MINISTERIO DE CIENCIA E INNOVACIÓN

Cofinanciado por la Unión Europea

AGENCIA ESTATAL DE INVESTIGACIÓN

CURRICULUM VITAE (CVA)

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

CV date	24/11/2021

Part A. PERSONAL INFORMATION

First name	Antonio		
Family name	Romero Garrido		
Gender (*)	Male	Birth date (dd/mm/yyyy)	11/12/1958
Social Security, Passport, ID number	29747562Y		
e-mail	romero@cib.csic.es	URL Web https://www.cib.csic.es/research/structural-and-chemical-biology/structural-biology-proteins	
Open Researcher and Contributor ID (ORCID) (*)		0000-0002-6990-6973	

(*) Mandatory

A.1. Current position

Position	Research Professor of the Spanish Research Council (CSIC)		
Initial date	21/07/2008		
Institution	Spanish Research Council (CSIC)		
Department/Center	Structural and Chemical Biology	Centro de Investigaciones Biológicas Margarita Salas	
Country	Spain	Teleph. number	911098044
Keywords	Structural Biology, Antibiotic resistance, virulence, galectins		

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

Period	Position/Institution/Country/Interruption cause
1991-2000	Científico Titular
2000-2008	Investigador Científico
2008-	Profesor de Investigación

A.3. Education

PhD, Licensed, Graduate	University/Country	Year
Bsc in Chemistry	The University of Sevilla	1981
Msc in Chemistry	The University of Sevilla	1982
PhD in Chemistry	The Complutense University of Madrid	1987

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

My scientific career has essentially been developed in the boundary between chemistry, physics and biology, which gave me the tools to study the structure of proteins and their complexes. One of our research areas is associated to antibiotic resistance and bacterial pathogenesis. As a result, we described the structure of C-LytA (Nat Struct Biol, 2001), the first described choline-binding domain, directly related to the virulence of pneumococcus and highlighted in The Lancet Infectious Diseases. Second, we solved the structure of a carbapenemase involved in multiresistance in *Acinetobacter baumannii* (PNAS, 2007), which helped us to understand the hydrolytic mechanism deployed towards

carbapenems (antibiotics of last resort) and provided us the basis for the development of new antimicrobial agents aimed to treat infectious diseases with special relevance in public health (JACS, 2010). Now, we are applying all the experience acquired over the years to study membrane proteins and macromolecular complexes that are part of the bacterial secretion machinery, more specifically those associated to the type VI secretion system (T6SS) in *A. baumannii* and *P. aeruginosa*. These multi-protein complexes function as nano-machines in constant movement, which makes their study difficult, and for which we are applying electron microscopy to solve the three-dimensional structure. However, despite the difficulty of the project we were able to solve the structures of two components of the contractile needle-like cell-puncturing device, Hcp from *A. baumannii* (PLoS One, 2015), VgrG1 from *P. aeruginosa* (Acta Cryst D, 2016), TssL (J Bacteriol, 2020), and more recently the complex between the Tse1 effector from *A. baumanii* and its immunity protein.

Our second goal has been related with galectins and cancer. Galectins are frequently overexpressed in cancerous cells and cancer-associated stromal cells, particularly in those cell types that do not normally express the specific galectins. The biological effects of galectins linked to tumours have been investigated for a long time but no structural relationships have been inferred up to now. This has been a major interest in the group since the beginning, with recent landmark results on engineered modular galectins (Angew. Chem., 2017) and on the first crystallographic picture of the N-terminal flexible domain of galectin-3 (Sci. Rep., 2018).

Collaborations with other groups at the CIB resulted in common publications (A.T. Martinez, C. Fernández-Tornero). Outside the Institute, collaborations with groups at the CNB (Madrid), IBV (Valencia), IBVF (Sevilla), CHUAC (A Coruña), LMU (Munich), UNAM (Mexico) and CWRU (USA) are among the most relevant.

Our group has trained a good number of young scientists over the years, highlighting in particular the research group leaded by Carlos Fernández-Tornero at the CIB and Israel S. Fernández, a great specialist in cryo EM actually at the St. Jude Children's Research Hospital in Memphis (USA).

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

C.1. Publications *(see instructions)*

1. Murphy P, Romero A*, Xiao Q,…….., Gabius H-J*. (2021) Probing sulfatide-tissue lectin recognition with functionalized glycodendrimersomes *iScience* **24**, 101919 (**IF 5.45**) (2/18)

2. Ruiz FM, Lopez J, Ferrara CG, Santillana E, Espinosa YR, Feldman MF, Romero A* (2020) Structural characterization of TssL from *Acinetobacter baumannii*: a key component of the type VI secretion system. *J Bacteriol* **202(17)**: e00210-20 (**IF 3.2**)

3. Gato E, Vázquez-Ucha JC, Rumbo-Feal S,….., Romero A, Poza M, Bou G, Pérez A (2020) Kpi, a novel chaperone-usher pili system associated with the worldwide-disseminated high-risk clone *Klebsiella pneumoniae* ST-15. *PNAS* **117(29)**, 17249–17259 (13/16)

4. Campos LA, Sharma R, Alvira S, ….., Romero A, Valpuesta JM, Muñoz V* (2019) Engineering protein assemblies with allosteric control via monomer fold-switching. *Nat Commun* **10(1):**5703 (**IF 11.9)** (10/12)

5. Romero A*, Gabius H-J* (2019) Galectin-3: is this member of a large family of multifunctional lectins (already) a therapeutic target? *Expert Opin Ther Tar* **23(10)**, 819-828 (**IF 4.62**)

6. Flores-Ibarra A, Vértesy S, Medrano FJ, Gabius H-J*, Romero A* (2018) Crystallization of a human galectin-3 variant with two ordered segments in the shortened N-terminal tail. *Sci Rep* **8**, 9835 (**IF 4.52**)

7. Kopitz J, Xiao Q, Ludwig A-K, Romero A,……, Gabius, H-J*, Percec, V* (2017) Reaction of a Programmable Glycan Presentation of Glycodendrimersomes and Cells with Engineered Human Lectins to Show the Sugar Functionality of the Cell Surface. *Angew Chem Int Ed Engl* **56(46)**,14677-14681 (**IF 12.10**) (4/13)

8. Spínola-Amilibia M, Davó-Siguero I, Ruiz FM, Santillana E, Medrano FJ, Romero, A* (2016) The structure of VgrG1 from *Pseudomonas aeruginosa*, the needle tip of the bacterial Type VI Secretion System. Acta Cryst **D72**, 22-33 (**IF 7.65**)

9. Ruiz FM, Santillana E, Spínola-Amilibia M, Torreira E, Culebras E, Romero, A* (2015) Crystal structure of Hcp from *Acinetobacter baumannii*: a component of the Type VI Secretion System. *PLoS One* **10(6)**: e0129691 (**IF 3.54**)

10. Bou G, Santillana E, Sheri A, …., Bonomo RA*, Romero A*, Buynak JD* (2010) Design, Synthesis, and Crystal Structures of 6-Alkylidene-2'-substituted penicillanic acid sulfones as potent inhibitors of *Acinetobacter Baumannii* OXA-24 carbapenemase. *JACS* **132**, 13320-13331 (**IF 8.94**) (13/14)

*** (Co) or corresponding author**

C.2. Congress

7th International Iberian Biophysics Congress, Coimbra (Portugal) (2021)
Medrano FJ, Santillana E, Gabius H-J, Romero A
Model of human galectin-3 through crystallography and SAXS
Poster/Video

11th International Symposium on the Biology of *Acinetobacter,* Sevilla (Spain) (2017)
Santillana E, Medrano FJ, Romero A, Ruiz FM
Crystal structure of the TssL cytoplasmic domain from *Acinetobacter baumannii*, a component of the Type 6 Secretion System
Poster

4th Mexican Synchrotron Radiation Users Meeting, Huatulco (Mexico) (2014)
Ruiz FM, Santillana E, Spínola-Amilibia M, Medrano FJ, Romero A
Unmasking pathogenicity and virulence: a structural approach using synchrotron radiation
Keynote lecture

Half a century of proteases & proteomics, Barcelona (Spain) (2014)
Romero A
Unmasking pathogenicity and virulence in *Acinetobacter baumannii*
Lecture

XXXVI Congreso SEBBM, Madrid (Spain) (2013)
Ruiz, F.M., Santillana, E., Torreira, E. & Romero, A.
Structural characterization of a virulence factor from *Acinetobacter baumannii*
Poster

XXXVI Congreso SEBBM, Madrid (Spain) (2013)
Spínola-Amilibia, M. & Romero, A.
Crystallization and preliminary X-ray structure analysis of a virulence factor from *Pseudomonas aeruginosa*
Poster

XXXIII Reunión Bienal de la RSEQ, Valencia (Spain) (2011)
Santillana E, Bou G, Buynak J, Romero A
Estructura tridimensional de la beta-lactamasa OXA-24 y estudio de su interacción con inhibidores del tipo sulfonas penémicas
Oral presentation

XXII Congress of the International Union of Crystallography, Madrid (Spain) 2011
Medrano FJ, Sánchez-Amat A, Romero A
Structure of lysine oxidase with a cysteine tryptophylquinone in the active site
Oral presentation

XXXII SEBBM, Oviedo (Spain) (2009)
Santillana E, Beceiro A, Bou G, Romero A
Búsqueda de nuevos inhibidores de OXA-24: una carbapenemasa aislada de una cepa

clínica multiresistente de A. Baumannii
Conferencia invitada

C.3. Research projects

1. *PIE2020E224-COVID19*; ***Title:*** Relación estructura function de inhibidores de cisteína proteasas del SARS-CoV-2; ***IP:*** A. Romero; ***Dates:*** 2020-2021; ***Funding:*** 45.000€

2. *BFU2016-77835-R*; ***Title:*** The Type VI Secretion System in Gram-negative bacteria: structural studies of effectors and essential components of this cellular machine; ***IP:*** A. Romero; ***Dates:*** 2017-2019; ***Funding:*** 100.000€

3. *BFU2014-55448-P*; ***Title:*** Unmasking pathogenicity and virulence in *Acinetobacter baumannii:* a structural approach; ***IP:*** A. Romero; ***Dates:*** 2015-2016; Funding: 80.000€

4. *FP7-PEOPLE-2012-ITN*; ***Title:*** The Sugar Code: from (bio)chemical concept to clinics; ***Coordinator:*** D. Solís; ***Dates:*** 2012-2016; ***Funding:*** 3.005.458,30€

5. *S2010/BMD2353*; ***Title:*** Descubrimiento y validación de dianas terapéuticas. Desarrollo de la plataforma Mhit; ***Coordinator:*** M.Luz Rodriguez; ***Dates:*** 2012-2015; ***Funding:*** 741.750€

6. *BFU2011-24615*; ***Title:*** Structural analysis of the major mechanisms of antibiotic resistance and bacterial virulence: from cell wall proteins to specialized secretion systems; ***IP:*** A. Romero; ***Dates:*** 2011-2014; ***Funding:*** 225.060€

7. *CSD2009-00088*; ***Title:*** From Protein Structure and Dynamics to Tailored Enzymes, Therapeutics, and Synthetic Macromolecular Devices (PRODESTECH); ***Coordinator:*** V. Muñoz; ***Dates:*** 2010-2016; ***Funding:*** 3.500.000€.

8. *BFU2008-02595*; Title: Structural biology of proteins involved in amyloidogenic processes, in antibiotic resistance and in tumour progression; ***IP:*** A. Romero; ***Dates:*** 2008-2011; ***Funding:*** 226.100€

C.4. Contracts, technological or transfer merits

Title: Synthesis and structural characterization of the polypeptide coded by the oncogene FUS-CHOP and of its interaction with Yondelis; ***Company:*** PharmaMar; ***IP's:*** A. Romero and G. Giménez-Gallego; ***Dates:*** 2007-2009; Funding: 219.349,23€

Title: Obtención de estructuras cristalográficas de alta resolución del enzima BACE con varias moléculas de Neuropharma; ***Company:*** Neuropharma; ***IP:*** A. Romero; ***Dates:*** 2008; ***Funding:*** 10.442,87€

Patents

• Cuevas P, Giménez-Gallego G, Sáenz De Tejada I, Angulo J, Lozano R.M., ***Romero A***, Valverde S. Use of 2,5-dihydroxybenzene compounds and derivatives for the treatment of hematological dyscrasias and cancer of an organ. Patent 9248114 (2/2/2016)

• Cuevas P, Giménez-Gallego G, Sáenz de Tejada I, Angulo J, Valverde S, ***Romero A***, Lozano R.M. Use of 2,5-dihydroxybenzene compounds and derivatives for the treatment of rosacea. Patent 9592216 (14/03/2017)

• Cuevas P, Giménez-Gallego G, Sáenz de Tejada I, Angulo J, Valverde S, ***Romero A***, Lozano R.M. Use of 2,5-dihydroxybenzene compounds and derivatives for the treatment of skin cancer. Patent 9511044 (6/12/2016)

• Cuevas P, Giménez-Gallego G, Sáenz de Tejada, I, Angulo J, Valverde S, ***Romero A***, Lozano RM. The use of 2,5-dihydroxybenzene derivatives for treating dermatitis. Patent 9597303 (21/03/2017)