

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

16/01/2023

<i>First and Family names</i>	Benjamí Oller Salvia	<i>ID number</i>	47733690L	<i>Age</i>	35
<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>	+34 935 756 072	<i>E-mail</i>	<a href="mailto:benjami.oller@iqs.url.edu">benjami.oller@iqs.url.edu</a>		
<i>Current position</i>	Assistant Professor	<i>From</i>	21/01/2019		
<i>Espec. cod. UNESCO</i>	230418	<i>Key word</i>	drug delivery, peptide & protein chemistry, antibody engineering, blood-brain barrier		

**A.2. Education**

PhD in Organic Chemistry <i>cum laude</i> , <b>extraordinary award (top 5%)</b> <b>International mention, Pioner and Margalef awards</b>	University of Barcelona	2015
MSc in Advanced Chemistry: Organic Chemistry (9.1/10 – top 5%)	University of Barcelona	2012
5-year degree (“licenciatura”) in Chemistry (9.4/10 – ranked #1) <i>Scholarship Academic Excellency Francesc Castelló i Aleu – 5 years</i>	IQS-URL	2010

**A.3. Indicators**

Total citations (WoS): 587, Citations/year in the last 5 years: 45. Peer-reviewed articles: 17 (15 WoS, 1 EMBASE), of which: Q1: 9, **Top 5% journals in SJR: 7, First author: 7, Corresponding author: 3**. h-index: 10 (WoS). One “Sexenio de investigación” (2019). Research accreditation by AQU (2022). Supervision: **Postdoc: 1 current Marie Sklodowska-Curie Fellow, PhD: 3 current, including one FPU Fellow; MSc: 7 defended and 1 current; BSc: 12 defended.**

**Part B. CV SUMMARY**

I am **assistant professor** at IQS School of Engineering - Ramon Llull University since 2019, where I **lead the Protein Therapeutics Laboratory** ([www.pptn.iqs.edu](http://www.pptn.iqs.edu)). In the last 4 years I have obtained 6 projects as principal investigator, raising over 2.3 M €, including an **ERC Starting grant** and a fellowship from “La Caixa” **Junior Leaders program**. With my research team, we **combine chemistry and synthetic biology to create novel targeted therapies, especially to treat brain diseases**. We currently focus on engineering novel strategies to generate **therapeutic proteins with activity on demand** and new strategies to **transport drugs into the brain**. We have so far generated two strategies to render antibodies activatable with proteases or light and have developed a new highly efficient peptide for brain delivery.

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**. 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 capable of efficiently shuttling a variety of compounds across the blood-brain barrier (BBB) and the patent of which has been licenced to Gate2Brain. Another main contribution from my PhD was a highly cited review on BBB-shuttle peptides. 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 ERC Starting Grant, “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 am currently responsible for three courses related to my research**. I hold the **lecturer and research accreditations (AQU)** and I am currently a board member of the Catalan Chemical Society, with which I have recently co-organized the XI and XII meetings of young scientists in Catalonia.

## Part C. RELEVANT MERITS

### C.1. Ten most relevant publications (out of 16 articles and 1 book chapter, \*corresponding author)

- One article submitted and three in preparation.
- M C Lucana, Y Arruga, E Petrachi, A Roig, R Lucchi, B Oller-Salvia\*. Protease-resistant peptides for targeting and intracellular delivery of therapeutics. *Pharmaceutics* 2021, 13, 2065. (IF: 6.3)
- **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*. 2021, 7, 724-738 (IF: 14.6)**
- J L Watson, S Aich, B Oller-Salvia, A A Drabek, S C Blacklow, J Chin, E Derivery. High-efficacy subcellular micropatterning of proteins using fibrinogen anchors. *J Cell Biol.* 2021, 220, e202009063 (IF 10.5, 5 citations)
- **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, 20 citations)**
- 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, 19 citations)
- **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, 47 citations)**
- **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, 205 citations, 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, 57 citations, Hot article. Inside cover).** I contributed to conceiving the idea of the project, wrote the manuscript, designed and performed the peptide syntheses and characterization, most cell-based experiments, and designed and participated in the in vivo experiments.
- **R Prades, B Oller-Salvia, MS Schwarzmaier, ..., M Teixidó, E Giralt. (2/12) Revisiting the retro-entanto approach to obtain a peptide able to overcome the blood-brain barrier. *Angewandte Chemie International Edition*. 2015, 54, 3967-3972. (IF: 11.7, 73 citations, 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. (IF 2.5, 33 citations, Front cover)**

### C.2. Research projects and grants

- Reference number: **European Research Council (ERC) Starting Grant** 101077370. Amount awarded: **1.499.136€**. Title: Creating an orthogonal gate to the brain. Funding body: ERC. Start date: 02/05/2023. End date: 01/05/2028. Role: **Supervisor (PI)**
- Reference number: Projectes Llabor G59069740. Amount awarded: **20.000€** Title: Generation of antibody-drug conjugates capable of crossing the blood-brain barrier. Funding body: AGAUR. Start date: 01/11/2022. End date: 31/07/2023. Role: **Principal Investigator**.
- Reference number: Proyecto **Ideas Semilla** IDEAS211057OLLE. Amount awarded: **20.000€** Title: Desarrollo de un anticuerpo activable para dirigir un nanosistema de vectorización de terapias génicas a células madre de glioma. Funding body: Asociación Española Contra el Cáncer (AECC). Start date: 01/11/2021. End date: 31/10/2023. Role: **Principal Investigator**.
- Reference number: 2021 **"Proyectos I+D+I"** Retos de Investigación PID2020-117486RA-I00. Amount awarded: **136.125€**. Title: Towards a universal strategy to generate activatable antibodies and its application to target gene nanotherapies to glioma stem cells. Funding body: Ministerio de Ciencia e Innovación. Start date: 01/09/2021. End date: 31/08/2024. Role: **Principal Investigator**.
- Reference number: 2021 **"La Caixa" Postdoctoral Junior Leader** – Retaining LCF/BQ/PR21/11840002. 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"



Foundation (co-fund with MSCA). Start date: 01/07/2021. End date: 30/06/2024. Role: **Principal Investigator**.

- Reference number: 2021-URL-Proj-028. Amount awarded: **12.000€**. Title: Desenvolupament d'un recobriment amb pèptids llançadora per transportar nanoteràpies a través de la barrera hematoencefàlica. Funding body: Unversitat Ramon Llull. Start date: 01/01/2021. End date: 31/12/2021. Role: **Principal Investigator**.
- Reference number: **Marie Sklodowska-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. 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). 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. 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, licenced to Gate2Brain.

### **C.4. Ten selected conference presentations and invited lectures (out of 12 oral and 7 poster presentations, including 2 poster awards)**

- *November 2022. Keynote talk. Protein & Antibody Engineering Summit (PEGS Europe)*, Barcelona, Spain. Advances on conditionally active antibodies. Toward more versatile masking strategies.
- *September 2022. Oral communication. 36<sup>th</sup> European Peptide Symposium*, Sitges, Spain. Masked antibody conjugates targeting brain tumors.
- *April 2022. Invited seminar. Université de Strasbourg – Faculty of Pharmacy*, Strasbourg, France. Toward peptidomimetics and antibody conjugates for the treatment of brain tumors
- *October 2021. Invited seminar. Institute of Biomedical Research of Bellvitge (IDIBELL)*, Hospitalet, Spain. Proteomimetics and peptidomimetics targeting nanotherapeutics to brain tumors
- *October 2021. Invited lecture. European Antibody Congress 2021, Basel, Switzerland*. Development of new protease- sensitive masked antibodies.
- *May 2021. Invited lecture. Young Investigators Workshop – European Chemical Biology Symposium*, Austria (online). Toward proteo- and peptide- mimetics targeting nanotherapeutics.
- *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.
- *August 2014. Oral communication. European Peptide Symposium, Sofia, Bulgaria*. B. Oller-Salvia, M. Teixidó, E. Giralt. Transport assessment of apamin-inspired shuttles and conjugates. **Travel grant**.

### **C5. Relevant research experience**

- *July 2021-present. Group leader and “La Caixa” Junior Leader Fellow. IQS – URL*, Spain.
- *July 2019-June 2021. Marie Sklodowska-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
- *October 2010-June 2015. PhD candidate*. (MSc 2010-2012) 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**.
- *June 2012*. Secondment to learn about antibody-drug conjugation techniques. Advisor: Prof. Dario Neri. **Eidgenössische Technische Hochschule Zurich (ETH Zurich)**, Switzerland.
- *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. **Beca de colaboración** del Ministerio de Ciencia. **IQS-URL**, Spain

#### **C.6. Ten most relevant fellowships and awards (out of 17)**

- 2022 **Fulbright / Ruth Lee Kennedy scientific exchange grant** to pursue a sabbatical stay at University of Washington – Prof. David Baker’s laboratory (3 months)
- 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.7. Teaching experience and training**

- *April 2022*. **Research accreditation by the “Agència de Qualitat Universitària”**
- *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**
- *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

#### **C.8. Selected leadership, editorial, reviewing, and other volunteering activities**

- *2021-pres*. **Evaluator of UK BBSRC and EU MSCA projects**.
- *2021-pres*. **Consultant** for antibody-drug conjugate and peptide therapeutics R&D and production.
- *2021-present*. **Topic and special issue editor** for the journal *Pharmaceutics*.
- *2021*. **Talk at the European Researcher’s night (CosmoCaixa)**
- *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 and XII Meeting of young chemists in Catalan-speaking countries**.
- *2019-present*. Evaluation juries for: PhD thesis, and MSc and BSc final degree research projects
- *2018*. **Organizer of action stations** for the Homerton 250 anniversary. Cambridge, UK
- *2015-present*. **Reviewer for several journals** from Wiley and MDPI.
- *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.9. Affiliation to societies**

2019.– *Real Sociedad Española de Química – Grupo de química Biológica*. 2019.– *Societat Catalana de Química*. 2014.– *Sociedad Española de Bioquímica y Biología Molecular (SEBBM)*, FEBS. 2013.– *European Peptide Society*.