

**Part A. PERSONAL INFORMATION****CV date**

24/04/2021

<i>First and Family names</i>	Benjamí Oller Salvia	<i>ID number</i>	47733690L	<i>Age</i>	34
<i>Researcher numbers</i>	<i>ORCID</i> 0000-0002-8140-6111	<i>Socpus Author ID</i>	55988108100		

A.1. Current position

<i>Name of Institution</i>	Institut Químic de Sarrià (IQS) – Ramon Llull University				
<i>Department</i>	Bioengineering	<i>Address</i>	Via Augusta 390. 08017 Barcelona. Spain		
<i>Phone number</i>	699810420	<i>E-mail</i>	benjami.oller@iqs.url.edu		
<i>Current position</i>	Assistant Professor	<i>From</i>	21/01/2019		
<i>Espec. cod. UNESCO</i>	230418	<i>Key word</i>	drug delivery, blood-brain barrier, peptide & protein chemistry, antibody engineering		

A.2. Education

PhD in Organic Chemistry (<i>cum laude</i>) international mention & extraordinary, pioneer, Margalef awards	University of Barcelona	2015
MSc in Advanced Chemistry: Organic Chemistry (9.1/10)	University of Barcelona	2012
5-year degree ("licenciatura") in Chemistry (9.4/10 – ranked #1) Scholarship Academic Excellency Francesc Castelló i Aleu – 5 years	IQS-URL	2010

A.3. Indicators

Total citations (WoS): 371, Citations/year in the last 5 years: 46. Peer-reviewed articles: 15 (13 WoS, 1 in press, 1 EMBASE), of which: Q1: 8, **Top 10% journals: 6, First author: 7, Corresponding author: 2.** h-index: 8 (Scopus). One "Sexenio de investigación" (2019). Student supervision: **PhD: 1 in course – FPU fellowship** awardee, MSc: 3 defended and 2 in course; BSc: 5 defended and 4 in course.

Part B. CV SUMMARY

I am an **assistant professor** at IQS School of Engineering - Ramon Llull University since 2019. I currently hold a **Marie Skłodowska-Curie Fellowship**, which has enabled me to **start my research program** (www.oller-salvia.com) with the support of the GEMAT group. I have recently been awarded "**La Caixa**" **Junior Leaders fellowship**, which will enable me to focus on research for 3 additional years. Together with my research team, we aim to **combine chemistry and synthetic biology to create novel biomolecules for the targeting of gene therapies, especially to treat brain diseases.**

Prior to my current appointment, I held an **EMBO postdoctoral fellowship** to pursue research in Prof. Jason Chin's group at the **MRC Laboratory of Molecular Biology in Cambridge**. There I developed a **new platform to produce antibody-drug conjugates** using genetic code expansion, which has drawn considerable attention in academia and industry. I also **established a highly efficient method to encode multiple non-canonical amino acids into phage displayed proteins**. Moreover, in my 3-year stage in Cambridge I broadened my **international network** and started fruitful collaborations. My predoctoral work, conducted in Prof. Ernest Giralt's group at **IRB Barcelona**, focused on the design of peptides for brain delivery. My main contribution was the **development of a cyclic peptidomimetic**, inspired by a component of bee venom, which is stable in serum and capable of efficiently shuttling a variety of compounds across the blood-brain barrier (BBB). I also developed a **protease-resistant BBB-shuttle** based on a retroenantiomeric design. Another main contribution from my PhD thesis is a highly cited review on BBB-shuttle peptides. In my PhD I also started a research line on **antibody-BBB-shuttles conjugates**, which has recently yielded promising results *in vivo* (**m. in preparation**). Prior to my predoctoral work, I acquired experience in polymeric nanoparticles and the BBB with Prof. Borrós at IQS-URL and Prof. Edelman at MIT. My academic and research achievements, published in high impact articles, have been recognized with **several honors** such as the "La Caixa" Junior Leaders, MSCA-IF, EMBO and "La Caixa"/IRB Barcelona fellowships, and the Ramon Margalef and Pioner awards.

Furthermore, to me, research is not only about pushing the boundaries of knowledge but also mentoring and **educating new generations of scientists**. This is why I **lead a team of graduate and one undergraduate students, and I am currently responsible for three courses related to my research**. I hold a **lecturer accreditation (AQU)** and I am currently a board member of the Catalan Chemical Society, with which I have co-organized the XI Meeting of young scientists in Catalonia and the 2020 European Young Chemist's Network.



Part C. RELEVANT MERITS

C.1. Ten most relevant publications (out of 15, *corresponding author)

- **R Lucchi, J Bentanachs, B Oller-Salvia***. The masking game: design of activatable antibody and mimetics for selective therapeutics and cell control. *ACS Central Science*. DOI: 10.1021/acscentsci.0c01448 (IF: 12.9)
- J L Watson, S Aich, B Oller-Salvia, A A Drabek, S C Blacklow, J Chin, E Derivery. Fibrinogen anchors enable efficient multiplexed patterning of active proteins and subcellular control of membrane-receptor distribution. *J Cell Biol*. In press. DOI: 10.1083/jcb.202009063 (IF 8.8)
- **B Oller-Salvia, J W Chin**. Efficient phage display with multiple distinct non-canonical amino acids via orthogonal ribosome mediated genetic code expansion. *Angewandte Chemie International Edition*. 2019, 58, 10844-10848. (IF: 13.0)
- C Díaz-Perlas, B Oller-Salvia, M Sánchez-Navarro, M Teixidó, E Giralt. Branched BBB-shuttle peptides. Chemoselective modification of proteins to enhance blood-brain barrier transport. *Chemical Science*. 2018, 9, 8409-8415. (IF: 9.3)
- **B Oller-Salvia***. Genetic encoding of a cyclopropene derivative to generate antibody-drug conjugates through a rapid, site-specific, bioorthogonal reaction. *Journal of Visualised Experiments*. 2018, 139, e58066.
- **B Oller-Salvia, G Kym, JW Chin**. Rapid and efficient generation of stable antibody-drug conjugates via an encoded cyclopropene and an inverse electron demand Diels-Alder reaction. *Angewandte Chemie International Edition*. 2018, 57, 2831-2834. (IF: 12.3)
- **B Oller-Salvia, M Sánchez-Navarro, E Giralt, M Teixidó**. BBB-shuttle peptides: an emerging paradigm for brain delivery. *Chemical Society Reviews*. 2016, 45, 4690-4707. (IF 38.6, Inside cover)
- **B Oller-Salvia, M Sánchez-Navarro, S Ciudad, ..., E Giralt, M Teixidó**. (1/11) MiniAp-4: a venom-inspired peptidomimetic for brain delivery. *Angewandte Chemie International Edition*. 2016, 55, 572-575. (IF: 12.0, Hot article. Inside cover). I contributed to conceiving the idea of the project, wrote the manuscript, designed and performed the peptide syntheses, peptide characterization, most cell-based experiments, and designed and participated in the in vivo experiments.
- **R Prades, B Oller-Salvia, MS Schwarzaier, ..., M Teixidó, E Giralt**. (2/12) Jumping hurdles: revisiting the retro-enantio approach to obtain a peptide able to overcome the blood-brain barrier. *Angewandte Chemie International Edition*. 2015, 54, 3967-3972. (IF: 11.7, Featured in the Spanish press: El País and Diario Médico, among others). I contributed the design and realization of in vivo experiments, as well as major revisions on the cell binding and internalization experiments.
- **B Oller-Salvia, M Teixidó, E Giralt**. From Venoms to BBB Shuttles. Synthesis and Blood-Brain Barrier Transport Assessment of Apamin and a Non-Toxic Analog. *Biopolymers-Peptide Science*. 2013, 100, 675-686. (Front cover)

C.2. Research projects and grants

- Reference number: 2021 “La Caixa” **Postdoctoral Junior Leader** – Retaining 103529. Amount awarded: **292.500€**. Title: Development of activatable antibody mimetics for the targeted delivery of gene therapies to glioma stem cells. Funding body: “La Caixa” (co-fund with MSCA). PI (Institution): Benjamí Oller-Salvia (IQS-URL). Start date: 01/07/2021. End date: 30/06/2024. Role: **Principal Investigator**.
- Reference number: **Marie Skłodowska-Curie Actions – Individual Fellowship** 844441. Amount awarded: **160.923€**. Title: Generating a targeted, brain-permeable and stable polymeric nanoparticle for systemic gene delivery to glioblastoma. Funding body: MSCA. European Commission. PI (Institution): Benjamí Oller-Salvia (IQS-URL). Start date: 01/07/2019. End date: 30/06/2021. Role: **Principal Investigator**.
- Reference number: **EMBO Long-Term Fellowship** ALTF 158-2016. Amount awarded: **60.921 GBP**. Title: Genetic encoding of phosphothreonine and its non-hydrolysable and photocaged derivatives. Funding body: European Molecular Biology Organization (EMBO). PI (Institution): Benjamí Oller Salvia (MRC-LMB). Start date: 01/02/2017. End date: 15/01/2019. Role: **Principal Investigator**.
- Reference number: PROVAT- 2011-013. Amount awarded: **614.000€**. Title: Use of peptide shuttles for the delivery of monoclonal antibodies across the blood-brain barrier in brain tumours. Funding body: Generalitat de Catalunya. PI (Institution): Joan Seoane Suárez (Vall d’Hebron Institute of Oncology). Start date: 31/12/2012. End date: 01/01/2013. Role: participant researcher.



C.3. Contract

- Title: Genetic code expansion for next generation protein therapeutics. PI: Jason W. Chin
Funding body: MRC-LMB. Start date: 18/01/2016. End date: 31/01/2017

C.4. Patent

- E Giralt, M Teixidó, B Oller. Actively transported and protease-resistant peptides as BBB shuttles and shuttle-cargo constructs. PCT/EP2014/064173. IRB Barcelona & UB. Granted and licenced to Gate2Brain.

C.5. Ten selected conference presentations and invited lectures

C5.1. Oral presentations (out of 9)

- May 2020 (Postponed to June 2022 due to COVID-19 pandemic) **Invited keynote speaker. MedChem2020**, Barcelona, Spain. New trends in drug delivery.
- November 2019. **Invited seminar. Germans Trias i Pujol Research Institute**, Badalona, Spain. Protein targeted therapeutics: merging chemistry and synthetic biology to develop next generation drugs
- October 2019. **Invited lecture. European Antibody Congress 2019, Basel, Switzerland**. Efficient incorporation of non-canonical amino acids in phage display via genetic code expansion.
- October 2018. **Invited lecture. European Antibody Congress 2018, Basel, Switzerland**. Genetic encoding of a cyclopropene for the rapid and efficient generation of stable antibody conjugates.
- November 2016. **Invited lecture**. Masters course on Pharmaceutical Chemistry (IQS-URL), Barcelona, Spain. B. Oller-Salvia. Blood-brain barrier shuttles and the power of genetic code expansion.
- June 2015. **Invited lecture**. Neuromed closing workshop, Bellaterra, Spain. Development of minimized apamin derivatives for brain delivery of antibodies and other cargoes.
- August 2014. **European Peptide Symposium, Sofia, Bulgaria**. Bs. Oller-Salvia, M. Teixidó, E. Giralt. From venoms to blood-brain barrier shuttles. Transport assessment of apamin-inspired shuttles and conjugates. **Travel grant**.
- June 2013. **5th European Chemistry Conference for Life Sciences (ECCLS)**, Barcelona, Spain. B. Oller-Salvia, M. Sánchez-Navarro, M. Teixidó, E. Giralt. From venoms to BBB shuttles. Synthesis, protease stability and blood-brain barrier transport of apamin and a non-toxic analogue.

C5.2. Poster presentations (out of 7)

- June 2019. **Chemical Protein Synthesis Meeting 2019, Berlin, Germany**. B. Oller-Salvia, J. W. Chin. Efficient genetic encoding of a cyclopropene for the rapid generation of stable therapeutic protein conjugates. **Poster award**.
- October 2015. B. Oller-Salvia, M. Sánchez-Navarro, M. Teixidó, E. Giralt. **ECBS & ICBS (Chemical Biology Societies) meeting, Berlin, Germany**. Venom-inspired cyclic peptides for brain delivery of antibodies and other cargoes. **Poster award**.

C.6. Relevant research experience

- July 2019-present. **Marie Skłodowska-Curie Fellow and leader** of the research program on “Protein and Peptide in Targeted Nanotherapeutics”. **IQS – URL**, Spain.
- February 2017-January 2019. European Molecular Biology Organization (**EMBO**) **postdoctoral fellow**. Incorporation of non-canonical amino acids into proteins of therapeutic interest using genetic code expansion. Advisor: Prof. Jason Chin’s laboratory. **MRC-LMB**, UK
- January 2016-January 2017. **MRC Postdoctoral Scientist**. Using genetic code expansion applied to new therapeutic protein generation. Advisor: Prof. Jason Chin. **MRC-LMB**, UK
- June 2012-June 2015. **PhD candidate**. Thesis entitled “From bee venom to blood-brain barrier shuttles. Development of minimized apamin derivatives for brain delivery of antibodies and other cargoes”. Advisors: Prof. Ernest Giralt and Dr. Meritxell Teixidó. **IRB Barcelona**.
 - January-April 2015. Secondment to study the cell uptake and receptor binding of fluorophore-BBB-shuttle peptide conjugates. Advisor: Prof. Kai Johnsson. **École Polytechnique Fédérale de Lausanne (EPFL)**, Switzerland. **Boehringer Ingelheim 3-month travel grant**.
 - November 2013. Secondment to set up a stable human BBB cell-based model derived from stem cells. Advisor: Prof. Roméo Cecchelli. **University of Artois**, France
 - June 2012. Secondment to learn about antibody-drug conjugation techniques. Advisor: Prof. Dario Neri. **Eidgenössische Technische Hochschule Zurich (ETH Zurich)**, Switzerland.
 - January 2014. Course in laboratory animal science (80h). University of Barcelona, Spain.



- *July 2010-March 2012.* MSc student. Thesis entitled “From venoms to BBB shuttles. Synthesis and blood-brain barrier transport assessment of apamin and two analogues”. Advisors: Prof. Ernest Giralt and Dr. Meritxell Teixidó. **IRB Barcelona**, Spain
- *July-October 2010.* Research stage to set up a dynamic BBB cell-based model in a hollow fibre flow reactor. Advisors: Prof. Mercedes Balcells and Prof. Elazer R. Edelman. **Massachusetts Institute of Technology (MIT)**, USA. **MOBINT travel grant** (Generalitat de Catalunya)
- *October 2009-June 2010.* Part time collaboration in the European project NanoBioPharmaceutics. Advisor: Prof. Salvador Borrós. **IQS-URL**, Spain

C.7. Ten most relevant fellowships, grants and awards (out of 16)

- 2021 **“La Caixa” Postdoctoral Junior Leaders fellowship** to pursue research at IQS-URL (3 years)
- 2019 **Marie Skłodowska-Curie Actions - Individual fellowship** to pursue research at IQS-URL (2 years)
- 2018 Appointed **Fellow of the Higher Education academy (UK)**
- 2016 **EMBO long-term fellowship** to pursue postdoctoral research at the MRC-LMB (2 years)
- 2016 **Research Associate** position at Homerton college, **University of Cambridge**
- 2016 **Ramon Margalef** award: best research article derived from a PhD thesis - University of Barcelona
- 2016 **PhD thesis extraordinary prize 2016** - University of Barcelona
- 2015 **“Pioner 2015” prize** for PhD thesis originality and translational value - CERCA
- 2014 **Three-month travel grant** to pursue research at EPFL - Boehringer Ingelheim Fonds
- 2010 **“La Caixa”/IRB Barcelona International PhD Program Fellowship (4 years)**

C.8. Teaching experience and training

- *September 2019-present.* **Responsible for** the “Biocatalysis” course, Biotechnology degree IQS-URL.
- *February 2019-present.* **Responsible for** the “Advanced Drug Delivery” and “Biomaterials & Biomedical Applications” **master’s courses at IQS-URL.**
- *November 2016-June 2018.* **Supervisor for Biochemistry and Molecular Biology (2017/2018) and Biology of Cells (2016/2017) at Homerton College, University of Cambridge**
- *2017/2018.* **Teaching Associates Programme, University of Cambridge**
- *October 2017.* **Lectureship accreditation by the “Agència de Qualitat Universitària”**
- *2013/2014.* **Co-director of the baccalaureate research work** of Martí Domènech. Award from the Barcelona Science Park for the best research work
- *January 2013.* **Course tutor** at the workshop “Crazy about biomedicine” organized by IRB Barcelona for 16/17-year-old high-school students
- *July-September 2012.* **Laboratory co-supervision** of the master’s student Cristina Díaz-Perlas
- *October 2010.* **Instructor** of high-school students (16/17 years old) for the European Scientific Olympics (EUSO) at Aula Escola Europea, Spain.

C.9. Leadership, editorial, reviewing, and other volunteering activities

- *2021-present.* **Topic and issue editor** for the journal *Pharmaceutics*.
- *September 2019-present.* **Board member of the Societat Catalana de Química** and delegate at the **Young Chemical European Network. Organization of the 2020 European Young Chemist’s Network** annual meeting and the **XI Meeting of young chemists.**
- *2019-present.* Evaluation juries for: PhD thesis, and MSc and BSc final degree research projects
- *September 2018.* Volunteer at LifeLab European Researchers’ Night MSCA activity. Peterborough, UK
- *September 2018.* **EMBO Lab leadership course**, Heidelberg, Germany.
- *February 2018.* **Organizer of an action station** for the Homerton 250 anniversary. Cambridge, UK
- *2015-present.* Reviewer for Wiley - *Journal of Peptide Science*
- *2012-2014.* Member of the PhD Student Council at IRB Barcelona.
- *2013.* Member of the **organizing committee for the 3rd IRB PhD symposium “The Clock of life”**
- *2012* Reviewer for the program “Science & Youth” organized by Catalunya Caixa

C.10. Affiliation to societies

2019.– *Real Sociedad Española de Química - Grupo de Jóvenes Químicos Investigadores y Grupo de Química Biológica.* 2019.– *European Young Chemists Network.* 2019.– *Societat Catalana de Química.* 2019.– *Claustre de Doctors de la Universitat de Barcelona.* 2018.– *Higher Education Academy, UK.* 2014.– *Sociedad Española de Bioquímica y Biología Molecular (SEBBM, Spanish branch of FEBS).* 2013.– *European Peptide Society.*