Jonathan Ipsaro, Ph.D.

Senior Scientist – Atavistik Bio, Cambridge, Massachusetts, USA

jon.ipsaro@gmail.com | www.jonipsaro.com

Summary

- Broadly-trained researcher with 15 years of experience in structure determination, biophysics, biochemistry, and computation
- Accomplished structural biologist that has successfully utilized X-ray, cryo-EM, and NMR for an array of targets (RNA interference machinery, cytoskeletal complexes, nucleosomes bound to chromatin remodelers, transcription factors, metabolic enzymes, etc.)
- Extensive experience with protein and nucleic acid biochemistry
- Effective project manager comfortable with CRO management, in-house collaboration, and independent work
- Ambitious to tackle human health issues using integrated structural and computational methods

Experience

2023-Current Senior Scientist (Structural Biology) – Atavistik Bio, Cambridge, MA

2019-2023 Howard Hughes Medical Institute / Cold Spring Harbor Laboratory – Research Investigator

Primary Project: Structural studies of epigenetic regulatory machinery

Collaborations: Molecular characterization of cancer drivers; Structure determination of chromatin remodelers in plants; Protein/enzyme engineering for mass spectrometry biotechnology tools

Current Responsibilities:

- Execution of structure determination workflows for 4-6 concurrent projects
- Designing and cloning of constructs for protein and nucleic acid production
- Expression of targets in multiple recombinant systems (*E. coli*, insect cells, etc.)
- Protein purification, biochemical analysis, and biophysical characterization (including binding analyses of multi-component complexes)
- Determination of macromolecular and multi-subunit complex structures by X-ray crystallography and cryo-EM (data collection, processing, model building, refinement, and deposition)
- Preparation and analysis of next-gen sequencing libraries including custom bioinformatic pipeline coding and implementation
- Training and supervision of multiple graduate students, junior post-docs, and technicians
- Training for users, maintenance of, and basic repairs for numerous biochemical and biophysical apparatus (e.g. ITC, SPR, MALLS)

2010-2019 Cold Spring Harbor Laboratory – Post-doctoral Fellow

Primary Project: Structural studies of epigenetic regulatory machinery

Advisor: Leemor Joshua-Tor

Skills

Structural biology:	X-ray crystallography & cryo-EM (sample preparation, crystallization/freezing, data collection, processing, model building, refinement) NMR (sample preparation, basic analysis of protein samples)
Molecular biology:	Construct design (protein and nucleic acid), cloning, protein expression and purification, RNA transcription and purification
Biophysics:	Analytical ultracentrifugation (AUC), circular dichroism (CD), fluorescence polarization (FP), surface plasmon resonance (SPR), small-angle X-ray scattering (SAXS), multi-angle light scattering (MALLS)
Biochemistry:	Nucleic acid labeling and detection, enzymatic activity assays with various readouts (gels, TLC, MS), SHAPE, Next-generation sequencing
Computation:	Python, Web development HTML/PHP/SQL/JavaScript, Bash, R

Education

2004-2009 Ph.D., Northwestern University – Department of Biochemistry, Molecular Biology & Cell Biology
Thesis: Biophysical characterization and structural elucidation of the spectrin-ankyrin interaction
Advisor: Alfonso Mondragón, Ph.D.

2000-2004 B.S., Case Western Reserve University – Department of Biochemistry (with Honors); minor in Physics
B.A, Case Western Reserve University – Department of Modern Languages and Literature (Spanish)

Funding & Academic Honors

2011-2013 NIH Ruth L. Kirschstein National Research Service Award

2010 Harvey L. Karp Discovery Award, Cold Spring Harbor Laboratory

2008 Northwestern University Graduate School Conference Travel Award

2006-2009 Cellular and Molecular Basis of Disease NIH Training Grant
(NIH 5 T32 GM008061-24), Northwestern University, Evanston IL

2005-2006 Neil Welker Interdepartmental Biological Sciences Teaching Assistant Award,
Northwestern University, Evanston IL

2004-2005 Rappaport Fellow, Northwestern University, Evanston IL

Recent Invited Talks

Nov. 2020 *RNA Interest Group – Student Invited Speaker – University of Utah, UT*

May 2020 *Regulatory and Non-Coding RNAs Meeting – Cold Spring Harbor Laboratory, NY*

Aug. 2019 *New York Structural Biology Discussion Group – New York City, NY*

Publications (most recent first; 11 first author)

1. Blanco MJ, Buskes MJ, Govindaraj RG, **Ipsaro JJ**, Prescott-Roy JE, Padyana AK. Allostery Illuminated: Harnessing AI and Machine Learning for Drug Discovery. 2024. ACS Med. Chem. Lett. doi: 10.1021/acsmedchemlett.4c00260
2. Baumgartner L, **Ipsaro JJ**, Hohmann U, Handler D, Schleiffer A, Duchek P, Brennecke J. Evolutionary adaptation of an HP1-protein chromodomain integrates chromatin and DNA sequence signals. 2024. *eLife*. 13:RP93194. PMID: 38995818
3. Qian Z, Song D, **Ipsaro JJ**, Bautista C, Joshua-Tor L, Yeh JT-H, Tonks NK. Manipulating PTPRD function with ectodomain antibodies. 2023. *Genes Dev*. 37(15-16):743-759. PMID: 37669874
4. Lee SC*, Adams DW*, **Ipsaro JJ***, Cahn J*, Lynn J, Kim HS, Berube B, Major V, Calarco JP, LeBlanc C, Bhattacharjee S, Ramu U, Grimanelli D, Jacob Y, Voigt P, Joshua-Tor L, Martienssen RA. 2023. Chromatin remodeling of histone H3 variants underlies epigenetic inheritance of DNA methylation. *Cell*. 186(19): 4100-4116.e15. PMID: 37643610
5. Gao Y, He X, Wu XS, Huang Y, Toneyan S, **Ipsaro JJ**, Ha T, Koo PK, Egeblad M, Joshua-Tor L. 2023. ETV6 dependency in Ewing sarcoma by antagonism of EWS-FLI1-mediated enhancer activation. *Nat. Cell Biology*. 25(2):298-308. PMID: 36658219
6. Wu XS, Huang Y, **Ipsaro JJ**, He X, Preall JB, Ng D, Shue YT, Sage J, Egeblad M, Joshua-Tor L, and Vakoc CR. 2022. C11orf53/OCA-T is a tuft cell-specific coactivator of OCT11. *Nature*. 607(7917):169-175. PMCID: PMC9419707
7. **Ipsaro JJ**‡, Joshua-Tor L. Developmental Roles and Molecular Mechanisms of Asterix/Gtsf1. 2022. *WIREs RNA*. doi: 10.1002/wrna.1716. PMID: 35108755. ‡**Corresponding author**
8. **Ipsaro JJ**, O'Brien PA, Bhattacharya S, Palmer AG 3rd, Joshua-Tor L. 2021. Asterix/Gtsf1 links tRNAs and piRNA silencing of retrotransposons. *Cell Reports*. 34(13):108914. PMID: 33789107
9. Wilson JP*, **Ipsaro JJ***, Del Giudice SN, Turna NS, Gauss CM, Dusenbury KH, Marquart K, Rivera KD, Pappin DJ. 2020. Tryp-N: A Thermostable Protease for the Production of N-terminal Argininyl and Lysinyl Peptides. *J Proteome Res.* 19(4):1459-1469. PMCID: PMC7842235
10. Stein CB, Genzor P, Mitra S, Elchert AR, **Ipsaro JJ**, Benner L, Sobti S, Su Y, Hammell M, Joshua-Tor L, Haase AD. 2019. Decoding the 5' nucleotide bias of PIWI-interacting RNAs (piRNAs). *Nat. Commun*. 10(1):828. PMCID: PMC6381166

11. **Ipsaro JJ**, Shen C, Arai E, Xu Y, Kinney JB, Joshua-Tor L, Vakoc CR, Shi J. 2017. Rapid generation of drug-resistance alleles at endogenous loci using CRISPR-Cas9 indel mutagenesis. *PLoS One.* 12(2):e0172177. PMCID: PMC5322889
12. Shen C, **Ipsaro JJ**, Shi J, Milazzo JP, Wang E, Roe JS, Suzuki Y, Pappin DJ, Joshua-Tor L, Vakoc CR. 2015. NSD3-Short Is an Adaptor Protein that Couples BRD4 to the CHD8 Chromatin Remodeler. *Mol. Cell.* 60(6):847-59. *Selected for journal cover*. PMCID: PMC4688131
13. **Ipsaro JJ**, Joshua-Tor L. 2015. From guide to target: molecular insights into eukaryotic RNA-interference machinery. *Nat. Struct. Mol. Biol.* 22(1):20-8. PMCID: PMC4450863
14. **Ipsaro JJ***, Haase AD*, Knott SR, Joshua-Tor L, Hannon GJ. 2012. The structural biochemistry of Zucchini implicates it as a nuclease in piRNA biogenesis. *Nature*. 491(7423):279-83. PMCID: PMC3493678
15. Yasunaga M, **Ipsaro** JJ, Mondragón A. 2012. Structurally similar but functionally diverse ZU5 domains in human erythrocyte ankyrin. *J. Mol. Biol.* 417(4):336-50. PMCID: PMC3312341
16. Strauch RC, Mastarone DJ, Sukerkar PA, Song Y, **Ipsaro JJ**, Meade TJ. 2011. Reporter protein-targeted probes for magnetic resonance imaging. *J. Am. Chem. Soc.* 133(41):16346-9. PMCID: PMC3203639
17. **Ipsaro JJ**, Harper SL, Messick TE, Marmorstein R, Mondragón A, and Speicher DW. 2010. Crystal structure and functional interpretation of the erythrocyte spectrin tetramerization domain complex. *Blood*. 115(23):4843-52. *Selected for journal cover*. PMCID: PMC2890174
18. **Ipsaro JJ** and Mondragón A. 2010. Structural basis for spectrin recognition by ankyrin. *Blood*. 115(20):4093-101. *Selected for journal cover***.** PMCID: PMC2875089
19. **Ipsaro JJ**, Huang L, and Mondragón A. 2009. Structures of the spectrin-ankyrin interaction binding domains. *Blood*. 113(22):5385-93. PMCID: PMC2689041
20. **Ipsaro JJ***, Huang L*, Gutierrez L, and MacDonald RI. 2008. Molecular Epitopes of the Ankyrin-Spectrin Interaction. *Biochemistry*. 47(28):7452-64. PMCID: PMC3280509
21. Wuchty S, **Ipsaro JJ**. 2007. A draft of protein interactions in the malaria parasite *P. falciparum*. *J. Proteome Res.* 6(4):1461-70. PMID: 1730018

Patents

Pappin DJ, Wilson JP, **Ipsaro JJ**. 2017. Proteases for the production of N-terminal argininyl- and lysinyl-peptides and methods of use in protein analysis. U.S. Patent 9,719,078. Filed June 15, 2014 and issued August 01, 2017.

Organizations

2012-2015 Post-doc Liaison Committee, CSHL
Peer-elected group of post-docs chosen to facilitate interactions between post-docs and administrators.

2011-2014 Demystifying Science, founding member
Demystifying Science at CSHL was founded to allow post-docs could to improve their presentation skills while simultaneously educating the Laboratory support staff.

Other Skills

Languages: English (native), Spanish (professional working fluency), French (basic), Mandarin (beginner)
Hobbies: Web/graphic design, Swing dancing (instructor 2004-2018), Music (piano, winds), Sailboat racing