



**CURRICULUM VITAE (CVA)**

**IMPORTANT – The Curriculum Vitae cannot exceed 4 pages. Instructions to fill this document are available in the website.**

**Part A. PERSONAL INFORMATION**

**CV date** 09/12/2021

First name	María Dolores		
Family name	Solís Sánchez		
Gender (*)	Woman	Birth date (dd/mm/yyyy)	17/12/1959
Social Security, Passport, ID number	00684384L		
e-mail	<a href="mailto:d.solis@iqfr.csic.es">d.solis@iqfr.csic.es</a>		URL Web
Open Researcher and Contributor ID (ORCID) (*)	0000-0002-8148-1875		

(\*) Mandatory

**A.1. Current position**

Position	Staff Senior Scientist		
Initial date	09/06/2009		
Institution	Agencia Estatal Consejo Superior de Investigaciones Científicas		
Department/Center	Instituto de Química Física Rocasolano		
Country	Spain	Teleph. number	917459571 617972705
Key words	Structure and function of lectins, carbohydrates, molecular recognition, thermodynamics, structural glycobiology		

**A.2. Previous positions (research activity interruptions, art. 14.2.b))**

Period	Position/Institution/Country/Interruption cause
1997-2009	Staff scientist / Instituto Rocasolano / Spain
1996-1997	Hired researcher, CSIC / Instituto Rocasolano / Spain
1992-1995	Hired researcher, CSIC / Instituto Rocasolano / Spain
1991-1992	Postdoctoral Fellow, Industry / Instituto Rocasolano / Spain
1990	Postdoctoral Fellow, MEC / Clinical Research Centre / UK
1989-1990	Postdoctoral Fellow, MEC / Instituto de Química Orgánica / Spain
1987-1988	Postdoctoral Fellow, CSIC / Instituto Rocasolano / Spain
1982-1986	Predocctoral Fellow, CSIC / Instituto Rocasolano / Spain
1981-1982	Master's degree student / Instituto Rocasolano / Spain

**A.3. Education**

PhD, Licensed, Graduate	University/Country	Year
PhD in Chemistry	Universidad Complutense de Madrid / Spain	1986
Master in Biochemistry	Universidad Complutense de Madrid / Spain	1982
Bachelor in Chemistry, Specialization in Biochemistry	Universidad Complutense de Madrid / Spain	1981

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

The main scientific contributions of my scientific career have focussed on lectins and lectin-carbohydrate interactions of biological relevance. After initial studies on plant lectins, I pioneered a research line in Spain on animal lectins. Indeed, the study published in 1994 on sugar recognition by



bovine galectin-1 was one of the very first papers on an animal lectin entirely authored by Spanish researchers (*Eur J Biochem* 223:107-14). Since then, the panel of lectins studied have included animal as well as human lectins involved in different processes, as fertilization, innate immunity, or cancer. The objective has been the characterization of the lectins and their interactions at different levels: 1) defining the recognized sugar epitopes and the binding thermodynamics, 2) characterizing the specificity towards oligosaccharides and glycoconjugates, 3) determining the lectins' structural organization and its influence on ligand recognition, and 4) characterizing their three-dimensional structure and architecture of the binding site. Besides publication of the respective results in research articles, the information gained by this strategic combination of analyses was described in two relevant reviews published in *Trends in Biochemical Sciences* (TIBS, 36:298-313, 2011) and in *Biochimica et Biophysica Acta* (BBA 1850:186-235, 2015), which have reached a large scientific audience, as demonstrated by the number of times cited (to date, 369 and 163, respectively, according to WoS).

These studies were possible thanks to numerous national and international collaborations (illustrated by the co-authors listed in the publications given in section C1) that were established and/or strengthened in the course of one EC collaborative project (GLYCOHIT – 2011-2014) and three Marie Curie Training networks (DYNAMIC - 2006-2009, DYNANO - 2011-2016, and GLYCOPHARM - 2012-2016). Except for DYNAMIC, information on the funding obtained for these and other projects in the last 10 years is given in section C3. Worth mentioning, I was in charge of DYNANO networkwide training activities, monitoring & evaluation, and served as coordinator of the GLYCOPHARM network, which received a total EU contribution of 3 million €.

A more recent research line involves the analysis of carbohydrate structures decorating bacterial surfaces and the study of their recognition by endogenous receptors, mainly innate immune lectins. This line of research stemmed from our participation in the CIBER of respiratory diseases (CIBERES), in particular in the consortium project entitled “Toward improving the clinical management of respiratory infectious diseases by host-pathogen interplay innovative research”. This research line has also been the result of numerous national and international collaborations. A key tool employed in these studies is a novel application of the microarray technology based on the use of bacteria-printed microarrays, which has entirely been developed in my group. The technique enables the study of any type of bacteria–lectin/receptor interaction and the search for inhibitors of these interactions. A complementary microarray set-up, incorporating in the array a ligand for a particular bacterial adhesin, has also been developed and found to be efficient for evaluating bacterial adhesion and the efficacy of anti-adhesion compounds. Thus, this versatile technology can be applied to bacteria-related studies in multiple areas, from basic science to the clinical field.

Very recently, we have also developed novel exosome-based microarrays for the screening of surface glycans and study of their recognition by innate immune lectins, and already applied this technology to the analysis of exosomes isolated from a large collection of serum samples from patients with pneumonia of different bacterial etiology. We expect that this new microarray set-up will be of great help for the identification of disease biomarkers on exosomal surfaces, particularly for chronic and infectious respiratory diseases, which are very important causes of death and disability in the world.

Along the years, I have also contributed to the training of young researchers at different levels: i) by supervising 4 Doctoral Thesis and 2 Master Thesis, ii) by hosting young researchers for training in our microarray technology, iii) by organizing networkwide training activities for the Marie Curie networks in which I have been involved, and iii) by providing seminars in network meetings, summer schools and other training events. In addition, I have recently participated in the Evaluation Commission of pre- and post-doctoral grants of the Basque Country.

Other contributions that deserve to be mentioned include my activity as project evaluator for the Spanish National Agency of Evaluation and Prospective, as reviewer for different international indexed journals, and as Head of the Department of Physical Chemistry of Biological Macromolecules of the Rocasolano Institute (from January 2002 to April 2010).

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

### **C.1. Publications** (see instructions)

1. Campanero-Rhodes MA, Kalograiaki I, Euba B, Llobet E, Ardá A, Jiménez-Barbero J, Garmendia J, Solís D\* (2021) Exploration of galectin ligands displayed on gram-negative respiratory bacterial pathogens with different cell surface architectures. *Biomolecules* 11:595 (doi: 10.3390/biom11040595).



2. Campanero-Rhodes MA, Lacoma A, Prat C, García E, **Solís D\*** (2020) Development and evaluation of a microarray platform for detection of serum antibodies against *Streptococcus pneumoniae* capsular polysaccharides. *Anal Chem* 92:7437-43.
  3. Campanero-Rhodes MA, Palma AS, Menéndez M, **Solís D\*** (2020) Microarray strategies for exploring bacterial surface glycans and their interactions with glycan-binding proteins. *Front Microbiol* 10:2909 (doi: 10.3389/fmicb.2019.02909).
  4. Kalograiaki I, Euba B, Fernández-Alonso MDC, Proverbio D, St Geme JW 3rd, Aastrup T, Garmendia J, Cañada FJ, **Solís D\***. (2018) Differential recognition of *Haemophilus influenzae* whole bacterial cells and isolated lipooligosaccharides by galactose-specific lectins. *Sci Rep* 8:16292 (doi: 10.1038/s41598-018-34383-x).
  5. Kalograiaki I, Abellán-Flos M, Fernández LA, Menéndez M, Vincent SP, **Solís D\***. (2018) Direct Evaluation of Live Uropathogenic Escherichia coli Adhesion and Efficiency of Anti-adhesive Compounds Using a Simple Microarray Approach. *Anal Chem* 90:12314-21.
  6. Casals C, Campanero-Rhodes MA, García-Fojeda B, **Solís D\***. (2018) The Role of Collectins and Galectins in Lung Innate Immune Defense. *Front Immunol* 9:1998 (doi: 10.3389/fimmu.2018.01998).
  7. Kalograiaki I, Euba B, Proverbio D, Campanero-Rhodes MA, Aastrup T, Garmendia J, **Solís D\*** (2016) Combined bacteria microarray and quartz crystal microbalance approach for exploring glycosignatures of nontypeable *Haemophilus influenzae* and recognition by host lectins. *Anal Chem* 88:5950-57.
  8. **Solís D\***, Bovin NV, Davis AP, Jiménez-Barbero J, Romero A, Roy R, Smetana K Jr, Gabius HJ (2015) A guide into glycosciences: How chemistry, biochemistry and biology cooperate to crack the sugar code. *Biochim Biophys Acta* 1850:186-235.
  9. Campanero-Rhodes MA, Llobet E, Bengoechea JA, **Solís D\*** (2015) Bacteria microarrays as sensitive tools for exploring pathogen surface epitopes and recognition by host receptors. *RSC Adv* 5:7173-81.
  10. Ruiz FM, Fernández IS, López-Merino L, ... **Solís D\***, Gabius HJ\*, Romero A\* (2013) Fine-tuning of prototype chicken galectins: Structure of CG-2 and structure-activity correlations. *Acta Crystallogr D Biol Crystallogr* 69:1665-76.
- \* Corresponding author(s)

## C.2. Congress

1. Solís D (presenting author), Kalograiaki I, Abellán Flos M, Menéndez M, and Vincent S. "Adaptable microarray approach for rapid evaluation of bacterial anti-adhesives" (invited oral communication), 29<sup>th</sup> International Carbohydrate Symposium, 14-19 July 2018, Lisbon, Portugal
2. Solís D, "Bacterial surface glycans. Novel bacteria-based microarray and QCM approaches for in-situ assessment of glycan-lectin interactions" (invited lecture), 16<sup>th</sup> Spanish Biophysical Congress, 6-8 June 2017, Seville, Spain.
3. Solís D, "Biophysical characterization and functional analysis of galectins. The example of galectin-4" (lecture), Glycopharm Final Conference, 27-29 July 2016, Madrid, Spain.
4. Solís D, "Novel microarray strategies for exploring carbohydrate-mediated host-pathogen interactions" (invited lecture), XII Carbohydrate Symposium/III Chemical Biology Meeting of the Spanish Royal Society of Chemistry, 14-16 March 2016, Madrid, Spain.
5. Solís D, "Essentials of lectin-ligand interactions: A galectins' perspective" (lecture), GlycoBiology Summer School, 23-25 September 2015, Braga, Portugal
6. D. Solís, "Novel microarray platforms for exploring molecular recognition events" (invited lecture), Symposium "Dynamic Constitutional Systems", 27-28 July 2015, Montpellier, France.
7. Solís D, "Fine-tuning of galectins' activity" (oral communication), 2<sup>nd</sup> Dynano Workshop, 27-29 marzo 2013, Budapest, Hungary.
8. Solís D, "Lectin-glycan interaction analysis" (oral communication), GlycoHIT Review Meeting, 3-5 September 2012, Changsha, China.
9. Solís D, "Lectins as biosensors: Characterization of structural and ligand-binding features" (invited lecture), Symposium "Open Problems in Systems Chemistry", 23-25 January 2012, Montpellier, France.

## C.3. Research projects

1. Reference: RTI2018-099985-B-I00

Project title: Estudio de la glicosilación de exosomas circulantes y bacterias en infecciones respiratorias y susceptibilidad a lipopéptidos antimicrobianos y al reconocimiento por lectinas



Financial entity: Ministerio de Ciencia, Innovación y Universidades

Call: 2018, Proyectos de I+D+I “Retos Investigación”

Funding: 125.000 € (direct costs)

Principal Investigator: Dolores Solís

Start and end dates: 01/01/2019 - 30/09/2022

**2. Reference: BFU2015-70052R**

Project title: Búsqueda y desarrollo de nuevas aproximaciones preventivas y terapéuticas frente a las infecciones causadas por *Streptococcus pneumoniae*

Financial entity: Ministerio de Economía, Industria y Competitividad

Call: 2014, Proyectos de I+D+I “Retos Investigación”

Funding: 120.000 € (direct costs)

Principal Investigators: Margarita Menéndez and Dolores Solís

Start and end dates: 01/01/2016 - 30/06/2019

**3. Reference: BFU2012-36825**

Project title: Estudio de factores endógenos y exógenos como herramientas para el control de procesos infecciosos e inmunes

Financial entity: Ministerio de Economía y Competitividad, Plan Nacional de I+D+i 2008-2011

Call: Convocatoria de ayudas de Proyectos de Investigación Fundamental no orientada

Funding: 138.000 € (direct costs)

Principal Investigator: Margarita Menéndez (CSIC)

Participation: Member of the research team

Start and end dates: 01/01/2013 - 30/06/2016

**4. Reference: PITN-GA-2012-317297**

Project title: The Sugar Code: from (bio)chemical concept to clinics (GLYCOPHARM)

Financial entity: European Commission

Call: FP7-PEOPLE-2012-ITN

Group Funding: 398.881,79 € (Total EU contribution: 3,005,458.30 €)

Coordinator: Dolores Solís

Start and end dates: 01/11/2012 - 31/10/2016

**5. Reference: PITN- GA-2011-289033**

Project title: Dynamic Interactive Nanosystems (DYNANO)

Financial entity: European Commission

Call: FP7-PEOPLE-2011-ITN

Group Funding: 244.228 €

Coordinator: Mihai Barboiu (CNRS)

Participation: Principal Investigator at CSIC

Start and end dates: 01/11/2011 – 29/02/2016

**6. Reference: FP7-HEALTH-2010-260600**

Project title: Glycomics by High-throughput Integrated Technologies (GlycoHIT)

Financial entity: European Commission

Call: FP7-HEALTH-2010-single-stage

Group Funding: 93.138 €

Coordinator: Lokesh Joshi (NUI Galway)

Participation: Member of CSIC research team

Start and end dates: 01/01/2011 - 30/06/2014

**7. Reference: BFU2009-10052**

Project title: Diversidad estructural y especificidad de sustrato de dos familias de proteínas de interés biomédico

Financial entity: Ministerio de Ciencia e Innovación, Plan Nacional de I + D + I (2008-2011)

Call: Convocatoria de ayudas de Proyectos de Investigación Fundamental no orientada

Funding: 228.000 € (direct costs)

Principal Investigator: Margarita Menéndez (CSIC)

Participation: Member of the research team

Start and end dates: 01/01/2010 - 30/06/2013

#### **C.4. Contracts, technological or transfer merits**