CURRICULUM VITAE ABREVIADO (CVA)

Part A. PERSONAL INFORMATION

First name	Macarena		
Family name	Sánchez Navarro		
Gender (*)	Female	Birth date (dd/mm/yyyy)	23/09/1982
Social Security, Passport, ID number	74691502z		
e-mail	macarena.sanchez@ipb.csic.es	URL Web	https://lc.cx/wiahpo
Open Researcher and Contributor ID (ORCID) (*)	0000-0002-0159-2381		

(*) Mandatory

A.1. Current position

Position	Tenured scientist (Científica titular)		
Initial date	04/01/2024		
Institution	Instituto de parasitología y biomedicina “López Neyra”-CSIC		
Department/Center	Biochemistry and Molecular Pharmacology		
Country	Spain	Teleph. number	958181660
Key words	Peptide synthesis and modification, protein expression, protein-protein interaction, chemical modification of proteins and antibodies, blood-brain barrier, drug delivery		

A.2. Previous positions (research activity interuptions, indicate total months)

Period	Position/Institution/Country/Interruption cause	Months
2024-To date	Tenured scientist *(Científica titular* CSIC)/IPBLN/Spain	
2023	Maternity leave	5
2020-2023	*Ramón y Cajal* Researcher/IPBLN-CSIC/Spain	*34*
2016-2020	Research associate/IRB Barcelona/ Spain	53
2013-2016	*Juan de la cierva* researcher/IRB Barcelona/ Spain	36
2012-2013	Postdoctoral researcher/IRB Barcelona/ Spain	15
2010-2012	Postdoctoral researcher/Universidad de Oxford/ UK	24
2010	Postdoctoral researcher/Uni. Complutense de Madrid/ Spain	8
2006-2009	Predoctoral researcher (FPU)/ IIQ/ Spain	48

A.3. Education

PhD, Licensed, Graduate	University/Country	Year
PhD in Chemistry	Universidad de Sevilla	2009
Advanced studies certificate	Universidad de Sevilla	2007
Chemistry degree	Universidad de Granada	2005

Part B. CV SUMMARY *(max. 5000 characters, including spaces)*

Parte B. RESUMEN DEL CURRÍCULUM *(máx. 5000 caracteres, incluyendo espacios)*

I am tenured scientist of the CSIC at the “López Neyra” Institute of Parasitology and Biomedicine (IPBLN) which I joined in sep 2020 as a Ramón y Cajal researcher. My group is working in three research lines:

1. Use of peptide libraries to develop therapeutic protease-resistant peptides (funded by the AEI, call “Proyectos Retos de la sociedad”).
2. Controlled release of therapeutic compounds to the central nervous system (CNS) (proteins and antisense oligonucleotides) in the context of Friedrich's Ataxia disease (funded by AFAF, ASOGAF, FEDAES and the Junta de Andalucía).
3. Development of antibody conjugates, such as antibody-antibiotic conjugates (funded by the AEI, call “Consolidación investigadora”).

In addition, we collaborate with several national and international researchers (from institutions like IPBLN, University of Milan, or IRB Barcelona). Together with the competitive projects just mentioned, we have established 5 contracts with companies (GlyCardial, Gate2Brain (3 contracts) and IRBBarcelona). I have co-autored 50 publications, including reviews and research articles, six of them as independent researcher at IPBLN.

Before joining the IPBLN I worked in various institutions:
IRB Barcelona (2012-2020). In Prof. Ernest Giralt's group, I worked on the development and use of blood-brain barrier shuttle peptides and ligands that interfere with protein-protein interactions of interest.
Oxford University (2010-2012) where I worked on the site-selective modification of proteins. My work was centered in the (1) development of hydrothiolation of alkynes by two thiol fragments; (2) development of a tag-and-modify strategy for synthesis of homogeneous fluorinated glyco-amino acids, peptides and proteins carrying a fluorine label in the sugar, allowing access to first examples of directly radiolabeled ([18F]-glyco)proteins; (3) Synthesis of multivalent glycodendriprotein constructs (bearing up to 1,620 glycans).
Universidad Complutense de Madrid (2010). In the group of Prof. Nazario Martín I worked on the synthesis and characterization of water soluble fullerene derivatives.
Instituto de Investigaciones Químicas (2006-2009). During my PhD I worked on the design and synthesis of glycodendrimers. The developed synthetic strategy allowed the preparation of modified compounds with natural or mimetic oligosaccharides. These structures were used to study their interaction with the DC-SIGN receptor.
Working on these laboratories, gave me training in organic chemistry (synthetic methodology, purification, analysis and structural elucidation), biochemistry (plasmid design and preparation, protein expression, purification and modification) and molecular biology (cellular viability, internalization and transport assays), etc.). All this has allowed me to learn NMR, chromatography (HPLC, FPLC), MS, confocal microscopy and cytometry, among many other techniques. In addition, I have completed my training with the courses Supervisor of Laboratory Radioactive Facilities with non-encapsulated sources and Research staff for the use of animals for experimentation.
Furthermore, I regularly review research articles and reviews of internationally important journals from Wiley, Elservier and Taylor-Francis publishers. I have also evaluated research projects (Call: OPUS20 and OPUS21, Poland; Call: Proyectos de I+D+i», (Retos de la Sociedad, 2021, and Generación de Conocimiento 2022, Spain; Call: I-COOP, 2023, CSIC, SPAIN) and researchers (Juan de la Cierva Incorporación, 2020, Spain).
Alongside my scientific career, I worked as a laboratory coordinator, directly supervising undergraduate, master's and doctoral students, helping them to design, carry out and interpret experiments within their research project. I also guided them when it came to preparing articles or presentations (from seminars to congresses and thesis defense). As a result, I acquired important skills to direct and supervise students at any stage of their training. Many of my younger collaborators have asked for advice to confront the next steps of their careers.
In total, I have supervised 4 final degree projects and 10 final master's projects as well as co-directed a thesis. Currently, my group is formed by four PhD researchers, a master student and a “Torres Quevedo” postdoc (in collaboration with the company gate2brain).
Since the beginning of my career I have been involved in outreach activities such as seminars for high school teachers or primary school students. I have participated in programs such as Treball de recerca, *Fes reserca* or The European Night of Researchers. In addition, I published a popular article in the magazine *Mente y cerebro*.
Various of the projects I have been involved in have applications in the biotechnology field giving rise to 3 patents. One of them, in which we described the use of a peptide shuttle to deliver a drug to the CNS, served as foundation of the company Gate2Brain, which investigates to find a treatment for rare pediatric tumors.

Part C. RELEVANT MERITS *(sorted by typology)*

C.1. Publications *(Selection of publications from last 10 years).*

1. Masmudi-Martín, M.; Oller-Salvia, B.; Perea, M.; Teixidó, M.; Valiente, M.; Giralt, E.; **Sánchez-Navarro, M. (A.C)** (2025) A site-specific MiniAp4-trastuzumab conjugate prevents brain metastasis. *Mol. Pharmaceutics 22, 3,* 1384–1395 (7/7)

2. Castillo-González, J.; Ruiz, J.L.; Serrano-Martínez, I.; Forte-Lago, I.; Ubago-Rodriguez, A.; Caro, M.; Pérez-Gómez, J.M.; Benítez-Troncoso, A.; Andrés-León, E.; **Sánchez-Navarro, M.;** Luque, R. M.; González -Rey, E. (2023) Cortistatin deficiency reveals a dysfunctional brain endothelium with impaired gene pathways, exacerbated immune activation, and disrupted barrier integrity. *J Neuroinflammation* **20**, 226 (10/12)
3. Escobedo, A.; Piccirillo, J.; Aranda, J.; Diercks, T.; Mateos, B.; Garcia-Cabau, C.; **Sánchez-Navarro, M.;** Topal, B.; Biesaga, M.; Staby, L.; Kragelund, B.B.; García, J.; Millet, O., Orozco, M.; Coles, M.; Crehuet, R.; Salvatella, X. (2022) A glutamine-based single α-helix scaffold to target globular proteins. *Nat Commun* **13**, 7073 (7/17).
4. **Sánchez-Navarro, M. (A.C.);** (2021) Avances in peptide-mediated cytosolic delivery of proteins, *Adv. Drug Delivery Rev., 171,187*-198. (1/1).
5. Garcia, J.; Fernández-Pradas, J. M.; *et al.*; **Sánchez-Navarro, M. (A.C.)** (2021) The Combined Use of Gold Nanoparticles and Infrared Radiation Enables Cytosolic Protein Delivery, *Chem. Eur. J.*, *27*, 4670-4675. (8/8).
6. Fuster, C.; Varese, M.; García, J.; Giralt, E.; **Sánchez-Navarro, M. (A.C.),** Teixidó, M. (A.C.) (2019) Expanding the MiniAp-4 BBB-shuttle family: Evaluation of proline cis -trans ratio as tool to fine-tune transport *J. Peptide Sci.*, 16-e3172. (5/6).
7. Díaz-Perlas C; Oller-Salvia, B.; **Sánchez-Navarro, M. (A.C.);** Teixidó, M. (A.C.); Giralt, E. (A.C.). (2018) Branched BBB-shuttle peptides: chemoselective modification of proteins to enhance blood–brain barrier transport *Chemical Science., 9*, 8409-8415. (3/5).
8. Garcia, J.; Fernández-Blanco, A.; Teixidó, M.; **Sánchez-Navarro, M. (A.C.),** Giralt, E. (A.C.) (2018) D-Polyarginine Lipopeptides as Intestinal Permeation Enhancers *ChemMedChem*, *13*, 2045-2052. (4/5).
9. **Sánchez-Navarro; M.;** Teixidó, M.; Giralt., E. (2018) Cytosolic delivery: Just passing through. *Nature Chemistry. 9* - 8, 727-728. (1/3).
10. Oller-Salvia, B.; **Sánchez-Navarro, M.;** Ciudad, S.; *et. al*.; Giralt, E. (A.C.); Teixidó, M. (A.C.) (2016) Miniap-4: A Venom-Inspired Peptidomimetic for Brain Delivery, *Angew. Chem – Int. Ed.*, *55,* 572-575. (2/11).

C.2. Congress, indicating the modality of their participation.

I have attended more than 15 conferences (national and international), presenting 32 posters (11 as main author and 21 as co-author), 8 oral communications and 4 invited talks. In here, I include a selection of three conferences of the last 3 years:

1. Title: *The combined use of gold nanoparticles and infrared radiation enables cytosolic protein delivery;* Conference*:* 8th International electronic conference on medicinal chemistry; Type of participation: Invited Talk; City: Electronic; Date: 1-30/11/2022.
2. Title: *Preventing the binding between CD47 and SIRPα to avoid infections through the use of peptides*; Conference: 36th European and 12th International Peptide Symposium; Type of participation: Poster; City: Sitges (Spain); Date: 28/08/2022- 02/09/2022.
3. Title: Use of peptide libraries to discover inhibitors of the interaction between CD47 and SIRPα proteins; Conference: XXXVIII Reunión Bienal de la Real Sociedad de Química Española; Type of participation: Poster; City: Granada (Spain); Date: 27-30/06/2022.

C.3. Research projects, indicating your personal contribution.

1. Reference: FARA2025; Title: Preclinical assessment of protein replacement therapy in the central nervous system of Friedreich ataxia mouse models; Principal investigator (P.I.): Macarena Sánchez-Navarro (coordinator); Jordi Magrané (subproject; Well Cornell Medical College, New York, USA); Joaquim Ros (subproject; University of Lleida, Lleida, Spain); Agency: Friedreich Ataxia Research Alliance (FARA); Call: General grant; Duration: 2 years; Amount granted: 250.000 $, (110.000 $ for MSN; 50.000$ for JM, and 90.000 $ for JR).
2. Reference: PID2023-153338OB-I00; Title: Use of protease-resistant peptide libraries in combination with affinity selection-mass spectrometry assays to discover new peptide therapeutic agents; Agency: Ministerio de Ciencia e Innovación; Call "Proyectos generación de conocimiento 2023" Modality: Proyectos investigación orientada. P. I.: Macarena Sánchez-Navarro; Affiliation: IPBLN-CSIC; Duration: 2024-2027 (36 months); Amount: 122.500.
3. Reference: CA23111; Title: SNOOPY (Searching for Nanostructured or pOre fOrming Peptides for therapy); P.I. Daniela Kalafatovic; Tipo de participación: MC member and co-leader of working group 3; Agency: European Cooperation in Science and Technology; Call: COST action 2023. Duration: 2024-2028 (4 years).
4. Reference: CNS2022-136020; Title: Development of synthetic strategies for the preparation of antibody-antibiotic conjugates for the treatment of infections; P.I.: Macarena

Sánchez-Navarro; Agency: MICINN; Call: “Incentivación de la consolidación investigadora”; Duration: 01/09/2023 – 31/08/2025; Amount: 199.406 €

5. Reference: ProyExcel_00365; Title: Activation of frataxin expression through the use of oligonucleotide-peptide conjugates; Agency: Junta de Andalucia; Call: «Proyectos de I+D+i», orientada a los Retos de la Sociedad andaluza (2021). P. I.: Macarena Sánchez-Navarro; Affiliation: IPBLN-CSIC; Duration: 2021-2024 (36 months); Amount: 103.200 €.

6. Reference: AFAF; Title: Protein replacement therapy for Freidreich Ataxia: exploring the potential of BBB-shuttle peptides; Agency: Association Française de l'Ataxie de Friedreich; Call: 2022 Programme (2022). P. I.: Macarena Sánchez-Navarro; Affiliation: IPBLN-CSIC; Duration: 2023 (12 months); Amount: 30.000 €.

7. Reference: PID2020-119810RB-I00; Title: Development of peptide-based therapeutic agents against CD47 and SIRPα and potential application to treat infections; Agency: Ministerio de Ciencia e Innovación; Call «Proyectos de I+D+i», orientada a los Retos de la Sociedad (2020). P. I.: Macarena Sánchez-Navarro; Affiliation: IPBLN-CSIC; Duration: 2021-2024 (36 months); Amount: 108.900 €

8. Reference: AFAF; Title: Protein replacement therapy for Freidreich Ataxia: exploring the potential of BBB-shuttle peptides; Agency: Association Française de l'Ataxie de Friedreich; Call 2021 Programme (2021). P.I.: Macarena Sánchez-Navarro; Affiliation: IPBLN-CSIC; Duration: 2022 (12 months); Amount: 25.000 €.

C.4. Non competitive projects.

1. Reference: FEDAES; Title: Desarrollo de una terapia de reemplazamiento proteico para Ataxia de Friedreich; Agency: Federación española de Ataxias (Donation); P.I.: Macarena Sánchez-Navarro; Affiliation: IPBLN-CSIC; Duration: 2023 (12 month); Amount: 5.000 €.
2. Reference: ASOGAF2022; Title: Desarrollo de una terapia de reemplazamiento proteico para Ataxia de Friedreich; Agency: Asociación granadina de ataxia de Friedreich (Donation); P.I.: Macarena Sánchez-Navarro; Affiliation: IPBLN-CSIC; Duration: 2023-2024 (24 months); Amount: 77.000 €.
3. Reference: ASOGAF2021; Title: Desarrollo de una terapia de reemplazamiento proteico para Ataxia de Friedreich; Agency: Asociación granadina de ataxia de Friedreich (Donation); P.I.: Macarena Sánchez-Navarro; Affiliation: IPBLN-CSIC; Duration: 2022 (12 months); Amount: 20.000 €.

C.5. Contracts, transfer and patents.

Contracts with companies:

1. Contract: “Synthesis and evaluation of drug-blood-brain barrier peptide shuttle conjugates”; Company: Gate2Brain S.L.; Duration: 2024-6, 36 months; Amount: 24.000 €; P.I.: Macarena Sánchez Navarro.
2. Contract: “Synthesis and evaluation of drug-blood-brain barrier peptide shuttle conjugates”; Company: Gate2Brain S.L.; Duration: 2022-2023, 18 months; Amount: 25.000 €; P.I.: Macarena Sánchez Navarro.
3. Contract: “Synthesis and evaluation of drug-blood-brain barrier peptide shuttle conjugates”; Company: Gate2Brain S.L.; Duration: 2021, 12 months; Amount: 10.000 €; P.I.: Macarena Sánchez Navarro.
4. Contract: “Synthesis and evaluation of peptide with Tau aggregation inhibitor propertiess”; Company: Fundació Institut de Recerca Biomèdica (IRB Barcelona); Duration: 2021, 22 months; Amount: 35.000 €; P.I.: Macarena Sánchez Navarro.
5. Contract: “His-tag and endotoxin removal of two proteins”; Company: GlyCardial Diagnostics S.L.; Duration: 2021; 2 months; Amount: 5.000 €; P.I.: M. Sánchez Navarro.

Patents:

1. Inventors: M. Sánchez, M. Teixidó, E. Giralt. BBB-shuttle site-specific modification of antibody-based entities able to cross the Blood-Brain Barrier. Priority date: 01/08/2022; Nº EP22382746.0.
2. Inventors: M. Sánchez, M. Teixidó, N. Gené, E. Giralt, A. Montero. Peptidic conjugates of SN38 useful in the treatment of cancer. Priority date: 28/09/2020; Nº EP20382854. Licenced to the company Gate2Brain.
3. Inventors: Bernardi, A.; Sattin, S.; Clerici, M.; Berzi, A.; Rojo, F. J.; Sánchez, M. *et al*. Inhibitors of Microbial Infections. Priority date: 03/07/2009; Nº EP09380127.