Date of the CVA	

Section A. PERSONAL DATA

Name and Surname	Marcelo Guerin		
NIE		Age	
Researcher's identification number	Researcher ID		
	Scopus Author ID		
	ORCID		

* Obligatorio

A.1. Current professional situation

Institution	IIS-BioCruces Bizkaia		
Dpt. / Centre			
Address			
Phone	Email		
Professional category	IKERBASQUE Research Professor	Start date	2009
Keywords	Carbohydrates; Structural biology; Microbiology; Biochemistry		

A.2. Academic education (Degrees, institutions, dates)

Bachelor/Master/PhD	University	Year
Ph.D. Chemistry	Leloir Institute, School of Sciences, University of Buenos Aires, Argentina	2002
Pharm.D.	Faculty of Pharmacy and Biochemistry, University of Buenos Aires, Argentina	1997

A.3. General quality indicators of scientific production

Sexenios: 0
Total number of Publications: 53
Total number of Publications in Q1: 52 – SJR
Total number of Citations: 1793
Number of Citations - last 5 years: 963
Average number of Citations/year – last 5 years: 193
h-index: 22
h-index - last 5 years: 18
Number of Ph.D. students supervised - last 10 years: 9

Number of Post-Doctoral Fellows supervised – last 10 years: 6

Data calculated by Scholar Google.

Section B. SUMMARY OF THE CURRICULUM

My interest in Glycobiology began as an undergraduate student, working in glycosyl hydrolases in the Leloir Institute at Buenos Aires, Argentina (1991-1996). This research center was named in honor to Luis F. Leloir, who discovered the first sugar nucleotide and was awarded the Nobel Prize in Chemistry in 1970 for his fundamental contributions to our current knowledge of glycan biosynthesis and metabolism. I then completed my Ph.D. in Biochemistry and Molecular Biology by studying mechanistic aspects of the UDP-Glc:glycoprotein glucosyltransferase, an exquisite enzyme that senses the folding status of substrate glycoproteins in the endoplasmic reticulum (1997-2002). During that time, in the late 1990s, three-dimensional structural information of glycosyltransferases was very limited, in part because they are frequently membrane-associated. To further advance towards the understanding of the molecular mechanism that govern glycosyl

transfer reactions, I moved to the Structural Biochemistry Unit at the Institut Pasteur in Paris, France, where I was first introduced to macromolecular crystallography (2003-2007). After this postdoctoral stage, I continued my work on the biosynthesis of unique mycobacterial cell envelope glycoconjugates when I transferred as a scientist to the Mycobacteria Research Laboratories at Colorado State University, USA (2008-2009).

In November 2009, I was awarded an Ikerbasque Research Full Professor position as the leader of the Structural Glycobiology Lab, currently in BioCruces Bizkaia Health Research Institute (IIS-BioCruces), the Basque Country, Spain. In 2015, IIS-BioCruces received the Excellence Award from the Instituto de Salud Carlos III (ISCIII), earning a place alongside the top research health institutes in Spain . We are particularly interested in investigating the structural and mechanistic properties of Carbohydrate Active Enzymes (CAZYmes). To this end, we are using a multidisciplinary approach including molecular biology, protein/membrane biochemistry/biophysics and structural biology (X-ray crystallography, X-ray free electron laser (XFEL), Small-angle X-ray scattering (SAXS) and Cryo-Electron Microscopy). Our program received a kick-start with a grant from the Ikerbasque program, and we were awarded our first EU grant (FP6- LSHP-CT-2005-018923) in June of 2010. Our second EU grant (FP7 HEALTH-F32011-260872) followed in 2011. Moreover, we were awarded with the National Plan grant from the MINECO from 2011 up to date (SAF2010-19096; BIO2013-49022-C2-2-R and BFU2016-77427-C2-2-R) and also recently awarded with the Explora grant (BFU2017-92223-EXP). Consequently, the lab grew rapidly in size to its steady state size of about 6 to 10 researchers. The results of our work certainly have implications not only in fundamental aspects of glycobiology and the comprehension of some key pathogenic pathways, but also in the application of this knowledge in areas including biomedicine, bioengineering and biotechnology. Recent publications are in top-ranking journals including Nature Chemical Biology, Nature Communications, Proceedings National Academy Sciences USA, Angewandte Chemie Int. Ed., PloS Pathogens, EMBO J, Current Opinion Structural Biology, Structure , ACS Central Science, ACS Chemical Biology, the Journal of Molecular Biology, Biochemistry, and the Journal of Biological Chemistry between others.

Section C. MOST RELEVANT MERITS (ordered by typology)

C.1. Publications

AC: Autor de correspondencia; (nº x / nº y): posición firma solicitante / total autores

1 **Scientific paper**. Marcelo E Guerin; MVAS Navarro; D de Mendoza; et al;. 2020. Membrane fluidity adjusts the insertion of the transacylase PlsX to regulate phospholipid biosynthesis in Gram-positive bacteria J Biol Chem. J Biol Chem. 14-295 (7), pp.2136-2147.

2 **Scientific paper**. Marcelo E Guerin; EJ Sundberg; LX Wang; JO Cifuente; C Li; EH Klontz; JJ Du; Beatriz Trastoy. 2020. Structural basis of mammalian high-mannose N-glycans processing by human gut Bacteroides Nat. Commun.Nature, F1000Prime article. 11, pp.899.

3 **Scientific paper**. Marcelo E Guerin; J Sjögren; A Naegeli; Itsaso Anso; Beatriz Trastoy. 2020. Structural basis of mammalian mucin processing by the human gut O-glycopeptidase OgpA from Akkermansia muciniphila Nat. Commun.Nature. 11, pp.4844.

4 **Scientific paper**. EJ Sundberg; Marcelo E Guerin; LX Wang; et al;. 2019. Molecular basis of broad spectrum N-glycan specificity and processing of therapeutic IgG monoclonal antibodies by Endoglycosidase S2 ACS Cent. Sci. F1000Prime article. 5, pp.524-538.

5 **Scientific paper**. D Giganti; G Stirnemann; Marcelo E Guerin. 2018. Conformational entropy of a single peptide controlled under force governs protease recognition and catalysis Proc. Natl. Acad. Sci. USA. Science USA. 115, pp.11525-11530.

6 **Scientific paper**. Marcelo E Guerin; EJ Sundberg; LX Wang; A Marina; J Orwenyo; Erik Klontz; Beatriz Trastoy. 2018. Structural basis for the recognition of complex-type N-glycans by Endoglycosidase S Nat. Commun.Nature. 9, pp.1874.

7 **Scientific paper**. Marcelo E Guerin; C Rovira; M Gilleron; J Prandi; Beatriz Trastoy; D Albesa Jové; L Raich; M Tersa. 2018. The Molecular Mechanisms of Substrate Recognition and Catalysis of the Membrane Acetyltransferase PatA from Mycobacteria ACS CHem Biol. 19-13 (1), pp.131-140.

8 **Scientific paper**. Marcelo E Guerin; A Planas; X Biarnés; et al;. 2017. Structural Snapshots and Loop Dynamics along the Catalytic Cycle of Glycosyltransferase GpgS Structure. 5-25 (7), pp.1034-1044.

9 **Scientific paper**. Marcelo E Guerin; A Marina; MA Sainz Polo; D Albesa Jové. 2017. Structural Snapshots of the Reaction Center of alfa-1,3-Galactosyltransferase with Native Substrates Support a Conserved Catalytic Mechanism for Retaining Glycosyltransferases Angew. Chem. Int. Ed. Engl. 56-47, pp.14853-14857.

10 **Scientific paper**. Marcelo E Guerin; D Albesa Jové; J Agirre; M García Alija; S López Fernández; J Madariaga Marcos; N Comino; JO Cifuente. 2016. Structural Basis of GLycogen Biosynthesis Regulation in Bacteria Structure. Structure. 6-24 (9), pp.1613-1622.

11 **Scientific paper**. Marcelo E Guerin; K Mikusova; M Jackson; et al;. 2016. Structural basis for selective recognition of acyl chains by the integral membrane associated acyltransferase PatA Nat. Commun.Nature. 7, pp.10906.

12 **Scientific paper**. Marcelo E Guerin; D Albesa Jové. 2016. The conformational pasticity of glycosyltransferases Curr Opin Struct Biol. Current Opinion. 40, pp.23-32.

13 **Scientific paper**. Marcelo E Guerin; L Masgrau; P Merino; et al;. 2015. A native ternary complex trapped in crystal reveals the catalytic mechanism of a retaining glycosyltransferase Angew. Chem. Int. Ed. Engl.54, pp.9898-9902.

14 **Scientific paper**. Marcelo Guerin; PM Alzari; A Chenal; et al;. 2015. Secondary structure reshuffling modulates glycosyltransferase function at the membrane Nat. Chem. Biol.11, pp.16-18.

15 **Scientific paper**. G Riccardi; ST Cole; R Glockshuber; et al;. 2014. Rv2466c emdiates the activation of TP053 to kill replicating and non-replicating Mycobacterium tuberculosis ACS Chem Biol. ACS Chem Biol. 18-9 (7), pp.1567-1575.

16 **Scientific paper**. A Planas; Marcelo E Guerin; BM Moerschbacher; X Biarnés; D Albesa-Jové; E Andrés. 2014. Structural basis of chitin oligosaccharide deacetylation Angew. Chem. Int. Ed. Engl. 53, pp.6882-6887.

17 **Scientific paper**. Marcelo E Guerin; A Planas; BM Moerschbacher; X Biarnés; D Albesa Jové; E Andrés. 2014. Structural basis of chitin oligosaccharide deacylation Angew Chem Int Ed Engl. angewandte Chemie. 1-53 (27), pp.6882-6887.

18 **Scientific paper**. D de Mendoza; GE Schujman; A Buschiazzo; M Debarbouille; F Schaeffer; Marcelo E Guerin; G Reh; D Albanesi. 2013. Structural basis for feed-forward transcriptional regulation of membrane lipid homeostasis in Staphylococcus aureus PLoS Pathog. PLoS Pathog. 9-1.

19 **Scientific paper**. D de Mendoza; PM Alzari; AJ Vila; et al;. 2006. Structural basis of lipid biosynthesis regulation in Gram-positive bacteria EMBO J.EMBO J. 6-25 (17), pp.4074-4083.

20 **Scientific paper**. PM Alzari; RA Ugalde; W Shepard; ME Guerin; JE Ugalde; A Buschiazzo. 2004. Crystal structure of glycogen synthase: homologous enzymes catalyze glycogen synthesis and degradation EMBO J.EMBO J. 18-23 (13), pp.3196.

C.2. Participation in R&D and Innovation projects

1 R01 NIH grant No.: AI149297-01 2019-2024. 334.260 €.
2 MICINN grant No.: PID2019-105649RB-I00 2020-2023. 290.400 €.
3 MINECO grant No.: BFU2017-92223-EXP 2019-2020. 48.800 €.
4 MINECO grant No.: SEV-2016-0644 2017-2020. 4.000.000 €.
5 MINECO grant No.: BFU2016-77427-C2-2-R 2017-2019. 217.800 €.
6 MINECO grant No.: BIO2013-4902-C2-2-R 2014-2017. 108.900 €.
7 European Commission FP7 grant No.: HEALTH-F3-2011-260872 2011-2016. 250.000 €.

8 MICINN grant No.: SAF2010-19096 2011-2013. 114.950 €.
9 European Commission FP6 grant No.: LSHP-CT-2005-018923 2006-2010. 50.000 €.

C.3. Participation in R&D and Innovation contracts

C.4. Patents