts:**

- >675 peer-review papers, 20 books, 38 book chapters, 12 patents.
- h-index: 96 (42.000 Citations, Google Scholar) and 77 (28207 Citations, ISI WoS)
- Highly Cited Researcher 2018 (Clarivate Analytics).
- Prof. Vallet-Regi´s work is characterized by interdisciplinary. Her papers classified in more than 50 Knowledge Areas of WoS
- More than 14 prestigious Awards.
- Doctor Honoris cause by the Basque Country and Jaume I Universities.
- Member of 6 Academies.
- Member of the Editorial Board of Scientific Journals and Organizer of Scientific Meetings.
- Leader of >100 R&D research projects and scientific networks.
- > 300 plenary/invited lectures in Congresses, Universities and Research Centres.
- Outstanding educator. Pioneer in Spain in the teaching of "Biomaterials". Supervised over 30 graduation, 10 Master and 20 Ph.D. works. Her PhD students achieve relevant positions in Academy and Industry.



- Visiting Professor at INPG-Grenoble (France), NIRIM-Tsukuba (Japan), University of Stockholm (Sweden) and Cagliari University (Italy)
- Numerous institutional responsibilities and commissions of trust
- >100 activities of dissemination of science and international cooperation.

http://www.ucm.es/data/cont/media/www/pag-90171/CV.pdf
http://www.ucm.es/valletregigroup
https://vimeo.com/258578003
Highly Cited Researchers 2018

Selected Honors and Awards:

- 2019 George Winter Award.
- 2019 FEMS Award for Innovation in Materials
- 2019 Medal of Merit in Research and University Education. The Government of Spain.
- 2019 Influentials Career Award. El Conficencial and Herbert Smith Freehills.
- 2018-Rei Jaume I Award in Basic Research.
- 2017-Julio Peláez Award to Pioneer Women in Sciences, Physics, Chemistry and Mathematics.
- 2016-Lilly Award to the Distinguished Career in Chemistry.
- 2015-IDEA2 2015 Award. Autonomous Community of Madrid and Massachusetts Institute of Technology Consortium.
- 2015-Doctor *Honoris Causa* by the Universidad Jaume I, Castellón, Spain
- 2014- GACETA DENTAL Research Award.
- 2014-Member of the International Scientific Committee of Basque Center for Materials Applications & Nanostructure.
- 2014-IDEA2 Award. Autonomous Community of Madrid and MIT Consortium.
- 2013-IUPAC Distinguished Woman in Chemistry and Chemical Engineering.
- 2013-Doctor *Honoris Causa* by the Basque Country University.
- 2013-Research Prize in Sciences "Miguel Catalán" of the Autonomous Community of Madrid.
- 2011-Research Prize of the Business Federation of Spanish Chemical Industries (FEIQUE).
- 2011-Gold Medal of the Spanish Royal Society of Chemistry (RSEQ).
- 2010- Evaluator of the National Research Program "Smart Materials" (NRP 62) of the Swiss National Science Foundation (SNSF) and Swiss Innovation Promotion Agency (CTI).
- 2009-2015- Advisor of the Materials for the Future Cluster. Project: "The University City of Moncloa: a Campus of International Excellence in the City of Madrid". U.C.M.
- 2009-2017 Member of Scientific advisory board (SAB) of EXSELENT. University of Stockholm.
- 2008-National Research Prize in Engineering "Leonardo Torres Quevedo", Education Ministry.
- 2008-Prize in Inorganic Chemistry of the Spanish Royal Society of Chemistry (RSEQ).
- 2000-French-Spanish Prize "Catalán Sabatier" of the French Chemical Society.
- 1999-2007- Spanish Royal Society of Chemistry (R.S.E.Q.) Member and Vice-president.
- 1993-2003- Member of the "Science for peace steering group" of the NATO.

Academy Membership:

- Since 2019 Honorary Academician elected by the Royal European Academy of Doctors (READ).
- Since 2017 Fellow of the American Institute for Medical and Biological Engineering (AIMBE).
- Since 2012 International College of Fellows of Biomaterials Science & Engineering (ICF-BSE)
- Since 2011 Fellow of the Spanish Royal Academy of Pharmacy (RANF), Medal XLII
- Since 2004 Fellow of the Spanish Royal Academy of Engineering (RAI), Medal LII.
- Since 1997 Elected Honorary Member of the Materials Research Society of India.

Selected institutional responsibilities:

- Member of the "Science for peace steering group" of the NATO, 1999-2003.

- Evaluator of the National Research Program “Smart Materials” (NRP 62) of the Swiss National Science Foundation (SNSF) and Swiss Innovation Promotion Agency (CTI). 2010.
- Member of Scientific advisory board (SAB) of EXSELENT. University of Stockholm. 2009...
- Advisor of the Materials for the Future Cluster. Project: “The University City of Moncloa: a Campus of International Excellence in the City of Madrid”. UCM. 2009-2015.
- Member of the International Scientific Committee of Basque Center for Materials Applications & Nanostructure 2014....
- Evaluator of the proposals for Euronanomed and more than 10 Spanish Quality Agencies
- Panel Member for the panel PE8, European Research Council (ERC) Consolidator Grant
- Spanish Royal Society of Chemistry (R.S.E.Q.) Member and Vice-president 1999 - 2007

Commissions of Trust:

- President Advisory Committee (Chemistry) of the National Commission for the evaluation of research activity (Ministry of Education), 2004-06. (Secretary, 2002-04, Board Member, 2006-09).
- Coordinator of the Technology and Health Program; Autonomous Community. 2004.
- President of the Ministry Commission of Technology of Materials, 1996 -1999

Editorships:

- 1995-2000, International Advisory Editorial Board Member of Journal of Materials Chemistry of RSC
- 2005-International Advisory Editorial Board Member of the Journal Bulletin of Materials Science.
- 2007- Editorial Board Member of The Open Inorganic Chemistry Journal (Bentham Science).
- 2007-Editorial Board Member of The Open Biomedical Engineering Journal (Bentham Science).
- 2010-Editorial Board Member of Journal of Biomaterials and Nanobiotechnology.
- 2010-Editorial Board of Bioceramics Development and Application.
- 2011-Editorial Board Member of Acta Biomaterialia.
- 2011-Honorary Advisors of Journal of Biomaterials and Tissue Engineering.
- 2012-Editorial Board Member of Journal of Ceramics.
- 2013-Editorial Board Member of Academic and Scientific Publishing.
- 2017-Editorial Board of Nanomotors for nucleic acid detection.
- 2018- Editorial Board Member of Nanomaterials.

Conference Organization:

- Chair, MINISYMPOSIUM ON BIOCERAMICS. Seminario Internacional Complutense. Madrid, Spain (1997).
- Co-chair, VIIth EUROPEAN CONFERENCE ON SOLID STATE CHEMISTRY. Madrid, Spain (1999).
- National scientific committee and chair, 17th EUROPEAN CONFERENCE ON BIOMATERIALS. Barcelona, Spain (2002).
- Chair, 1st INTERNATIONAL WORKSHOP JAPAN-SWEDEN-SPAIN. UCM, Madrid, Spain (2007).
- Coordinator, INTERNATIONAL SYMPOSIUM DRUGS, NANOMEDICENE AND BIOMATERIALS: A COMMON GOAL. Areces Fundation, Madrid, Spain (2012).

- Coordinator, INTERNATIONAL SYMPOSIUM THE CANCER AS A RESULT OF AGING: POTENTIAL SOLUTIONS. Areces Fundation Madrid, Spain (2015).
- Coordinator, SIMPOSIO INTERNACIONAL MATERIALES MESOPOROSOS: DE 1991 A 2018. Areces Fundation , Madrid, Spain (2018).

Research Facts:

Author or co-author of over 650 articles, 10 books, 5 as editor, 50 books chapters, 10 patents and >600 communications to Congresses where he taught > 50 plenary and invited lectures.

- h-index = 96 (Google Scholar),
- Citations >42.000
- Highly Cited Researcher 2019 (Clarivate Analytics)
- https://www.ucm.es/data/cont/media/www/pag-90171/List%20of%20publications.pdf

- Rank 1st of all the Professors of the University Complutense after the Bibliometric portal of University according to the h-index found un database Scopus of Elsevier (December 2018).
- Rank 55rd among the 37,819 scientists in Spanish institutions from data collected in December 2016.in ACUMEN project from European Commission 7th Framework Program, and CSIC.
- Quality of her publications: >60% of the publications in Q1 Journals (first quartile of its category), >40% in D1 Journals (first decile of its category). Moreover, several articles are top 1% by number of citations (Tables)
- Interdisciplinary of her research: WoS classifies her publications in 51 Knowledge Areas with great impact on many. Thus, based on Maria Vallet's h-index that is 91, if the h- index is calculated taking into account only its publications in each of the Areas in Isi WoS, there are very high index-h values such as 63 in Materials Science (current second Spanish researcher, first for several decades), Chemistry 58, Engineering 52, Physics 50, etc.

First 1% of the most cited articles in its academic field (*Web of Science*)

Cites: **2109** I.F.: **12.102**	Cites: **1136** I.F.: **14.357**	Cites: **391** I.F.: **6.383**	Cites: **345** I.F.: **6.735**	Cites: **321** I.F.: **13.709**	Cites: **298** I.F.: **40.182**	Cites: **241** I.F.: **9.890**	Cites: **180** I.F.: **4,210**	Cites: **190.** I.F.: **6.626**	Cites: **147** I.F.: **5.553**	Cites: **165** I.F.: **105** F.I.: **13. 709**	Cites: **53** I.F.: **5.657**
Angew. Chem. Int. Ed. 46, 7548-7558, 2007	J. Am. Chem. Soc. 130 (21) 6774-6780 2008	Acta Biomaterialia. 6, 2874-2888 2010	Chem. Eng. J. 137, 30-37 2008	ACS Nano. 5 (2), 1259-1266 2011	Chem. Soc. Rev. 40 (2), 596-607 2011	Chem. Mater. 24, 517-524 2012	Biomater. Sci. 1, 114-134 2013	J. Mater. Chem. 12, 1634-1643 2014	Expert Opin. Drug Del. 12, 319-337 2015	ACS Nano. 9 (11), 11023-11033 2015	Expert Opin. Drug Del. 14 (2) 229-243 2017

Publications with more than 200 citations in Google Scholar:

- Mesoporous materials for drug delivery. M Vallet-Regí, F Balas, D Arcos. Angewandte Chemie International Edition 46, 7548-7558. 2007.
  Citations in Scholar: **2.109** F.I.: **12.102**
- A new property of MCM-41: drug delivery system. M Vallet-Regi, A Ramila, RP Del Real, J Pérez-Pariente. Chemistry of Materials 13, 308-311. 2001.
  Citations in Scholar: **1.818** F.I.: **9.890**
- Metal–organic frameworks as efficient materials for drug delivery. P Horcajada, C Serre, M Vallet-Regí, M Sebban, F Taulelle, G Férey. Angewandte Chemie 118, 6120-6124. 2006.
  Citations in Scholar: **1.449** F.I.: **12.102**
- Flexible porous metal-organic frameworks for a controlled drug delivery. P. Horcajada, Ch. Serre, G. Maurin, N.A Ramsahye, F. Balas, M. Vallet-Regi, M. Sebban, F. Taulelle, G. Férey. Journal of the American Chemical Society 130, 6774-6780. 2008.
  Citations in Scholar: **1.136** F.I.: **14.357**
- Calcium phosphates as substitution of bone tissues. M Vallet-Regí, JM González-Calbet. Progress in Solid State Chemistry 32, 1-31. 2004.
  Citations in Scholar: **993** F.I.: **9.313**
- MCM-41 organic modification as drug delivery rate regulator. B Munoz, A Ramila, J Perez-Pariente, I Diaz, M Vallet-Regi. Chemistry of Materials 15, 500-503. 2003.
  Citations in Scholar: **644** F.I.: **9. 890**
- Influence of pore size of MCM-41 matrices on drug delivery rate. P Horcajada, A Ramila, J Perez-Pariente, M Vallet-Regı. Microporous and Mesoporous Materials 68 (1), 105-109. 2004.
  Citations in Scholar: **551** F.I.: **3.649**
- Ordered mesoporous materials in the context of drug delivery systems and bone tissue engineering. M Vallet-Regí. Chemistry-A European Journal 12, 5934-5943. 2006.
  Citations in Scholar: **485** F.I.: **5.160**
- Ceramics for medical applications. M Vallet-Regí. Journal of the Chemical Society, Dalton Transactions, 97-108. 2001.
  Citations in Scholar: **477** F.I.: **4.099**
- Glasses with medical applications. M Vallet-Regí, C Ragel, AJ Salinas. European Journal of Inorganic Chemistry 2003 (6), 1029-1042. 2003.
  Citations in Scholar: **397** F.I.: **2.507**
- Confinement and controlled release of bisphosphonates on ordered mesoporous silica-based materials. F Balas, M Manzano, P Horcajada, M Vallet-Regí. Journal of the American Chemical Society 128, 8116-8117. 2006.
  Citations in Scholar: **396** F.I.: **14.357**
- Mesoporous SBA-15 HPLC evaluation for controlled gentamicin drug delivery. AL Doadrio, EMB Sousa, JC Doadrio, J Pérez Pariente, I Izquierdo-Barba, M Vallet-Regı. Journal of Controlled Release 97, 125-132. 2004.
  Citations in Scholar: **395** F.I.: **7.877**
- Sol–gel silica-based biomaterials and bone tissue regeneration. D Arcos, M Vallet-Regí. Acta Biomaterialia 6, 2874-2888. 2010.
  Citations in Scholar: **391** F.I.: **6.383**
- Studies on MCM-41 mesoporous silica for drug delivery: effect of particle morphology and amine functionalization. M Manzano, V Aina, CO Arean, F Balas, V Cauda, M Colilla, MR Delgado, M Vallet-Regi. Chemical Engineering Journal 137, 30-37. 2008.
  Citations in Scholar: **345** F.I.: **6.735**
- Smart drug delivery through DNA/magnetic nanoparticle gates. E Ruiz-Hernandez, A. Baeza, M Vallet-Regí. ACS nano 5, 1259-1266. 2011.
  Citations in Scholar: **321** F.I.: **13. 709**

- Revisiting silica based ordered mesoporous materials: medical applications. M Vallet-Regí, L Ruiz-González, I Izquierdo-Barba, JM González-Calbet. Journal Materials Chemistry 16, 26-31. 2006.
  Citations in Scholar: **308** F.I.: **6.626**

- Functionalization of mesoporous materials with long alkyl chains as a strategy for controlling drug delivery pattern. J.C Doadrio, E.MB Sousa, I. Izquierdo, A.L Doadrio, J. Perez-Pariente, M. Vallet-Regí. Journal of Materials Chemistry 16 (5), 462-466. 2006.
  Citations in Scholar: **305** F.I.: **6.626**
- Medical applications of organic–inorganic hybrid materials within the field of silica-based bioceramics. M Vallet-Regí, M Colilla, B González. Chemical Society Reviews 40, 596-607. 2011.
  Citations in Scholar: **298** F.I.: **40.182**
- A new method to produce macropores in calcium phosphate cements. RP Del Real, JGC Wolke, M Vallet-Regı, JA Jansen. Biomaterials 23 (17), 3673-3680. 2002.
  Citations in Scholar: **297** F.I.: **8. 806**
- Ordered mesoporous bioactive glasses for bone tissue regeneration. A López-Noriega, D Arcos, I Izquierdo-Barba, Y Sakamoto, O Terasaki, M Vallet-Regí. Chemistry of materials 18, 3137-3144. 2006.
  Citations in Scholar: **265** F.I.: **9. 890**
- New developments in ordered mesoporous materials for drug delivery. M Manzano, M Vallet-Regí. Journal of Materials Chemistry 20, 5593-5604. 2010.
  Citations in Scholar: **256** F.I.: **6.626**
- Magnetically triggered multidrug release by hybrid mesoporous silica nanoparticles. A Baeza, E Guisasola, E Ruiz-Hernández, M Vallet-Regí. Chemistry of Materials 24, 517-524. 2012.
  Citations in Scholar: **241** F.I.: **9. 890**
- Bioceramics: from bone regeneration to cancer nanomedicine. M Vallet-Regí, E Ruiz-Hernández. Advanced Materials 23, 5177-5218. 2011.
  Citations in Scholar: **239** F.I.: **21.950**
- Release evaluation of drugs from ordered three-dimensional silica structuresI. Izquierdo-Barba, Á. Martinez, A.L Doadrio, J. Pérez-Pariente, M. Vallet-Regí. European Journal of Pharmaceutical Sciences 26, 365-373. 2005.
  Citations in Scholar: **233** F.I.: **4.491**
- Silicon substituted hydroxyapatites. A method to upgrade calcium phosphate based implants. M Vallet-Regí, D Arcos. Journal of Materials chemistry 15, 1509-1516. 2005.
  Citations in Scholar: **231** F.I.: **6.626**
- In vitro biocompatibility assessment of poly (ε-caprolactone) films using L929 mouse fibroblasts. MC Serrano, R Pagani, M Vallet-Regı, J Pena, A Ramila, I Izquierdo, MT Portolés. Biomaterials 25, 5603-5611. 2004.
  Citations in Scholar: **226** F.I.: **8. 806**
- Controlled crystallization of calcium phosphate apatites. LM Rodriguez-Lorenzo, M Vallet-Regi Chemistry of materials 12, 2460-2465. 2000.
  Citations in Scholar: **221** F.I.: **9. 890**
- Hexagonal ordered mesoporous material as a matrix for the controlled release of amoxicillin. M Vallet-Regı, JC Doadrio, AL Doadrio, I Izquierdo-Barba, J Pérez-Pariente. Solid State Ionics 172, 435-439. 2004.
  Citations in Scholar: **212** F.I.: **2.751**
- Mesoporous MCM-41 as drug host system. A Rámila, B Munoz, J Pérez-Pariente, M Vallet-Regí. Journal of sol-gel science and technology 26, 1199-1202. 2003.
  Citations in Scholar: **210** F.I.: **1.745**
- Revisiting ceramics for medical applications. M Vallet-Regí. Dalton Transactions, 5211-5220. 2006.

Citations in Scholar: **205** F.I.: **4.099**

- The dissolution and biological effects of silver nanoparticles in biological media. K Loza, J Diendorf, C Sengstock, L Ruiz-Gonzalez, JM Gonzalez-Calbet, M Vallet-Regi, M Köller, M Epple. Journal of Materials Chemistry B 2 (12), 1634-1643. 2014.
  Citations in Scholar: **200** F.I.: 6.626
- Bioactivity of a CaO−SiO2 Binary Glasses System. A Martinez, I Izquierdo-Barba, M Vallet-Regi. Chemistry of Materials 12 (10), 3080-3088. 2000.
  Citations in Scholar: **205** F.I.: 9.890
- The influence of proteins on the dispersability and cell-biological activity of silver nanoparticles. S Kittler, C Greulich, JS Gebauer, J Diendorf, L Treuel, L Ruiz, JM Gonzalez-Calbet, M Vallet-Regi, R Zellner, M Köller, M Epple. Journal of Materials Chemistry 20 (3), 512-518. 2010.
  Citations in Scholar: **201** F.I.: 6**.626**

Selection of publications of the last 8 years:

- S. Montalvo, G. Aragoneses, L. Garcia, M. Vallet Regí, María, B. González, J.L. Luque. CANCER CELL TARGETING AND THERAPEUTIC DELIVERY OF SILVER NANOPARTICLES BY TRANSFERRIN DECORATED MESOPOROUS SILICA NANOCARRIERS: INSIGHTS INTO THE ACTION MECHANISMS BY QUANTITATIVE PROTEOMICS. Nanoscale. 11, 4531-4545 (2019). F.I.**: 7.233**
- G. Villaverde, A. Alfranca, A. González-Murillo, G.J. Menen, R. R. Castillo, M. Ramírez., A. Baeza, M. Vallet-Regí. MOLECULAR SCAFFOLDS AS DOUBLE TARGETING AGENTS FOR THE DIAGNOSIS AND TREATMENT OF NEUROBLASTOMA. Angew. Chem. Int. Ed. 58, 3067-3072 (2019). F.I.: **12.102**
- M. Manzano, M. Vallet-Regí. ULTRASOUND RESPONSIVE MESOPOROUS SILICA NANOPARTICLES FOR BIOMEDICAL APPLICATIONS. Chem. Commun. 55, 2731-2740 (2019). F.I.**: 6.290**
- N. Encinas, M. Angulo, C. Astorga, M. Colilla, I. Izquierdo-Barba, M. Vallet-Regí. MIXED-CHARGE PSEUDO-ZWITTERIONIC MESOPOROUS SILICA NANOPARTICLES WITH LOWFOULING AND REDUCED CELL UPTAKE PROPERTIES. Acta Biomaterialia . 84, 317-327 (2019). F.I.**: 6.383**
- R. Castillo; D. Lozano; M. Vallet-Regí. BUILDING BLOCK BASED CONSTRUCTION OF MEMBRANE-ORGANELLE DOUBLE TARGETED NANOSYSTEM FOR TWO-DRUG DELIVERY. Bioconjugate Chemistry. 29 (11) 3677-3685 (2018). F.I.: **4.485**
- M.R. Villegas, A. Baeza, A. Noureddine, P. Durfee, K. Butler, J. Agola, J.C. Brinker, M. Vallet Regí. MULTIFUNCTIONAL PROTOCELLS FOR ENHANCED PENETRATION IN 3D EXTRACELLULAR TUMORAL MATRICES. Chem. Mater. 30, 112-120 (2018). F I : **9.890**
- E. Guisasola, L. Asín, L. Beola, J.M. de la Fuente, A. Baeza, M. Vallet-Regí. BEYOND TRADITIONAL HYPERTHERMIA. IN VIVO CANCER TREATMENT WITH MAGNETIC-RESPONSIVE MESOPOROUS SILICA NANOCARRIERS. ACS Appl. Mater. Interfaces. 10, 12518-12525 (2018). F.I.: **8.097**
- M.A. Moreno, J. Sedó, E. Guisasola, A. Baeza, M. Vallet Regí, F. Nador, D. Ruiz. POLYDOPAMINE-LIKE COATINGS AS PAYLOAD GATEKEEPERS FOR MESOPOROUS SILICA NANOPARTICLES. ACS Appl. Mater. Inter. 10, 7661-7669 (2018). F.I.: **8.097**
- B. González, M. Colilla, J. Díez, D. Pedraza, M. Guembe, I. Izquierdo-Barba, M. Vallet-Regí. MESOPOROUS SILICA NANOPARTICLES DECORATED WITH POLYCATIONIC DENDRIMERS FOR INFECTION TREATMENT. Acta Biomaterialia. 68, 261-271 (2018). F.I.**: 6.383**
- A.Y. Rwei, J.L. Paris, B. Wang, W. Wang, C.D. Axon, M. Vallet-Regí, R. Langer, D,S. Kohane. ULTRASOUND TRIGGERED LOCAL ANAESTHESIA. Nat. Biomed. Eng. 1 (8), 644–653 (2017).

- J.L. Paris, P. de la Torre, M.V. Cabañas, M. Manzano, M. Grau, A.I. Flores, M. Vallet-Regí. VECTORIZATION OF ULTRASOUND-RESPONSIVE NANOPARTICLES IN PLACENTAL MESENCHYMAL STEM CELLS FOR CANCER THERAPY. Nanoscale, 9, 5528–5537 (2017). F.I.**: 7.233**
- G. Villaverde, V. Nairi, A. Baeza, M. Vallet-Regi. DOUBLE SEQUENTIAL ENCRYPTED TARGETING SEQUENCE: A NEW CONCEPT FOR BONE CANCER TREATMENT. Chem. Eur. J. 23,7174 –7179 (2017). F.I.**: 6.735**
- R Cortés-Gil, L. Ruiz-González, D. González-Merchante, J.M. Alonso, A. Hernando, S. Trasobares, M. Vallet-Regí, J.M. Rojo and J. M. González-Calbet. EXPERIMENTAL EVIDENCE OF THE ORIGIN OF PHASE SEPARATION IN LOW HOLE-DOPED COLOSSAL MAGNETORESISTANT MANGANITES. Nano Letters. 16, 760−765 (2016). F.I.**: 12.080**
- J.L. Paris, M. Cabañas, M. Manzano, M. Vallet-Regí. POLYMER-GRAFTED MESOPOROUS SILICA NANOPARTICLES AS ULTRASOUND-RESPONSIVE DRUG CARRIERS. ACS Nano. 9 (11) 11023-11033 (2015). F.I.**: 13.709**
- M.R. Villegas, A.Baeza, M. Vallet Regí. HYBRID COLLAGENASE NANOCAPSULES FOR ENHANCED NANOCARRIER PENETRATION IN TUMORAL TISSUES. ACS Appl. Mater. Inter. 7, 24075-24081 (2015). F.I.**: 8.097**
- N. Mas, D. Arcos, E. Aznar, S. Sánchez, F. Sancenón, A. García, M. D. Marcos, A. Baeza, M. Vallet-Regí, and R. Martínez. TOWARDS THE DEVELOPMENT OF SMART 3D "GATED SCAFFOLDS" FOR ON-COMMAND DELIVERY. Small. 10 (23), 4859-4864 (2014). F.I.**: 9.598**
- Baeza, E. Guisasola, A. Torres-Pardo, J.M. González-Calbet, G.J. Melen, M. Ramirez, M. Vallet-Regí. HYBRID ENZYME-POLYMERIC CAPSULES/MESOPOROUS SILICA NANODEVICE FOR IN SITU CYTOTOXIC AGENT GENERATION. Adv. Funct. Mater. 24 (29), 4625-4633 (2014). F.I.**: 11.325**
- D. Arcos, A.R. Boccaccini, M. Bohner, A. Díez-Pérez, M. Epple, E. Gómez-Barrena, A. Herrera, J.A. Planell, L. Rodríguez-Mañas, M. Vallet-Regí. THE RELEVANCE OF BIOMATERIALS TO THE PREVENTION AND TREATMENT OF OSTEOPOROSIS. Acta Biomaterialia. 1793–1805 (2014). F.I.**: 6.383**
- M.C.Matesanz, M.Vila, M.J.Feito, J.Linares, G.Gonçalves, M.Vallet-Regi, P.A.A.P.Marques, M.T.Portolés. THE EFFECTS OF GRAPHENE OXIDE NANOSHEETS LOCALIZED ON F-ACTIN FILAMENTS ON CELL-CYCLE ALTERATIONS. Biomaterials. 34, 1562-1569 (2013). F.I.**: 8.806**
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- J. Simchenn, A. Baeza, D. Ruiz, M. Esplandiu, M. Vallet-Regí. ASYMMETRIC HYBRID SILICA NANOMOTORS FOR CAPTURE AND CARGO TRANSPORT: TOWARDS A NOVEL MOTION-BASED DNA SENSOR. Small. 8, 2053-2059 (2012). F.I.**: 9.598**
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- M Vallet-Regí and E. Ruiz-Hernández. BIOCERAMICS: FROM BONE REGENERATION TO CANCER NANOMEDICINE. Adv. Mater. 23, 5177–5218. (2011) Review. F.I.**: 21.950**
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- M. Vallet-Regí, M. Manzano, J.M. González-Calbet and E. Okunishid. EVIDENCE OF DRUGS CONFINEMENT INTO SILICA MESOPOROUS MATRICES BY STEM CS CORRECTED MICROSCOPY. Chem. Commun. 46, 2956 - 2958 (2010). F.I.**: 6.290**
- M. Vallet-Regi. NANOSTRUCTURED MESOPOROUS SILICA MATRICES IN NANOMEDICINE. J. Internal Medicine. 267, 22-43 (2010). F.I.**: 6.754**

Knowledge Transfer:

For years, the knowledge she has been developing has been transferred to the following companies:

- Funding Company: Colorobbia España, S.A.
  Contract title: Bactericidal properties of titanium oxide
  Year: 1997
- Funding Company: Colorobbia España, S.A.
  Contract title: Development of a phosphorescent enamel
  Year: 2001
- Funding Company: CBA Expansivos, S. L.
  Contract title: Expansive demolishing cement
  Year: 2002
- Funding Company: Medical Precision Implants
  Contract title: Roughness Test (SEM) and In vitro Biological Test
  Year: 2017
- Funding Company/Administration: Medical Precision Implants
  Contract title: Roughness Test (SEM) and In vitro Biological Test
  Year: 2018
- Funding Company: MIS Ibérica,S.L.
  Contract title: Roughness Testing (SEM) and Biological Testing in Type of contract: Article 83
  Years: 2017-2018

Patents:

- “Phosphorescent pigment, procedure for obtaining it and its applications”. Application No: 200002703/2 Country: Spain-Italy Date: 10-11-2000 extended: CE and Brazil. Company that is exploiting it: COLOROBIA SPAIN S.A. (SPAIN).
- “Method for producing bioactive implants that are used as systems for the controlled release of antibiotics”. No: P200101386, ES2181593, PCT/ES2002/000301. Date: 27-12-02. Until 2021.
- “Device for measuring continuous magnetic fields, based on manganese mixed oxides having a perovskite structure”. No: P200502629, PCT/ES2006/000598 Date: 10-05-2007. Until 2025.
- "Method for the low-temperature preparation of bioceramic pieces with designed and interconnected three-dimensional porosity". No: P200802813, ES2333851, PCT/ES2009/000480. Date 08-04-2010. Until 2028.
- "Procedure for the preparation of a ceramic hybrid material of nanocrystalline clacio phosphate - organic coloring agent". No: P200901633, ES22701045, PCT/ES2010/000327 Date: 27-01-2011. Until 2029.
- "Manufacture of three-dimensional scaffolding with bioactive mesoporous glass by means of rapid prototyping". No: P201000353, ES2378044. Date: 04-04-2012. Until 2030.
- "Pure ceramic macroporous scaffold based on nanocrystalline apatite, preparation method and applications". No: P2010957, ES2373286, PCT/ES2011/000229 Date: 02-02-2012. Until 2030.
- "Biomaterial with osteostatin for bone regeneration and tissue engineering". No: P201031193, ES2373896, PCT/ES2011/070547. Date: 10-02-2012. Until 2030.
- “Bioceramic materials for the treatment of osteomyelitis”. No: P201100655, ES2393602, PCT/ES2012/000160. Date: 4-04-2013.

- “Biocompatible implants made of nanostructured titanium with antibacterial properties”. No: P201430616, ES2552278, PCT/ES2015/070345. Date: 07-09-2016. In force. Subscribed in March 2017 the 3rd annuity of the European patent application. In proceedings for protection in USA.
- "Nanocapsules with controlled degradation for sustained release of collagenase in clinical applications”. Patent No: EP18382005.9. Date of publication. 09-01-2018.
- “Ligands for enhanced imaging and drug delivery to neuroblastoma cells”. No: EP18382207.1 Date: 26-03-2018.

Applications in the Clinic:

Prof. Vallet-Regí is widely regarded for her contributions to **Biotechnology** and **Medicine**. Moreover, she is a Highly Cited Researcher 2018 (Clarivate Analytics). This list recognizes world-class researchers selected for their exceptional research performance, demonstrated by production of multiple highly cited papers that rank in the top 1% by citations per field and year in Web of Science. She is recognized as a pioneer in the field of ceramic materials applied to medicine. On one hand, she has been working in the biomaterials area developing bioceramics for bone grafting applications and scaffolds for regenerative biomedicine. On the other hand, prof. Vallet-Regí has intensely investigated on nanocarriers of different nature to deliver therapeutic agents to diseased tissues without affecting healthy organs. She was the pioneer who suggested introducing drugs into the pores of mesoporous silica materials, which inspired thousands of publications worldwide involving mesoporous silica nanoparticles for drug delivery.

The technology on smart drug delivery nanocarriers developed by Prof. Vallet-Regí drew the attention of many oncologists, such as Dr. Manuel Ramírez-Orellana, a prestigious pediatric oncologist who works in Neuroblastoma, the most frequent extracranial pediatric tumor. It presents a dismal prognosis despite the combination of chemotherapy, radiotherapy, surgery and bone narrow transplants. As a consequence of a fruitful collaboration, Prof. Vallet-Regí developed nanocarriers able to detect and destroy only neuroblastoma cells and the subsequent patent (*Ligands for enhanced imaging and drug delivery to neuroblastoma cells. Patent No: EP18382207.1*) is expected to fuel the **translation of this technology to the clinic** to be applied to patients. Additionally, Prof. Vallet-Regí works closely with the Association of Families with Children Affected by Neuroblastoma, through the following project: *Development of intelligent nanotransporters for neuroblastoma therapy*.

Prof. Vallet-Regí has also developed a novel stimuli-responsive nanodevice based on nanocapsules with controlled degradation for the sustained release of collagenase. This technology is on the first steps of **preclinical analyses** for the potential treatment of sclerodermia, a fibrotic disease characterised by an abnormal accumulation of collagen. The transport and release of a proteolytic enzyme such as collagenase able to digest collagen fibers has been tested both in vitro and in vivo using an animal model. The research team involved in this project includes specialized professionals in nanotechnology and medicine from Hospital 12 de Octubre in Madrid, Spain, and lead to the patent *Nanocapsules with controlled degradation for sustained release of collagenase in clinical applications (Patent No: EP18382005.9)*.

The research group of prof. Vallet-Regí has produced hundreds of publications on Stimuli-Responsive Mesoporous Silica Nanoparticles (http://www.ucm.es/valletregigroup). In this sense, Prof. Vallet-Regí has obtained **promising results on cell studies** using many different stimuli to trigger the release of the therapeutic cargo, such as ultrasound, magnetic field, light, near infrared, pH or presence of certain enzymes (see CV for publications in this area).

As a consequence of Prof. Vallet-Regí scientific results, both **Government Agencies and Companies have shown interest on commercializing her work**. In this sense, and based on the Advanced Grant from the European Research Council (ERC-2015-AdG Proposal No.694160, VERDI), the ERC has granted prof. Vallet-Regí the Proof of Concept Grant entitled: Developments of Collagenase Polymeric nanocapsules as Therapeutics (DECOMPACT). The goal of this proof of concept project is the development and commercialization of a novel treatment to scleroderma and the first clinical trials in patients is being designed in collaboration with 12 de Octubre University Hospital. Additionally, the Company Canaan Research & Investment has shown interest on Prof. Vallet-Regí work. Her research team has recently participated in the "Health Investment Forum", thanks to which, there are several companies bidding to work with them.

Prof. Vallet-Regí has also worked in collaboration with GlaxoSmithKline (GSK) Company in the development of three-dimensional polymeric scaffolds prepared by the technique of rapid prototyping. The 3D scaffolds with macroporous structure were designed for hepatocyte cell culture and evaluation of hepatotoxicity. GSK Company is interested in the development of these 3D scaffolds for their direct application in the initial stages of the discovery process of new drugs by using them in the **drug screening** of efficacy and hepatic toxicity.

In addition, she was recipient of two IDEA^2 Awards in biomedical innovation competition of the M+Vision Consortium participated by the MIT and the Autonomous Community of Madrid entitled NANOIMPLANT: nanostructured coatings for orthopedic implants (2014) and NANODRONE: Nanomedicines targeted to Neuroblastoma (2015). Prof. Vallet-Regí has also thoroughly worked on treatment and prevention of orthopaedic implant-associated infections. She has developed, in collaboration with a CSIC group, a new technology able to avoid bacterial colonization and biofilm formation onto titanium implants, while promoting bone bonding. This technology is based on tailoring the surfaces of titanium at the nanoscale and has been recognized with the MIT-IDEA2 award above mentioned. The patent (*Biocompatible implants made of nanostructured titanium with antibacterial properties Patent No: PCT/ES2015/070345)* has generated **high interest from multinational companies** (DePuy Synthes) on a **potential translation to the clinical** application.

Teaching activities:

Maria Vallet-Regi is a widely recognised as outstanding educator and often invited to teach courses in and to teach the opening course lectures in many Spanish Universities. Along her teaching career:

- Pioneer in the teaching of the subject "Biomaterials" in graduate programs like Pharmacy and Materials Engineering of UCM and several doctoral programs: i) "Inorganic Materials" (UCM) and ii) "Surgery of the locomotor system" (UAM, 1999-2010).
- She taught master classes as invited professor in 16 doctoral graduate programs and 12 master courses.

Supervision of graduate students and postdoctoral fellows:

Maria Vallet-Regi educates students and doctoral staff members on how to become great chemists and engineers and how to do great research. She has supervised over 30 works of undergraduate students, 10 Master of Advanced Studies of graduate students and 20 Ph.D. works.

Her PhD. Students are currently holding relevant permanent positions at different institutions: i) Universities: 13 professors; ii) research centres (CSIC: 9 researchers; CNRS: 1 permanent researcher (Chargé de Recherché); iii) public and private companies (F. Hoffmann-La Roche Ltd. Basel, Switzerland and Medincell in Montpelier).

International collaborations:

- Waseda University, Japan
- School of Physical Science and Technology (SPST), ShanghaiTech University, China.
- Department of Microbiology, Immunology and Molecular Genetics, UCLA, CA, USA
- Institute for Advanced Study, Kyoto University, Kyoto, Japan
- Shaare Zedek MC and Hebrew University-School of Medicine, Jerusalem, Israel
- Collège de France, Paris
- Ludwig-Maximilians-Universität München, Germany
- Dep. of Chemical Engineering Technion – Israel Institute of Technololgy, Haifa
- Stockholm University, Suecia
- Vornia Limited, Dublin. Ireland.
- Cellogic GMBH, Berlin. Germany
- Charité – Universitätsmedizin Berlin, Germany
- Delsitech Oy, Turku. Finland
- Friedrich-Alexander-Universitäet Erlanger, Nürnberg. Germany
- Nanolith Sverige AB, Bromma. Sweden
- Nobil Bio Ricerche SRL, Portacomaro. Italy
- National Center for Scientific Research "Demokritos", Agia Paraskevi. Greece
- Politecnico di Torino, Torino. Italy
- The University of Sheffield, Sheffield. United Kingdom
- Iuliu Haţieganu University , Cluj-Napoca. Romania
- University of Tartu, Tartu. Estonia
- IRCCS AOU San Martino – IST, Génova. Italia
- University of Strasbourg, Strasbourg. France
- Research Center "E. Piaggio," University of Pisa, Pisa. Italy
- School of Engineering, Newcastle University, Newcastle. UK
- School of Mechanical and Systems Engineering, Newcastle University, Newcastle.UK
- Institute for Technology Inspired Regenerative Medicine, Maastricht University, Netherlands
- Center for Neuroscience and Cell Biology & Department of Life Sciences, Univ. Coimbra, Portugal
- School of Mechanical and Manufacturing Engineering, Dublin City University. Ireland
- University of Crete, Crete. Greece
- Università di Cagliari, Cagliari. Italy
- University of California Los Angeles, Los Angeles, CA. USA
- Chemical and Nuclear Engineering and Molecular Genetics and Microbiology University of New México, USA.
- University of Oxford, Department of Engineering Science, Oxford. United Kingdom
- Institute for Medical Engineering & Science, Cambridge, Massachusetts. United States

- Boston Children's Hospital – Harvard Medical School address, Boston. United States
- University of South Florida, College of Medicine, H. Lee Moffitt Cancer Center & Research Institute, Tampa, Florida. United States
- Indiana University School of Medicine, IN. United States
- Breast Center, IMO Clinique de Genolier, Genolier. Switzerland
- University of Modena and Reggio Emilia, Modena
- Inorganic Chemistry and Center for Nanointegration Duisburg-Essen University. Germany
- Queensland University of Technology, Brisbane. Australia
- Nanolith Sverige AB (Switzerland)
- Nobil Bio Ricerche (Italy)
- Vornia Biomaterials (Irland)
- Cellogic GmbH (Germany)
- DelSiTech Ltd. (Finland)
- Bewarrant (Bélgium)
- Cellink AB (Sweden)
- Biomech Innovations AG (Switzerland)
- Fluidinova SA (Portugal)
- Novaicos (Italy)
- Yodiwo Anonymi Etaireia Schediasisoloklиromenon Kyklomaton (Greece)

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2. M. Vallet-Regí, M.L. Veiga Blanco, A. Mata Arjona. TEXTURA DE GELES DE TiO_2: I. CARACTERIZACION DE MATERIALES OBTENIDOS EN DIFERENTES CONDICIONES DE PREPARACION. An. Quím. 76B, 172-176, (1980). A

3. M. Vallet-Regí, M.L. Veiga Blanco, A. Mata Arjona. TEXTURA DE GELES DE TiO_2: II. DESHIDRATACI0N TERMICA. An. Quím. 76B, 177-181, (1980). A

4. M. Vallet-Regí, M.L. Veiga Blanco, A. Mata Arjona. TEXTURA DE GELES DE TiO_2: III. PROPIEDADES TEXTURALES DE GELES OBTENIDOS POR HIDROLISIS DE $TiCl_4$. An. Quím. 76B, 182-186, (1980). A

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