
RESEARCH SCOPE AND EXPERTISE

Petros Giastas is a senior Postdoc at the Laboratory of Molecular Neurobiology and Immunology working on the nicotinic acetylcholine receptor (nAChR) structure-function relationship. At the beginning of his scientific career his research focused on the study of bacterial electron transfer proteins, particularly ferredoxins, trying to elucidate the structural features that affect their electrochemical properties. Since September 2007 Petros Giastas is working uninterruptedly on projects that involve structural and biochemical studies of muscle and neuronal type nAChRs. Specifically, his interests involve the determination of structures of near-intact nAChRs and of their extracellular domains (ECDs), the elucidation of their functional mechanisms, as well as their specific pharmacological properties. Furthermore, he has started a collaboration with Dr. E. Stratikos from NCSR Demokritos working on the structures of human endoplasmic reticulum aminopeptidases, while he has also initiated a new collaborative project with the Agricultural University of Athens (Prof. Elias Eliopoulos) and University of Crete (Prof. V. Bouriotis), where he investigates the molecular determinants that influence the inhibition of peptidoglycan deacetylases from *Bacillus* species. His research is based on several technologies, such as X-ray crystallography and electrophysiology, while his expertise includes *in silico* design of protein mutants, protein expression in bacterial and eukaryotic expression systems, protein purification, biophysical characterization and ligand binding studies.

PROJECTS

- Identification of novel allosteric binding sites located at the extracellular domain (ECD) of $\alpha 2$ -containing nAChRs by a combination of structural and functional studies.
- Structural and pharmacological studies of "orphan" nAChR subunits. Elucidation of "unorthodox" nAChR binding sites in high resolution.
- Studies of the $\alpha 4(+)/\alpha 4(-)$ binding site, present in the low sensitivity $\alpha 4\beta 2$ nAChR, with the exploitation of chimeric nAChRs.
- Elucidation of the structures of $\alpha 9$ -ECD in complex with a variety of small molecule ligands and α -conotoxins. Useful for the design of subtype specific and potent ligands.
- Structural studies of human endoplasmic reticulum aminopeptidases bound with potential inhibitors.
- Identification of the molecular determinants that influence the inhibition of peptidoglycan deacetylases from *Bacillus* species.

EDUCATION AND PROFESSIONAL/RESEARCH EXPERIENCE

2007-present	Post-doctoral Research Associate, Hellenic Pasteur Institute, Athens, Greece.
2016, 2017	Temporary lecturer (at the level of Associate Professor) in Agricultural University of Athens teaching Biochemistry and Molecular Recognition.
2002-2007	PhD student (NCSR Demokritos and University of Athens) studying the molecular structures of bacterial metalloproteins (ferredoxins) and the correlation between

	their structure and function (electrochemical properties). This period includes 17 month mandatory military service.
2000-2002	MSc student (NCSR Demokritos and University of Athens) studying the structures of modified cyclodextrins bound with a variety of ligands molecules.
1994-2000	BSc in Chemistry (University of Athens).

HONOURS AND AWARDS

2000	Scholarship granted by NCSR Demokritos after entrance examinations to elaborate doctoral studies.
2004	Marie Curie fellowship granted for the cloning, expression and purification of muscular proteins in collaboration with EMBL Hamburg, Germany.
2012	REGPOT Scholarship for training in membrane protein purification methods, University of Konstanz, Germany.
2014	Traveling fellowship and full fees coverage from Wellcome Trust Institute for attending and presenting orally at the Nicotinic Acetylcholine Receptors Conference, Cambridge, UK

PUBLICATIONS

- 1. Giastas, P.,** Zouridakis, M., Tzartos, S.J. Understanding structure-function relationship of the human neuronal acetylcholine receptor: insights from the first crystal structures of neuronal subunits. *Br. J. Pharmacol.*, **2017**, doi: 10.1111/bph.13838, Review article
- 2. Mpakali, A.,** Saridakis, E., Harlos, K., Zhao, Y., Kokkala, P., Georgiadis, D., **Giastas, P.,** Papakyriakou, A., Stratikos, E. Ligand-Induced Conformational Change of Insulin-Regulated Aminopeptidase: Insights on Catalytic Mechanism and Active Site Plasticity. *J. Med. Chem.* DOI: 10.1021/acs.jmedchem.6b01890, **2017**
- 3. Mpakali, A., Giastas, P.,** Deprez-Poulain, R., Papakyriakou, A., Koumantou, D., Tsoukalidou, S., Vourloumis, D., Mavridis, I.M., Stratikos, E., Saridakis, E. Crystal Structures of ER Aminopeptidase 2 in Complex with Inhibitors Reveal Pharmacophore Requirements for Optimizing Inhibitor Potency. *ACS Med. Chem. Lett.*, 8(3), pp 333–337, **2017**
- 4. Kouvatsos, N., Giastas, P.*,** Chroni-Tzartou, D., Pouloupoulou, C., Tzartos, J.S. Crystal structure of a human neuronal nAChR extracellular domain in pentameric assembly: Ligand-bound $\alpha 2$ homopentamer. *Proc. Natl. Acad. Sci. USA* 113(34):9635-40, **2016** *(Giastas P. co-first author)
- 5. Kaloudi-Chantzea, A.,** Martinou, E., Seintis, K., Karakostas, N., **Giastas, P.,** Petter, F., Fakis, M., Pistolis, G. Formation of a highly-ordered rigid multichromophoric 3D supramolecular network by combining ionic and coordination-driven self-assembly. *Chem. Commun.* **2016** DOI: 10.1039/C5CC10335E
- 6. Mpakali, A., Giastas, P.,** Mathioudakis, N., Mavridis, I.M., Saridakis, E., Stratikos, E. Structural Basis for Antigenic Peptide Recognition and Processing by Endoplasmic Reticulum (ER) Aminopeptidase 2. *J. Biol. Chem.* 43, 26021-32, **2015**
- 7. Arnaouteli, S., Giastas, P.,** Andreou, A., Tzanodaskalaki, M., Aldridge, C., Tzartos, S.J., Vollmer, W., Eliopoulos, E., Bouriotis, V. Two Putative Polysaccharide Deacetylases Are Required for Osmotic Stability and Cell Shape Maintenance in *Bacillus anthracis*. *J. Biol. Chem.* 21, 13465-78, **2015**
- 8. Azam, L.,** Papakyriakou, A., Zouridakis, M., **Giastas, P.,** Tzartos, S., McIntosh, M., Molecular interaction of α -conotoxin RgIA with rat $\alpha 9\alpha 10$ nAChR. *Mol. Pharm.* 5, 855-64, **2015**
- 9. Zouridakis, M., Giastas, P.*,** Zarkadas, E., Chroni-Tzartou, D., Bregestovski, P., Tzartos, S.J. Crystal structures of free and antagonist-bound states of human alpha 9 nicotinic receptor extracellular domain. *Nature Struct. Mol. Biol.*, 21, 976-980, **2014** *(Giastas P. co-first author)

10. Boltsis, I., Lagoumintzis, G., Chatzileontiadou, D.S.M., **Giastas, P.**, Tzartos, S.J., Leonidas, D.D., Poulas, K. Non-contact Current Transfer Induces the Formation and Improves the X-ray Diffraction Quality of Protein Crystals. *Cryst. Growth & Design*, 14, 4347-4354, **2014**
11. Lazaridis, K., Zisimopoulou, P., **Giastas, P.**, Bitzopoulou, K., Evangelakou, P., Sideri, A., Tzartos, S.J. Expression of human AChR extracellular domain mutants with improved characteristics. *Int J Biol Macromol.*, 63: 210-217, **2014**
12. Grigoropoulos, A., Maganas, D., Symeonidis, D., **Giastas, P.**, Cowley, A.R., Kyritsis, P., Pneumatikakis, G. Synthesis of Chalcogenidoimidodiphosphinato-Rh-I Complexes and DFT Investigation of Their Catalytic Activation in Olefin Hydroformylation. *Eur. J. Inorg. Chem.*, 7, 1170-83, **2013**
13. Evnouchidou, I., Birtley, J., Seregin, S., Papakyriakou, A., Zervoudi, E., Samiotaki, M., Panayotou, G., **Giastas, P.**, Petrakis, O., Georgiadis, D., Amalfitano, A., Saridakis, E., Mavridis, I.M., Stratikos, E. A common single nucleotide polymorphism in endoplasmic reticulum aminopeptidase 2 induces a specificity switch that leads to altered antigen processing. *J. Immunol.* 189(5):2383-92, **2012**
14. Saridakis, E., **Giastas, P.***, Efthymiou, G., Thoma, V., Moulis J.-M., Kyritsis, P., Mavridis, I.M. Insight into the protein and solvent contributions to the reduction potentials of [4Fe-4S]^{2+/+} clusters: crystal structures of the *Allochromatium vinosum* ferredoxin variants C57A and V13G and the homologous *Escherichia coli* ferredoxin. *J. Biol. Inorg. Chem.*, 14: 783-799, **2009** *(Giastas P. co-first author)
15. Paulidou, A., **Giastas, P.**, Mourtzis, N., Yannakopoulou, K., Mavridis, I.M. Crystal and molecular structure of octakis(6-bromo-6-deoxy)-cyclodextrin. A novel stacking of a distorted macrocycle. *Carbohydrate research*, **2007**
16. **Giastas, P.**, Pinotsis, N., Efthymiou, G., Wilmanns, M., Kyritsis, P., Moulis, J.-M., Mavridis, I.M. The structure of the 2[4Fe-4S] ferredoxin from *Pseudomonas aeruginosa* at 1.32 Å resolution: comparison with other high-resolution structures of ferredoxins and contributing structural features to reduction potential values. *J. Biol. Inorg. Chem.*, 11: 445-458, **2006**
17. Yoshizawa K, Toyota S, Toda F, **Giastas, P.**, Chatziefthymiou, S, Mavridis, I.M. Control of differential inclusion complexation in the solid state by seed crystals. *Angew. Chem. Int. Ed.*, 44 (32): 5097-5100, **2005**
18. Tsorteki, F., Bethanis, K., Pinotsis, N., **Giastas, P.**, Mentzafos, D. Inclusion compounds of plant growth regulators in cyclodextrins. V. 4-Chloro-phenoxyacetic acid encapsulated in beta-cyclodextrin and heptakis (2,3,6-tri-O methyl)-beta-cyclodextrin. *Acta Cryst. B61*, 207-217 Part 2, **2005**
19. **Giastas, P.**, Eliadou, K., Plyta Z.F., Yannakopoulou, K., Mavridis, I.M. X-ray crystallography and solution NMR spectroscopy characterization of heptakis (2,3-di-O-acetyl-6-bromo-6-deoxy)cyclomaltoheptaose. *Carb. Res.* 339 (6): 1189-1194, **2004**
20. Eliadou, K., **Giastas, P.**, Yannakopoulou, K., Mavridis, I.M. Synthesis of 6-mono-6-deoxy-beta-cyclodextrins substituted with isomeric amino-benzoic acids. Structural characterization, conformational preferences, and self-inclusion as studied by NMR spectroscopy in aqueous solution and by X-ray crystallography in the solid state. *J. Org. Chem.* 68 (22): 8550-8557, **2003**
21. **Giastas P.**, Mourtzis N, Yannakopoulou, K., Mavridi, I.M. Pseudorotaxanes of β-Cyclodextrin with Diamino End-functionalized Oligo-phenyl and -benzyl Compounds in Solution and in the Solid State. *J. Incl. Phenom. Macr. Chem*, 44, 247-250 **2003**.
22. Yagi, M., Hirano, S., Toyota, S., Toda, F., **Giastas, P.**, Mavridis, I.M. Photoreactions of 2- and 4-pyridones in their inclusion crystal with a host compound. *HETEROCYCLES* 59 (2): 735-744, **2003**
23. **Giastas, P.**, Yannakopoulou, K., Mavridis, I.M. Molecular structures of the inclusion complexes beta-cyclodextrin-1,2-bis(4-aminophenyl)ethane and beta-cyclodextrin-4,4'-diaminobiphenyl; packing of dimeric beta-cyclodextrin inclusion complexes. *Acta Cryst. B59*: 287-299 Part 2, **2003**
24. Salakhutdinov, B.A., Dalimov, D.N., Aripov, T.F., Tukfatullina, I.I., Ziyatdinova, R.K., Dzhuraev, A.Z., Kamaev, F.G., Izotova, L.Y., Ibragimov, B.T., Mavridis, I.M., **Giastas, P.** Synthesis, structure, and membrane activity of new glycyrrhetic acid derivatives. *Chem. Nat. Comp.* 38 (3): 249-256, **2002**

BOOK CHAPTERS

- “Macromolecular Crystallographic Computing” in “Biocomputation and Biomedical Informatics: Case Studies and Applications”, Bethanis K., **Giastas P.**, Thireou T., Atlamazoglou V., pp. 1-34, IGI Global, Hershey, PA, USA, doi: 10.4018/978-1-60566-768-3.ch001, **2010**
- “Antigen-specific apheresis of autoantibodies as a treatment strategy for myasthenia gravis” in “Myasthenia Gravis: Disease Mechanisms and Immune intervention”, Linus Publications, Deer Park NY USA, pp. 397-409, Zisimopoulou P., Lagoumintzis G., Trakas N., **Giastas P.**, Poulas K. and Tzartos S.J., **2010**