

Curriculum Vitae
Nataly P. Podolnikova, Ph.D.
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School of Life Sciences
Arizona State University
Tempe, AZ 85287-4501

Interdisciplinary Science and Technology Building -I
Office 422
Email: Nataly.Podolnikova@asu.edu

EDUCATION

1994-1998 B.S. in Biological Sciences, National University of "Kyiv-Mohyla Academy", Kyiv, Ukraine
1998-2000 M.S. in Biological Sciences, National University of "Kyiv-Mohyla Academy", Kyiv, Ukraine
2000-2004 Ph.D. in Biochemistry, the National Academy of Sciences, Kyiv, Ukraine

PROFESSIONAL APPOINTMENTS

1999-2000 Engineer, Institute of Biochemistry, the National Academy of Science of Ukraine, Kyiv
2000-2003 Graduate student, the National Academy of Science of Ukraine, Kyiv
2000-2004 Predoctoral Fellow, J. J. Jacobs Center for Thrombosis and Vascular Biology, Department of Molecular Cardiology, Cleveland Clinic Foundation, Cleveland, OH
2004-2006 Postdoctoral Fellow, J. J. Jacobs Center for Thrombosis and Vascular Biology, Department of Molecular Cardiology, Cleveland Clinic Foundation, Cleveland, OH
2006-present Assistant Research Professor, School of Life Sciences, College of Liberal Arts and Sciences, Arizona State University, AZ

INTELLECTUAL PROPERTY

September 13, 2021 Co-founder of start-up company MacOne Therapeutics,
Goal: Find a novel therapeutics that counteract bacterial immune evasion

November 9, 2021 Inventor in patent - Ugarova, T., Podolnikova, N., Methods of using platelet factor 4 as an antimicrobial agent, PCT Application No. PCT/US21/58654

PUBLICATIONS

1. **Podolnikova NP***, Lishko VK, Roberson R, Koh Z, Derkach, Richardson D, Sheller M, and Ugarova TP. Platelet factor 4 (PF4) improves survival in a murine model of antibiotic-susceptible and methicillin-resistant *Staphylococcus aureus* peritonitis. (under revision).#*
2. **Podolnikova NP**, Key S, Wang X. and Ugarova TP. The CIS association of CD47 with integrin Mac-1 regulates macrophage responses by stabilizing the extended integrin conformation. *J Biol Chem.* 2023 Apr; 294(4):103024 *
3. Balabiyev A, **Podolnikova NP**, Kilbourne JA, Baluch DP, Lowry D, Zare A, Ros R, Flick MJ, and Ugarova TP. Fibrin polymer on the surface of biomaterial implants drives the foreign body reaction. *Biomaterials.* 2021 Oct;277:121087
4. Feng W, Nguyen H, Shen D, Deng H, Jiang Z, **Podolnikova NP**, Ugarova TP, and Wang X. Structural characterization of the interaction between the α_M -domain of the integrin Mac-1 ($\alpha_M\beta_2$) and the cytokine pleiotrophin. *Biochemistry* 2021 Jan 26;60(3):182-193
5. Balabiyev A, **Podolnikova NP**, Mursalimov A, Lowry D, Newbern J, Roberson R and. Ugarova TP. Transition of podosomes into the zipper-like structures in macrophage-derived multinucleated giant cells. *Mol Biol Cell.* 2020 Jun 15;31(18):2002-2020 *

6. Cui K, **Podolnikova NP**, Bailey W, Szmuc E, Podrez EA., Byzova TV, Yakubenko VP. Inhibition of integrin $\alpha_D\beta_2$ -mediated macrophage adhesion to end product of docosahexaenoic acid (DHA) oxidation prevents macrophage accumulation during inflammation. *J Biol Chem.* 2019 Sep 27;294(39):14370-14382
7. Faust JJ, Balabiyev A, Heddleston JM, **Podolnikova NP**, Baluch DP, Chew TL, Ugarova TP. An actin-based protrusion originating from a podosome-enriched region initiates macrophage fusion. *Mol Biol Cell* 2019 Aug 1;30(17):2254-226 *
8. **Podolnikova NP**, Hlavackova M, Wu Y, Yakubenko VP, Faust J, Balabiyev A, Wang X, Ugarova TP. Interaction between the integrin Mac-1 and signal regulatory protein α (SIRP α) mediates fusion in heterologous cells. *J Biol Chem.* 2019 May 10;294(19):7833-7849 *
9. Cui K, Ardell CL, **Podolnikova NP**, Yakubenko VP, Distinct migratory properties of M1, M2, and resident macrophages are regulated by $\alpha_D\beta_2$ and $\alpha_M\beta_2$ integrin-mediated adhesion. *Front Immunol.* 2018 Nov 15;9:2650
10. Lishko VK, Yakubenko VP, Ugarova TP, **Podolnikova NP***. Leukocyte integrin Mac-1 (CD11b/CD18, $\alpha_M\beta_2$, CR3) acts as a functional receptor for platelet factor 4. *J. Biol. Chem.* 2018 May 4; 293(18):6869-6882. #
11. Shen D, **Podolnikova NP**, Yakubenko VP, Ardell CL, Balabiyev A, Ugarova TP, Wang X. Pleiotrophin, a multifunctional cytokine and growth factor, induces leukocyte responses through the integrin Mac-1. *J Biol Chem.* 2017 *
12. **Podolnikova NP**, Kushchayeva YS, Wu Y, Faust J, Ugarova TP. The Role of Integrins $\alpha_M\beta_2$ (Mac-1, CD11b/CD18) and $\alpha_D\beta_2$ (CD11d/CD18) in Macrophage Fusion. *Am J Pathol.* 2016 Aug;186(8):2105-16. PMID:27315778
13. Lishko VK, Moreno B, **Podolnikova NP**, Ugarova TP. Identification of human cathelicidin peptide LL-37 as a ligand for macrophage integrin $\alpha_M\beta_2$ (Mac-1, CD11b/CD18) that promotes phagocytosis by opsonizing bacteria. *Res Rep Biochem.* 2016 Jul 7;2016(6):39-55. PMID:27990411 *
14. Tsen SD, Kibler K, Jacobs B, Fay JC, **Podolnikova NP**, Ugarova TP, Achilefu S, Tsen KT. Selective photonic disinfection of cell culture using a visible ultrashort pulsed laser. *IEEE J Sel Top Quantum Electron.* 2016 May-Jun;22(3). PMID:27013847
15. **Podolnikova NP***, Brothwell JA, Ugarova TP. The opioid peptide dynorphin A induces leukocyte responses via integrin Mac-1 ($\alpha_M\beta_2$, CD11b/CD18). *Mol Pain.* 2015 Jun 3;11:33. PMID:26036990 *
16. **Podolnikova NP**, Podolnikov AV, Haas TA, Lishko VK, Ugarova TP. Ligand recognition specificity of leukocyte integrin $\alpha_M\beta_2$ (Mac-1, CD11b/CD18) and its functional consequences. *Biochemistry.* 2015 Feb 17;54(6):1408-20. PMID: 25613106.
17. Gorbatyuk V, Nguyen K, **Podolnikova NP**, Deshmukh L, Lin X, Ugarova TP, Vinogradova O. Skelemin association with $\alpha_{IIb}\beta_3$ integrin: a structural model. *Biochemistry.* 2014 Nov 4;53(43):6766-75. PMID: 25224262.
18. **Podolnikova NP***, Yakovlev S, Yakubenko VP, Wang X, Gorkun OV, Ugarova TP. The interaction of integrin $\alpha_{IIb}\beta_3$ with fibrin occurs through multiple binding sites in the α_{IIb} β -propeller domain. *J Biol Chem.* 2014 Jan 24;289(4):2371-83. PMID: 24338009
19. Yermolenko IS, Gorkun OV, Fuhrmann A, **Podolnikova NP**, Lishko VK, Oshkadyerov SP, Lord ST, Ros R, Ugarova TP. The assembly of nonadhesive fibrinogen matrices depends on the α_C regions of the fibrinogen molecule. *J Biol Chem.* 2012 Dec 7;287(50):41979-90. PMID: 23086938.
20. **Podolnikova NP**, Yermolenko IS, Fuhrmann A, Lishko VK, Magonov S, Bowen B, Enderlein J, Podolnikov AV, Ros R, Ugarova TP. Control of integrin $\alpha_{IIb}\beta_3$ outside-in signaling and platelet adhesion by sensing the physical properties of fibrin(ogen) substrates. *Biochemistry.* 2010 Jan 12;49(1):68-77. PMID: 19929007 *
21. **Podolnikova NP**, O'Toole TE, Haas TA, Lam SC, Fox JE, Ugarova TP. Adhesion-induced unclasp of cytoplasmic tails of integrin $\alpha_{IIb}\beta_3$. *Biochemistry.* 2009 Jan 27;48(3):617-29. PMID: 19117493
22. **Podolnikova NP**, Gorkun OV, Loreth RM, Yee VC, Lord ST, Ugarova TP. A cluster of basic amino acid residues in the g370-381 sequence of fibrinogen comprises a binding site for platelet integrin $\alpha_{IIb}\beta_3$ (glycoprotein IIb/IIIa). *Biochemistry.* 2005, 44(51):16920-16930. PMID: 16363805
23. Lishko VK, **Podolnikova NP**, Yakubenko VP, Yakovlev S, Medved L, Yadav SP, Ugarova TP. Multiple binding sites in fibrinogen for integrin $\alpha_M\beta_2$ (Mac-1). *J Biol Chem.* 2004 Oct 22;279(43):44897-906. PMID: 15304494

24. Ugarova TP, Lishko VK, **Podolnikova NP**, Okumura N, Merkulov SM, Yakubenko VP, Yee VC, Lord ST, Haas TA. Sequence gamma 377-395(P2), but not gamma 190-202(P1), is the binding site for the α_M I-domain of integrin $\alpha_M\beta_2$ in the gamma C-domain of fibrinogen. *Biochemistry*. 2003 Aug 12;42(31):9365-73. PMID: 12899623
25. **Podolnikova NP**, Yakubenko VP, Volkov GL, Plow EF, Ugarova TP. Identification of a novel binding site for platelet integrins $\alpha_{IIb}\beta_3$ (GPIIb/IIIa) and $\alpha_5\beta_1$ in the g C-domain of fibrinogen. *J Biol Chem*. 2003 Aug 22;278(34):32251-8. PMID: 12799374

* -corresponding author

¥ - publications with undergraduate and graduate students

- publications include data about the compound studied at MacOne Therapeutic

Selected Presentation on Conferences

1. **Podolnikova NP**, Roberson R, Ugarova TP. Platelet Factor 4 (PF4) clears *S. aureus* infection by enhancing Complement receptor 3 (CR3)-dependent phagocytosis by macrophages. Gordon Research Conference on Phagocytes, (2023) Waterville Valley in Waterville Valley, NH.
2. **Podolnikova NP**, Key S, Wang X, Ugarova TP. The *cis* association of CD47 with integrin Mac-1 regulates macrophage responses by stabilizing the extended integrin conformation. CellBio (2022) Washington, DC.
3. **Podolnikova NP**, Balabiyev A, Ugarova TP. The *Cis* Interaction of CD47 with Integrin Mac-1 ($\alpha_M\beta_2$, CD11b/CD18) Regulates Macrophage Responses ExpBio_FASEB (2021) volume 35 (S1).
4. Nguyen H, **Podolnikova NP**, Ugarova TP, Wang X. Structural Characterization of the Interaction between the α MI-Domain of the Integrin Mac-1 ($\alpha_M\beta_2$) and the Cytokine Pleiotrophin. Biophysics Conference (2021) Boston, MA.
5. Nguyen H, **Podolnikova NP**, Ugarova TP, Wang X. Structural Characterization of the Interaction between the α MI-Domain of the Integrin Mac-1 ($\alpha_M\beta_2$) and the Cytokine Pleiotrophin. ExpBio_FASEB (2021) volume 35 (S1).
6. Christenson W, **Podolnikova NP**, Lishko V, Ros R, and Ugarova T. Quantifying adhesion of platelets to fibrin(ogen) substrates using single cell force spectroscopy. International Fibrinogen workshop (2018), Winston-Salem,NC.
7. **Podolnikova NP**, Balabiyev A, Ugarova TP Association of CD47 with Integrin Mac-1 ($\alpha_M\beta_2$, CD11b/CD18) Regulates Macrophage Responses. *Blood* (2018) 132 (Supplement 1): 1109.
8. **Podolnikova NP**, Hlavackova M, Wu Y, Yakubenko V, Faust J, Balabiyev A, Ugarova Association of CD47 with integrin Mac-1 regulates macrophage responses. *Blood* (2017) 130 (Supplement 1): 1001.
9. **Podolnikova NP**, Yakubenko VP, Ugarova TP Platelet Factor 4 Induces Leukocyte Responses through Integrin Mac-1 (CD11b/CD18) *Blood* (2016) 128 (22): 2529.
10. **Podolnikova NP**, Lishko V, Haas T, Ugarova TP. Recognition Specificity of Leukocyte Integrin $\alpha_M\beta_2$ (Mac-1, CD11b/CD18) and its Functional Consequences. ExpBio_FASEB (2015) volume 29 (S1)
11. Lishko V, Moreno B, **Podolnikova NP**, Ugarova TP. Human Cathelicidin Peptide LL-37 Deposited on the Bacterial Surface Enhances Phagocytosis via Binding to Macrophage Integrin (Mac-1, CD11b/CD18) and Heparan Sulfate Proteoglycans (2015)
12. **Podolnikova NP**, Kyubeom O, Yermolenko I, Ugarova TP. An Altered Macrophage Migration In Adipose Tissue Of Integrin Mac-1 (CD11b/CD18) Deficient Mice *Blood* (2013) 122 (21): 1031.
13. **Podolnikova NP**, Yakubenko VP, Ugarova TP., Molecular Basis for Fibrin Binding by Platelet Integrin $\alpha_{IIb}\beta_3$, XXIII Congress of the International Society on Thrombosis and Haemostasis, (2011) Kyoto, Japan

RECOGNITIONS AND AWARDS

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| 2011 | U.S. New Investigator Travel Award on XXIII Congress of the International Society on Thrombosis and Haemostasis, Kyoto Japan |
| 2009 | Selected Poster at the Arteriosclerosis, Thrombosis, and Vascular Biology Early Career Networking Reception. A top-rated abstract at the AHA Scientific Sessions 2009 |
| 2004 | Young Investigator Travel Award on XVII th International Fibrinogen Workshop, Chapel Hill, NC |

Resume of Nataly P. Podolnikova

- 2002 Merit Award for Young Investigators, American Heart Association, 75th Scientific Sessions, Chicago
- 2002 Selected poster on Cleveland Clinic Foundation's 22nd Annual Research Day, Cleveland, OH
- 2000 Summa cum laude, National University of "Kyiv-Mohyla Academy", Kyiv, Ukraine

PROFESSIONAL MEMBERSHIPS

- 2002-present American Heart Association Professional Membership. Arteriosclerosis, Thrombosis, and Vascular Biology Scientific Council
- 2017-2020 American Society of Hematology

STUDENT SUPERVISION

Guidance of undergraduates and graduates in research.

2023-Present	Summer	James Flores
2023-Present	Spring	Romele Robe Marcial Rivera
2023	Spring Summer	Aayushi Parikh
2022-2023	Summer-Summer	Zhikian Koh *
2020-2021	Spring Summer	Tobechi Okuago
2018-2020	Spring Spring	Anton Voronov
2019	Fall	Valerie Oldenberg
2018-2019	Fall Spring	Seraphine Kamayirese
2018	Fall	Kery McKeever
2017	Summer/Fall	Britany Phelps
2017	Summer/Fall	Paige Mitchell
2016	Fall	Joshua Yeaman
2014-2015	Fall Spring	Afroza Nahid
2014	Summer	Trinity Vance
2014	Summer	Shizuka Barclay
2013	Fall	Allexander Ellingson
2012-2013	Fall Spring	Margarita Sadova
2010-2012	Fall Spring	Alexa Yantas
2012	Spring/Fall	Kamini Joshi
2011	Spring	Hadil Owaynat*
2010-2012	Spring Spring	Ali Zaidi
2009-2010	Fall Spring	Alvaro La Rosa
2009	Summer/Fall	Joseph Elashkar
2008-2009	Fall Summer	Julie Brothwell*
2008	Spring/Summer	Dhaval Gajjar
2009	Fall	Charles Pokora
2009	Spring	Daehan Kim

2009	Spring	Kendra Black
2008	Spring/Fall	Timothy Schmayer
2008	Fall	Benjamin Moreno*
2008	Spring	Ju Year Song
2007-2008	Spring Fall	Sharon Williams
2008	Spring	Emily Shortbridge
2007	Spring	Walla Al-Saed
2007	Spring/Fall	Victoria Vo
2007	Summer	Lilia Sen
2007-2008	Fall Spring	Jake Moon
2007	Spring	Amna Khan

Mentoring and training undergraduate students from **Barrett Honor College** in research and preparing of thesis for defense:

2021	Karina Lazo	Isolation of recombinant IgV-CD47 fragment to probe the interaction between CD47 and Mac-1 integrin
2019	Seraphine Kamayirese	Expression of the Fusogenic Protein Syncytin in Macrophages
2012	Alexa S. Yantas	The Association of Cytoplasmic Molecules with Integrin During Bidirectional Signaling
2010	Julia Brothwell	The Opioid Peptides Dynorphin A and Dynorphin B induce leukocyte responses via integrin Mac-1

Committee member:

2021 Aibek Mursalimov
2020 Kiko Rex
2018 Isaac Gamus
2017 Rahat Alam
2016 Wayne Christenson

SERVICE

2007-current Ad hoc peer reviewer for ~ 20 scientific journals: Frontiers in Immunology, Biochemistry, Current Medicinal Chemistry, Thrombosis and Haemostasis.
2022- current Faculty Advisor for The Ukrainian Association at ASU.

RESEARCH SUPPORT

01/01/2024-12/31/2028	Molecular basis for integrin Mac-1 (alpha M beta 2, CD11b/CD18)-CD47 interaction	R01,HHS: National Institutes of Health (NIH)	\$2,639,847	Pending
10/01/2023-09/30/2024	Novel Therapeutics to Treat Antibiotic-Resistant Infections	SBIR, National Institutes of Health (NIH)	\$273,896	Pending

Resume of Nataly P. Podolnikova

Completed

07/01/2008 - 6/30/2012	Molecular basis for fibrin binding by platelet integrin $\alpha_{IIb}\beta_3$	Scientist Development Grant from American Heart Association, National Center, 0835257N	\$308,000
07/01/2005 - 12/06/2006	Molecular Basis for Fibrin binding by platelet integrin $\alpha_{IIb}\beta_3$	Postdoctoral Fellowship from American Heart Association Southern and Ohio Valley Affiliate, 0525389B	\$86,000
07/01/2001 - 6/30/2003	Identification of a novel binding site for beta 1 Integrin(s) within gamma chain of fibrinogen	Predocotrual Fellowship from American Heart Association Southern and Ohio Valley Affiliate, 0110129B	\$34,000