Sergey A. Krupenko Ph.D.

Curriculum Vitae

WORK ADDRESS: University of North Carolina at Chapel Hill
Department of Nutrition
UNC Nutrition Research Institute
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CITIZENSHIP: United States (Naturalized)

EDUCATION

1980 **B.S.** (Biochemistry)
Byelorussian State University, Minsk, USSR. Thesis title: Effects of cholinolytics and cholinomimetics on metabolism of GABA in radiation exposed rats (Docent V. Chernoguzov, advisor)

1987 **Degree of Candidate of Science in Biochemistry** (equivalent to Ph.D.)
Institute of Bioorganic Chemistry Byelorussian Academy of Science, Minsk, USSR

Dissertation title: Quantitative radioimmunoassays of thyroid hormones in human samples (Prof. O. Strel'chyonok, advisor)

Postgraduate Education

1990 **Research Fellow in Molecular Biology**
Institute of Bioorganic Chemistry, USSR Academy of Science, Moscow USSR

FACULTY APPOINTMENTS

1987-1990 **Scientist**
Inst. Bioorganic Chemistry Byelorussian Academy of Science, Minsk, USSR

1990-1992 **Senior Scientist**
Inst. Bioorganic Chemistry Byelorussian Academy of Science, Minsk, USSR

1991 **Assistant Professor**
Dept. of Chemistry, Byelorussian State University, Minsk, USSR

1992-1993 **Visiting Scientist**
Center for Reproductive Biology Research, Vanderbilt University School of Medicine, Nashville, TN

1993-1994 **Research Associate**
Dept. Biochemistry, Vanderbilt University School of Medicine, Nashville, TN

1995-1997 **Research Instructor**
Dept. Biochemistry, Vanderbilt University School of Medicine, Nashville, TN

1997-1999 **Research Assistant Professor**
Dept. Biochemistry, Vanderbilt University School of Medicine, Nashville, TN

1999-2005 **Assistant Professor**
Department of Biochemistry & Molecular Biology, Medical University of South Carolina, Charleston, SC

2005-2009 **Associate Professor**
Department of Biochemistry & Molecular Biology, Medical University of South Carolina, Charleston, SC

2010-2014 **Professor**
Department of Biochemistry and Molecular Biology, Medical University of South Carolina, Charleston, SC

2014-Present **Professor**
Department of Nutrition, The University of North Carolina at Chapel Hill

HONORS

1987	Award in Bioorganic Chemistry for Young Scientists, Byelorussian Academic Science
1988	Award in Bioorganic Chemistry, Byelorussian Academic Science
1989	Award of USSR Committee in Discoveries and Patents
2002	The Health Science Foundation Developing Scholar Award
2004	Nomination for Faculty Excellence Award
2004	Nomination for MUSC Developing Teacher Award
2005	Nomination for Faculty Excellence Award
2006	Nomination for Faculty Excellence Award
2009	Teacher of the month, first year medical curriculum
2011	Teacher of the month, first year medical curriculum
2012	Teacher of the month, first year medical curriculum
2018	Nominated for Osborne & Mendel Award

SCIENTIFIC SOCIETIES

American Society for Biochemistry and Molecular Biology, Member

TEACHING EXPERIENCE

Undergraduate Courses

1990-1991 Bioorganic Chemistry, Byelorussian State University

Graduate Courses

2001-2013 Foundations in Biomedical Sciences (CGS 701), Medical University of South Carolina

2003-2014 Course Director, Molecular Basis of Apoptosis (BMB-702), Medical University of South Carolina

2008-2013 Topics in Cancer Research, Medical University of South Carolina

Medical Courses

2001-2009 Clinical Application of Biochemistry (BMB-610), Medical University of South Carolina

2001-2014 Molecular Basis of Medicine (BMB-610), Medical University of South Carolina

UNC Chapel Hill

2016-Present **Introduction to Nutritional Biochemistry NUTR400**, Instructor

2016 **Nutritional Metabolism, NUTR845**, Instructor

2017 **Nutrition and Cancer, NUTR868,** Course Co-Director

2017 **MS Comprehensive Examination**

2022 **Readings in Nutrition, NUTR 696,** Instructor

2023 **Nutritional Metabolism, NUTR845**, Instructor

MENTORING EXPERIENCE

Undergraduate/Pre-Doctoral Students

Julie Smart	2001	Undergraduate Summer Student	Mentor
Lindsey Young	2004	Undergraduate Summer Student	Mentor
Ella Zimmerly	2004	Undergraduate Summer Student	Mentor
Danielle Gordon	2005	Undergraduate Summer Student	Mentor
Justin B. Jones, BS	2006	Medical Student/ Summer Student	Mentor
Amanda Brock	2006	Undergraduate Summer Student	Mentor

Calvin Hu	2010	Summer Student	Mentor
Yuryi Malakhau, MS	2012-2015	Visiting Student	PI/Mentor
Ryan Mercer	2013	Medical Student/ Summer Student	Mentor
Chris Loe	2013	Summer Student	Mentor
Louisa Xue, BS	2014- 2015	Intern/Predoctoral	Mentor
Ali Tajkarimi	2015	Summer Student	Mentor
Michael Fennel	2017	Summer Student	Mentor
Kristen Duncan	2017	Summer Student	Mentor
Claire Gates, BS	2019-2020	Predoctoral	Mentor
Halle Fogle, BS	2021-present	Doctoral Student	Mentor
Neha Balakrishnan	2023	Undergraduate Summer Student	Mentor

Graduate Students

Steven N. Reuland	2000-2006	PhD Student	Mentor/Advisor
L. Alexis Hoeferlin	2006-2011	PhD Student	Mentor/Advisor
Kyle C. Strickland	2007-2011	MD/PhD Student	Mentor/Advisor
Evan Paules	2016-2018	PhD Student	Mentor/Advisor
Kaylee Helfrich	2016-2017	PhD Student	Mentor/Advisor
Halle Fogle	2021-present	PhD Student	Mentor/Advisor

Post-Doctoral Fellows

Alexander P. Vlasov, PhD	1998-2001	Postdoctoral Fellow	PI/Mentor

Natalia V. Oleinik, PhD	2000-2006	Postdoctoral Fellow	PI/Mentor
Alexander Chumanevich, PhD	2000-2003	Postdoctoral Fellow	PI/Mentor
Elena Fedorovich, PhD	2003-2004	Postdoctoral Fellow	PI/Mentor
Yaroslav Tsybovsky, PhD	2005-2008	Postdoctoral Fellow	PI/Mentor
Sampa Ghose, PhD	2005-2009	Postdoctoral Fellow	PI/Mentor
Marianne Dubard, MD	2009-2011	Postdoctoral Fellow	PI/Mentor
Suchandra Deb Roy, PhD	2008-2010	Postdoctoral Fellow	Co-Mentor
Inga Kramarenko, MD, PhD	2010-2012	Postdoctoral Fellow	Co-Mentor
Baharan Fekry, PhD	2011-2015	Postdoctoral Fellow	Co-Mentor
Prakasam Annamalai, PhD	2010-2014	Staff Scientist	PI/Mentor
Amin Esmaeilniakooshkghazi, PhD	2012-2015	Postdoctoral Fellow	PI/Mentor
Silvia Gutierrez, PhD	2015	Postdoctoral Fellow	PI/Mentor
Zahra Ashkavand, PhD	2015-2017	Postdoctoral Fellow	PI/Mentor
Candice Summitt, PhD	2015	Postdoctoral Fellow	PI/Mentor
Ting Li, PhD	2016	Research Scientist	PI/Mentor
Valentin Sereda, PhD	2016-2017	Postdoctoral Fellow	PI/Mentor
Qasim Khan, PhD	2016-2017	Research Scientist	PI/Mentor
Jaspreet Sharma, PhD	2017-2022	Postdoctoral Fellow	PI/Mentor
Yasir Mohammed Salim	2019-2020	Post-doctoral Fellow	PI/Mentor
Mikyoung You, PhD	2020-2022	Postdoctoral Fellow	PI/Mentor
Bryan Munoz, PhD	2022-present	Postdoctoral Fellow	PI/Mentor

Amira Abdellatef, PhD	2022-present	Postdoctoral Fellow	PI/Mentor

Faculty

Henry Donato, Jr., PhD	2003-2012	Visiting Faculty (Adjunct Professor)	PI/Mentor
Chiara Luberto, PhD	2008-2012	Mentored Faculty I (Assistant Professor)	Mentor
Natalia I. Krupenko, PhD	2000-2012	Mentored Faculty (Assistant Professor)	Mentor
Ashley Cowart, PhD	2012-2014	Mentored Faculty (Assistant Professor)	Mentor
Natalia V. Oleinik, PhD	2006-2014	Mentored Faculty (Res. Ass. Professor)	PI/Mentor
Delisha Stewart, PhD	2018-2022	Mentored Faculty (Ass. Professor)	Member, mentoring comm.
Wimal Pathmasiri, PhD	2018-2022	Mentored Faculty (Ass. Professor)	Member, mentoring comm.
Blake Rushing, Ph.D.	2020-Present	Mentored Faculty (Ass. Professor)	Member, mentoring comm.

STUDENT ADVISORY COMMITTEES

George Nicola, Ph.D. Student	2002-2005
Steven N. Reuland, Ph.D. student	2002-2006
Can E. Senkal, Ph.D. student	2006-2008
Arelis M. Salas, Ph.D. student	2009-2011
L. Alexis Hoeferlin, Ph.D. Student	2006-2011
Kyle C. Strickland, M.D. Ph.D. student	2007-2011
Rosanna M. Robertson, Ph.D. student	2008-2011
Graham Solomons, Ph.D. student	2009-2012
Wenhui Jiang, MS student	2013
Kaylee Helfrich, Ph.D. student	2016-2017
Emily L. Rossi, Ph.D. student	2015-2017
Evan Paules, Ph.D. student	2016-2018
Keri Barron, Ph.D. student	2017-2020
Melissa Orenduff, Ph.D. student	2018
Madeline Hall, Ph.D. student	2022-Present
Halle Fogle, Ph.D. student	2021-Present
Bingzhen Shang, PhD student	2022-Present
Matt Zimmerman, PhD student	2022-Present

RESEARCH GRANT SUPPORT

Current

04/01/19-03/31/25 Principal Investigator
"Regulation of mitochondrial function by folate enzyme ALDH1L2 in health and disease"
NIH/NIDDK R01 DK117854
Annual Direct Costs: $305,966
Total Costs: $2,378,885

Goal: understanding function and metabolic role of mitochondrial ALDH1L2 enzyme, abnormalities in which cause rare diseases.

08/01/21-07/31/26 Multi-PI (Krupenko, contact PI, Voruganti and Sumner)
"Mechanistic and metabolomic underpinnings of ALDH1L1 polymorphisms in the regulation of glycine metabolism"
NIH/NIDDK R01 DK126666
Annual Direct Costs: $435,915
Total Costs: $3,145,242
Goal: characterize haplotype-specific ALDH1L1 enzyme variants and their distinct roles in the regulation of glycine metabolism in humans.

08/01/23-07/31/24 Multi-PI (Krupenko, contact PI, Voruganti and Sumner)
"Mechanistic and metabolomic underpinnings of ALDH1L1 polymorphisms in the regulation of glycine metabolism"
NIH/NIDDK 3R01 DK126666-03S1
Annual Direct Costs: $158,000
Total Costs: $245,690
Goal: this supplement is for recruitment of a local cohort of pregnant women.

Completed

09/01/18 – 05/31/23 Co-Investigator (Styblo, Fry, MPIs)
"Developmental windows for arsenic-associated diabetes"
NIH/NIEHS R01 ES028721
Total Costs: $2,235,852
Goal: This project uses mice to characterize diabetic phenotypes associated with pre- and postnatal exposure to iAs and to identify the underlying mechanisms.

08/01/98-06/30/18 Principal Investigator
"Mechanism of Action of a Major Folate Enzyme"
NIH/NIDDK R01 DK54388-16
Annual Costs: $455,628
Total Direct Costs: 1,822,512
Goal: The broad objectives of this proposal are to understand the metabolic and regulatory role of one of the most abundant folate enzymes, FDH (ALDH1L1).

03/01/05-02/28/15 Principal Investigator
"FDH: A Novel Determinant of Tumor Suppression"
NIH/NCI R01 CA95030-06A1
Annual Direct Costs: $173,595
Total Direct Costs: $867,975
Goal: To characterize the novel tumor suppressor activity of a key metabolic enzyme and determine the mechanisms transforming metabolic effects into regulation of proliferation.

09/26/02-06/30/12 Co-Investigator on Core D 5% (PI: Christopher Davies, Ph.D.)
COBRE Center Director: Lina Obeid, M.D., Ph.D.)
"*COBRE in Lipidomics and Pathobiology: Core D – Protein Science"*
NIH/NCRR 5 P20 RR017677-07
Annual Direct Costs: $88,493
Total Direct Costs: $1,470,000
Goal: Program focuses on mentoring several junior investigators to establish independent research programs on the role of bioactivelipids in pathobiology including projects focused on cancer, neurodegeneration and angiogenesis.

02/08/10-02/07/11 Principal Investigator
"Mechanisms of Action of a Major Folate Enzyme"
NIH/NIDDK R01 DK54388-12S1 (ARRA Funds)
Total Direct Costs: $96,518
Goal: The broad objectives of this proposal are to understand the metabolic role of one of the most abundant folate enzymes, FDH. FDH converts 10-formyltetrahydrofolate (10-fTHF) to tetrahydrofolate in an NADP-dependent dehydrogenase reaction or in an NADP-independent hydrolase reaction.

06/01/02-05/31/03 Principal Investigator
"A Novel Target Mediating Cytotoxicity of Antifolates"
DoD Phase IV Grant (MUSC Hollings Cancer Grant)
Total Direct Costs: $25,000
Goal: (1) Compare potency of FDH overexpression vs. antifolates in induction of cytotoxicity. (2) Elucidate whether FDH overexpression and antifolates induce the same apoptotic pathways. (3) Elucidate whether elevated FDH enhances cytotoxic effects of antifolates.

01/01/00-07/01/01 Principal Investigator (Subcontract)
"Tissue Stores of Folate, Dietary Control and Assay"
NIH/NIDDK 4 R37 DK15289-25
Total Direct Costs: $46,371
Goal: To determine properties of a major enzyme of liver, glycine N methyltransferase (GNMT).

04/01/00-12/31/01 Principal Investigator
"Structure/Function Study of the Intermediate Domain of 10 Formyltetrahydrofolate"
MUSC Research Council Grant
Total Direct Costs: $ 25,000
Goal: The goal of this proposal was to to characterize the folate-binding site and to evaluate the hydrolase mechanism of FDH.

01/01/01-12/31/01 Principal Investigator
"10-Formyltetrahydrofolate Dehydrogenase: A Potential Target for Anticancer Therapy"
R00-M12 South Carolina Commission on Higher Education Research Initiative Grant
Total Direct Costs: $104,365
Goal: The overall goal of this proposal was to exploit 10-formyltetrahydrofolate dehydrogenase as a new target in cancer chemotherapy.

MAJOR COMMITTEE ASSIGNMENTS

National Institute of Health Study Sections

2005-2007 Ad hoc reviewer, Cancer Etiology Study Section NIH
2007-2010 Member, Cancer Etiology Study Section NIH
2009 Ad hoc reviewer, ZRG1 OBT-M Study Section, NIH
2011 Ad hoc reviewer, ZGM1, BRT-X Study Section, NIH
2012 Ad hoc reviewer, ZCA1, SRLB-9 (M1) R Study Section, NIH
2012 Ad hoc reviewer, ZCA1, SRLB-D Study Section, NIH
2019 Ad hoc reviewer, INMP Study Section, NIH
2020 Ad hoc reviewer, INMP Study Section, NIH
2021 Ad hoc reviewer, NMHD Study Section, NIH
2023 Ad hoc reviewer, NMHD Study Section, NIH

University Committees

2011-2014 Faculty Senate
Member, Medical University of South Carolina
2000-2012 Advanced Curriculum Committee
Member, Medical University of South Carolina
2001-2014 Distinguished Graduate Student Award Committee
Member, Medical University of South Carolina
2015-2020 IACUC-DHMRI, Member
2020-present IACUC-DHMRI, Chair

Departmental Committees

2000-2011 Biochemistry Graduate Committee
Member, Medical University of South Carolina

2000-2014 Biochemistry Seminar Committee
Member, Medical University of South Carolina

2006-2014 APT Committee, Department of Biochemistry & Molecular Biology
Member, Medical University of South Carolina

2011-2012 APT Committee, Division of Basic Sciences
Member, Medical University of South Carolina

2015 Faculty Search Committee, Member NRI UNC-CH

2016-2019 Curriculum Committee Member, Department of Nutrition, UNC-CH

2019-Present BSPH/MS Program Committee Member, Department of Nutrition, UNC-CH

EDITORIAL

2013-Present Editorial Board Member, *The Journal of Biological Chemistry*

PATENTS

1. Radioimmunoassay kit for quantitative analysis of thyroxin in human serum (USSR).
2. Radioimmunoassay kit for quantitative analysis of triiodothyronine in human serum (USSR).
3. Radioimmunoassay kit for quantitative analysis of progesterone in cow milk (USSR).
4. Rapid method for evaluation of degradation of radiolabeled steroid and thyroid hormones (USSR).

BIBLIOGRAPHY

Peer-Reviewed Publications

1. **Krupenko, S.A.**, Babinina, N.D., Sviridov, O.V., and Strel'chyonok, O.A (1986) Radioimmunological system for quantitative analysis of thyroxin in human serum (in Russian). *Antibiotics and Medical Biotechnology* (USSR) 31, 31-37.
2. **Krupenko, S.A.**, Derkach, T.A., Sviridov, O.V., and Strel'chyonok, O.A. (1986) Radioimmunological system for quantitative analysis of triiodothyronine in human serum (in Russian). *Medical Radiology* (USSR) 31, 56-60.
3. Avvakumov, G.V., **Krupenko, S.A.**, Dubovskaya, L.V., and Strel'chyonok, O.A. (1988) Interaction of the transcortin-progesterone complex with plasma membrane of human decidual endometrium cells (in Russian). *Biochemistry* (USSR) 53, 586-590.
4. Avvakumov, G.V., **Krupenko, S.A.**, and Strel'chyonok, O.A. (1989) Characterization of the transcortin-binding component of human decidual endometrium plasma membrane (in Russian) *Biochemistry* (USSR) 54,1373-1378.
5. Avvakumov, G.V., **Krupenko, S.A.**, and Strel'chyonok, O.A. (1989) Study of the transcortin binding to human endometrium plasma membrane. *Biochim. Biophys. Acta* 984, 143-150.
6. **Krupenko, S.A.**, and Dubovskaya, L.V. (1990) Study of transcortin receptor with the use affinity chromatography (in Russian). *Reports of Byelorussian Acad. Sci.* (USSR) 4, 121.
7. Vrubel, S.V., Avvakumov, G.V., and **Krupenko, S.A.** (1990) The levels of transcortin and its pregnancy associated molecular variant in women in postpartum period (in Russian). *Problems of Endocrinology* (USSR).
8. **Krupenko, S.A.**, Avvakumov, G.V., and Strel'chyonok, O.A. (1991) On the functional form of transcortin-recognition subunits of transcortin membrane receptor. *FEBS Lett.* 281, 152-154.
9. **Krupenko,** S.A., Avvakumov, G.V., and Strel'chyonok, O.A. (1991) A transcortin-binding protein in the plasma membrane of human syncytiotrophoblast. *Biochem. Biophys. Res. Commun.* 177, 834-839.
10. **Krupenko, S.A.**, and Strel'chyonok, O.A. (1992) Testosterone destroys the transcortin-receptor complex. *Biochem. Biophys. Res. Commun.* 184, 491-497.
11. **Krupenko, S.A.**, Krupenko, N.I., and Danzo, B.J. (1994) Interaction of sex hormone-binding globulin with plasma membranes from the rat epididymis and other tissues. *J.*

Steroid Biochem. Mol.Biol. 51, 115-124.

12. **Krupenko, S.A.**, Kolesnik, O.I., Krupenko, N.I., and Strel'chyonok, O.A. (1995) Organization of the transcortin-binding domain on placental plasma membranes. *Biochim. Biophys. Acta* 1235, 387-394.
13. **Krupenko, S.A.**, Wagner, C., Cook, R.J. (1995) Recombinant 10-formyltetrahydro- folate dehydrogenase catalyses both dehydrogenase and hydrolase reactions utilizing the synthetic substrate 10-formyl-5,8-dideazafolate. *Biochem. J.* 306, 651-655.
14. **Krupenko, S.A.**, Wagner, C., Cook, R.J. (1995) Cystein 707 is involved in the dehydrogenase active site of rat 10-formyltetrahydrofolate dehydrogenase. *J. Biol. Chem.* 270, 519-522.
15. **Krupenko, S.A.**, Horstman, D.A., Wagner, C., and Cook, R.J. (1995) Baculovirus expression and purification of rat 10-formyltetrahydrofolate dehydrogenase. *Protein Expression and Purification* 6,457-464
16. **Krupenko, S.A.**, Wagner, C., and Cook, R.J. (1997) Domain structure of rat 10-formyltetrahydrofolate dehydrogenase. *J. Biol. Chem.* 272, 10273-10278
17. **Krupenko, S.A.**, Wagner, C., and Cook, R.J. (1997) Expression, purification and property of the aldehyde dehydrogenase homologous carboxyl-terminal domain of rat 10-formyltetrahydro-folate dehydrogenase. *J. Biol. Chem.* 272, 10266-10272
18. **Krupenko, S.A.**, and Wagner, C. (1998) Overexpression of functional hydrolase domain of 10- formyltetrahydrofolate dehydrogenase in E. coli. *Protein Expression and Purification* **14**, 146-152
19. **Krupenko, S.A.**, and Wagner, C. (1999) Aspartate 142 is involved in both hydrolase and dehydrogenase catalytic centers of 10-formyltetrahydrofolate dehydrogenase. *J. Biol.Chem.* **274**,35777-35784
20. **Krupenko, S.A.**, Vlasov, A.P., and Wagner, C. (2001) On the role of histidine 106 in the catalytic mechanism of 10-formyltetrahydrofolate dehydrogenase. *J. Biol. Chem.* **276** 24030-24037
21. **Krupenko, S.A.**, and Oleinik, N.V. (2002) FDH, one of the major folate enzymes, is down-regulated in tumor tissues and possesses suppressor effect on cancer cells. *Cell Growth Diff.* **13**, 227-236
22. Chumanevich, A.A., Davies, C., and **Krupenko, S.A.** (2002) Crystallization and preliminary X-ray diffraction analysis of recombinant hydrolase domain of 10-formyltetrahydrofolate dehydrogenase. *Acta Cryst.* **D58**, 1841-1842
23. Reuland, S.N., Vlasov, A.P., and **Krupenko, S.A.** (2003) Disruption of a calmodulin central helix like region of FDH impairs its dehydrogenase activity by uncoupling the functional domains. *J. Biol. Chem.*, **278**, 22894-2290
24. Oleinik, N.V., and **Krupenko, S.A.** (2003) Ectopic expression of FDH in A549 cells induces G1 cell cycle arrest and apoptosis. *Mol. Cancer Res.* **1**, 577-588
25. Chumanevich, A.A., **Krupenko, S.A.,** and Davies, C. (2004) The crystal structure of the hydrolase domain of 10-formyltetrahydrofolate dehydrogenase: mechanism of hydrolysisand its interplay with the dehydrogenase domain. *J. Biol. Chem.*, **279**, 14355-14364
26. Oleinik, N.V., Krupenko, N.I., Priest, D.G., and **Krupenko, S.A.** (2005) Cancer cells activate p53 in response to FDH expression. *Biochem. J.*, **391**, 503-511
27. Chattopadhyay, S., Zhao, R., **Krupenko, S.A.,** Krupenko, N.I., and Goldman, I.D. (2006) Augmentation of permetrexed activity with the loss of reduced folate carrier function in a human colon cancer cell line. *Mol. Cancer Ther.*, **5**, 438-449
28. Reuland, S.N., Vlasov, A.P., and **Krupenko, S.A.** (2006) Modular organization of FDH: exploring the basis of hydrolase catalysis. *Protein Science* **15**, 1076-1084.
29. Oleinik, N.V., Krupenko, N.I., Reuland, S.N., and **Krupenko, S.A.** (2006) DHFR up-regulation causes acquired resistance against FDH growth suppressor effects. *Biochem. Pharmacol*., **72**, 256-266
30. Santos, M.A., Enyedy, E.A., Rossello, Carelli, A.P., Krupenko, N.I., and **Krupenko, S.A.** (2007) Hydroxamate derivatives of folic acid and methotrexate as potential dual

antitumour drugs for chemotherapy *Bioorg. Med. Chem.* **15**, 1266-1274

31. Tsybovsky, Y., Donato, H., Krupenko, N.I., Davies, C., and **Krupenko, S.A.** (2007) Crystal structure of the carboxyl terminal domain of 10-formyltetrahydrofolate dehydrogenase: implications for the catalytic mechanism of aldehyde dehydrogenases. *Biochemistry* **46,** 2917-2929
32. Elmore C.L.,Wu X., LeClerc D., Wats-on E.D., Bottiglieri T., Krupenko N.I., **Krupenko S.A.**, Cross J.C., Rozen, R., Gravel, R.A., Matthews, R.G. (2007) Mice deficient in methionine synthase reductase exhibit hyperhomocysteinemia and hypomethioninemia with normal to high ratios of *S*adenosylmethionine to *S*-adenosylhomocysteine and methyltetrahydrofolate trapping *Mol. Genet. Metab.* 91, 85-97
33. Oleinik, N.V., Krupenko, N.I. and **Krupenko, S.A.** (2007) Cooperation between Jun kinase 1 and 2 in activation of p53 apoptotic pathway. *Oncogene* 26, 7222-7230
34. Oleinik, N.V., Krupenko, N.I., and **Krupenko, S.A.** (2007) Tumor Suppressor Effects of 10- Formyltetrahydrofolate Dehydrogenase. *In:* Chemistry and Biology of Pteridines and Folates (Jansen, G. and Peters, G.J., eds.) *SPS Publications, Heilbronn,* 423-431
35. Donato H., Krupenko N.I., Tsybovsky Y. and **Krupenko S.A.** (2007) 10-Formyltetrahydrofolate dehydrogenase requires 4'-phosphopantetheine prosthetic group for catalysis. *J. Biol. Chem.* 282, 34159-34166
36. Cahoy, J.D., Emery, B., Kaushal,A., Foo, L.C., Zamanian, J.L., Christopherson, K.S., Xing, Y.,Lubischer, J.L., Krieg, P., **Krupenko, S.A.**, Thompson, W.J., Barres, B.A. (2008) A Transcriptome Database for Astrocytes, Neurons, and Oligodendrocytes: A New Resource for Understanding Brain Development and Function. *J. Neurosci.* 28, 264-278
37. Celtikci B., Leclerc D., Lawrance A.K., Deng L., Friedman H.C., Krupenko N.I., **Krupenko S.A.,** Melnyk S., James S.J., Peterson A.C. and Rozen R. (2008) Altered expression of methylenetetrahydrofolate reductase modifies response to methotrexate in mice. *Pharmacogenetics and Genomics* 18, 577-589
38. Ghose S., Oleinik N.V., Krupenko N.I. and **Krupenko S.A.** (2009) FDH-induced JNK pathways diverge at the JNK substrate level in cells with different p53 status *Mol. Cancer Res.* 7, 99-107.
39. **Krupenko, S.A.** (2009) FDH: An aldehyde dehydrogenase fusion enzyme in folate metabolism.*Chem. Biol. Interact.* 178, 84-93
40. Strickland, K.C., Hoeferlin, L.A., Oleinik, N.V., Krupenko, N.I., and **Krupenko, S.A.** (2010) Acyl carrier protein-specific 4'-phosphopantetheinyl transferase activates 10-formyltetrahydrofolate dehydrogenase. *J. Biol. Chem.* 285, 1627-1633
41. Krupenko, N.I., Dubard, M.E., Strickland, K.C., Moxley, K.M., Oleinik, N.V., and **Krupenko, S.A.** (2010) ALDH1L2 is the mitochondrial homolog of 10-formyltetrahydrofolate dehydrogenase. *J. Biol.Chem.* 285, 23056-23063
42. Oleinik N.V., Krupenko N.I., and **Krupenko S.A.** (2010) ALDH1L1 inhibits cell motility via dephosphorylation of cofilin by PP1 and PP2A. *Oncogene* 29, 6233-6244
43. Marques S. M., Enyedy E. A., Supuran C. T., Krupenko N. I., **Krupenko S. A.** and Santos, M. A. (2010) Pteridine-sulfonamide conjugates as dual inhibitors of carbonic anhydrases and dihydrofolate reductase with potential antitumor activity. *Bioorg Med Chem*. 18, 5081-5089
44. Oleinik N.V., Krupenko N.I. and **Krupenko S.A.** (2011) Epigenetic Silencing of ALDH1L1, a Metabolic Regulator of Cellular Proliferation, in Cancers. *Genes & Cancer* 2, 130-139.
45. Tsybovsky Y. and **Krupenko S.A.** (2011) Conserved catalytic residues of the ALDH1L1 aldehyde dehydrogenase domain control binding and discharging of the coenzyme. *J. Biol. Chem.* 286, 23357-23367
46. Strickland K.C., Krupenko NI, Dubard M.E., Hu, C.J., Tsybovsky Y, **Krupenko S.A.** (2011) Enzymatic properties of ALDH1L2, a mitochondrial 10-formyltetrahydrofolate dehydrogenase. *Chem Biol Interact*. 191, 129-136
47. Strickland K.C., Holmes R.S., Oleinik N.V., Krupenko N.I. and **Krupenko S.A.** (2011) Phylogeny and evolution of aldehyde dehydrogenase-homologous folate enzymes. *Chem Biol Interact*. 191, 122-128.

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Mice Exposed to Inorganic Arsenic: The Role of Dietary Fat and Folate Intake. *Env. Health Persp*. Published:6 December 2018; CID: 127003

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66. **Krupenko S.A.** and Horita D.A. (2019) The role of single nucleotide polymorphisms in the function of candidate tumor suppressor ALDH1L1 *Front. Genet.* 10:1013 PMID: 31737034 PMCID: PMC6831610 DOI: 10.3389/fgene.2019.01013
67. Krupenko NI, Sharma J, Pediaditakis P, Fekry B, Helke KL, Du X, Sumner S, **Krupenko SA**. (2019) Cytosolic 10-formyltetrahydrofolate dehydrogenase regulates glycine metabolism in mouse liver. *Sci Rep.* Oct 17;9(1):14937. PMCID: PMC6797707
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70. Sharma J, **Krupenko SA.** (2020) Folate pathways mediating the effects of ethanol in tumorigenesis. *Chem. Bio. Int.* 173:114-122 PMID: 32283069 PMCID: PMC7232643
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74. Krupenko NI, Sharma J, Fogle HM, Pediaditakis P, Strickland KC, Du X, Helke KL, Sumner S, **Krupenko SA.** (2021) Knockout of Putative Tumor Suppressor Aldh1l1 in Mice Reprograms Metabolism to Accelerate Growth of Tumors in a Diethylnitrosamine (DEN) Model of Liver Carcinogenesis. *Cancers* (Basel) 13(13):3219. doi: 10.3390/cancers13133219.
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76. **Krupenko SA,** Cole SA, Hou R, Haack K, Laston S, Mehta NR, Comuzzie AG, Butte NF, Voruganti VS. (2022) Genetic variants in ALDH1L1 and GLDC influence serine to glycine ratio in Hispanic children. *Am J Clin Nutr*. Apr 23; nqac091. doi: 10.1093/ajcn/nqac091 Online ahead of print
77. Sharma J, Rushing BR, Hall M.S, Helke KL, McRitchie SL, Krupenko NI, Sumner SJ, **Krupenko SA.** (2022) Sex-Specific Metabolic Effects of Dietary Folate Withdrawal in Wild-Type and Aldh1l1 Knockout Mice. *Metabolites*, 12:454. doi: 10.3390/metabo12050454.
78. Rushing BR, Fogle HM, Sharma J, You M, McCormac JP, Molina S, Sumner SJ, Krupenko NI, **Krupenko SA.** (2022) Exploratory Metabolomics Underscores the Folate Enzyme ALDH1L1 as a Regulator of Glycine and Methylation Reactions. *Molecules*, 1;27(23):8394 doi: 10.3390/molecules27238394.
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Schrader J, Weber APM, **Krupenko SA**, Lammert E. (2023) Pancreatic islet protection at the expense of secretory function involves serine-linked mitochondrial one-carbon metabolism. *Cell Rep* 42(6):112615. doi: 10.1016/j.celrep.2023.112615

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81. You M, Shamseldin HE, *Fogle HM, Rushing BR, AlMalki RH, Jaafar A, Hashem M, Abdulwahab F, Abdel Rahman AM, Krupenko NI, Alkuraya FS, **Krupenko SA.** (2024) Further delineation of the phenotypic and metabolomic profile of ALDH1L2-related neurodevelopmental disorder. *Clin Gen* 105(5):488-498. doi: 10.1111/cge.14479.

INVITED SPEAKER

1988 Third International Conference on Bioorganic Chemistry, Puschino, USSR: “Study of the transcortin binding to human endometrium plasma membrane”

1989 Fourth International Conference on Bioorganic Chemistry, Prague, Czech Republic: “A transcortin-binding protein in the plasma membrane of human syncytiotrophoblast”

1990 Fifth International Conference on Bioorganic Chemistry, Riga, Latvia: “The functional form of transcortin-recognition subunits of the transcortin membrane receptor”

1997 NIH-NCI, Fredrick, MD: “Structure and catalytic mechanism of 10-formyltetrahydrofolate dehydrogenase, a major folate enzyme”

1998 Department of Chemistry and Biochemistry, University of Texas, Arlington, TX: “Structure/function studies of 10-formyltetrahydrofolate dehydrogenase”

1998 Program for Clinical Nutrition Research Unit, Vanderbilt University, Nashville, TN: "Study of the folate binding site of 10-formyltetrahydrofolate dehydrogenase"

1999 Department of Biochemistry, Thomas Jefferson University, Philadelphia, PA: “Structure Functional studies of 10-formyltetrahydrofolate dehydrogenase, a major folate enzyme”

1999 Seminar at the University of New Mexico, Albuquerque, NM: “Structure-functional studies of 10 formyltetrahydrofolate dehydrogenase”

1999 Department of Biochemistry, St. Louis University, St. Louis, MO: “Structure-functional studies of 10-formyltetrahydrofolate dehydrogenase”

1999 Department of Biochemistry and Molecular Biology, Medical University of South Carolina, Charleston, SC: “Structure/function studies of 10-formyltetrahydrofolate dehydrogenase”

1999 Department of Biochemistry, Vanderbilt University School of Medicine: “Mechanism of action of a major folate enzyme”

2000 FASEB Summer Research Conferences, Snowmass Village, CO: “Structure/function studies of 10-formyltetrahydrofolate dehydrogenase”

2000 MCBP seminar series, Medical University of South Carolina, Charleston, SC: “Structure/function studies of 10-formyltetrahydrofolatedehydrogenase”

2001 12th International Symposium Chemistry and Biology Pteridines and Folates, Bethesda, MD: “FDH, one of the major folate enzymes, is down-regulated in tumor tissues and possesses suppressor effect on cancer cells”

2003 Developing Scholars Seminar, MCBP, Medical University of South Carolina, Charleston, SC: “10-Formyltetrahydrofolate Dehydrogenase: Structure, Function and Its Role in Cellular Proliferation”

2004 Seminar at the Department of Chemistry and Biochemistry, College of Charleston, Charleston, SC: “The role of folate and folate enzymes in cellular function”

2004 Joined 9th World Congress on Advances in Oncology and the 7th International Symposium on Molecular Medicine, Crete, Greece: “Tumor suppressor activity of FDH, a folate metabolizing enzyme”

2005 13th International Symposium Chemistry and Biology Pteridines and Folates Egmond aan Zee, the Netherlands: “Tumor Suppressor Effects of 10-Formyltetrahydrofolate Dehydrogenase”

2006 University of Maryland Biotechnology Institute/NIST, Rockville, MD: “Deciphering a major folate enzyme at molecular and cellular levels: from a unique catalytic mechanismto a tumor suppressor activity”

2007 Department of Cell and Molecular Pharmacology, MUSC, Charleston, SC: “Deciphering a major folate Enzyme at molecular and cellular levels: from a unique catalytic mechanism to a tumor-suppressor activity”

2007 University of California, Davis, CA: “Two faces of a major folate enzyme: a metabolic regulator moonlighting as a tumor suppressor”

2008 Hollings Cancer Center, Medical University of South Carolina, Charleston, SC: “Two faces of a major folate enzyme: a metabolic Regulator moonlighting as a tumor suppressor”

2008 14th international symposium Enzymology and Molecular Biology of Carbonyl Metabolism, Kranjska Gora, Slovenia: “FDH: an Aldehyde Dehydrogenase Fusion Enzyme in Folate Metabolism”

2008 FASEB Summer Research Conferences, Il Ciocco, Lucca, Italy: “10-Formyltetrahydrofolate dehydrogenase: a metabolic regulator moonlighting as a tumor suppressor?”

2008 The Cancer Institute of New Jersey, Newark, NJ: “10-Formyltetrahydrofolate dehydrogenase: a metabolic regulator moonlighting as a tumor suppressor?”

2009 Cancer genes and molecular regulation seminar program, Hollings Cancer Center, Medical University of South Carolina, Charleston, SC: “Folate-dependent mechanisms in the control of proliferation and motility”

2010 Department of Environment Medicine, New York University, NY, NY: “Folate pathways in cancer cell fate:control of proliferation and motility”

2010 15th International Symposium Enzymology and Molecular Biology of Carbonyl Metabolism, Lexington, KY: “Aldehyde Dehydrogenase Homologous Folate Enzymes”

2010 FASEB Summer Research Conferences, Carefree, AZ: “Folate regulates actin dynamics and cell motility via dephosphorylation of cofilin”

2010 Department of Pharmacology, University of Pennsylvania, Philadelphia, PA: “Formyltetrahydrofolate dehydrogenase: role in regulation of folate metabolism, proliferation and motility”

2010 Cancer genes and molecular regulation retreat, Hollings Cancer Center, MUSC, Charleston, SC: “Motility control by folate pathways”

2011 8th International Conference on Homocysteine Metabolism, Lisbon, Portugal: “Epigenetic silencing of ALDH1L1, a metabolic regulator of cellular proliferation, in cancers”

2011 Department of Biochemistry, University of Kentucky, Lexington, KY: “Role of ALDH1L1 in folate metabolism, proliferation and motility”

2012 Advances and Controversies in B-Vitamins and Choline, Leipzig, Germany: “Folate-dependent regulation of cellular motility”

2012 School of Biomedicine, University of Manchester, Manchester, UK: “The metabolic role of ALDH1L1”

2012 University of North Carolina-NRI, Kannapolis, NC: “Folate regulatory enzymes and cancer”

2012 16th International Symposium Enzymology and Molecular Biology of Carbonyl Metabolism, Ploen, Germany: “Unusual mode of coenzyme binding in the carboxy-terminal domain of Aldh1L1”

2012 FASEB Summer Research Conferences, Crete, Greece: “Mitochondrial Folate Metabolism”

2012 Department of Chemistry and Biochemistry, University of Texas at Austin, Austin, TX: “Formyltetrahydrofolate dehydrogenase: structure, catalytic mechanism and role in regulation of metabolism, proliferation and motility”

2014 17th International Workshop Enzymology and Molecular Biology of Carbonyl Metabolism, Skytop Lodge, Poconos, PA: “Aldehyde Dehydrogenase Homologous Folate Enzymes”

2015 3rd Alcohol and Cancer Conference, Aldemar Knossos Royal Village, Crete Greece: “ALDH1L1 and ALDH1L2 Folate Regulatory Enzymes in Cancer”

2016 Science Cafe, UNC-CH: “Dietary folate: neural tube defects and beyond”.

2016 18th International Workshop on the Enzymology and Molecular Biology of Carbonyl Metabolism, July 12-17, 2016 - Hotel Eden Roc, Sant Feliu de Guíxols (Girona), Spain: "Regulation of Aldh1l1 folate enzyme in NIH 3T3 cells"

2016 FASEB Summer Research Conferences Folic Acid, Vitamin B12 and One-Carbon Metabolism, August 7-11, Steamboat Springs, CO: "Metabolic reprograming of mammary cancer cells by folate starvation"

2017 Workshop on a patient with Sjogren-Larsson-like syndrome, Hospital Robert Debré, Paris, France, March 13-15: " Role of ALDH1L2 enzyme and phenotype of the Aldh1l2 KO mouse"

2017 11th International Conference on Homocysteine and One-Carbon Metabolism, Aarhus, Denmark, May 13-19: "Proteasomal degradation of ALDH1L1 during the transition from G0/G1 to S-phase"

2018 19th International Carbonyl Conference, July 17-22, 2018 - Breckenridge, CO: "Role of ALDH1L1 folate enzyme in cancer "

2019 4th Alcohol and Cancer Conference, April 14-18, Newport, RI: Folate pathways in mediating the effects of alcohol on cancer

2019 12th International Conference on One-Carbon Metabolism, B Vitamins and Homocysteine, June 9-13, Tarragona, Southern Catalonia, Spain: Folate-dependent molecular mechanisms and metabolic disorders

2020 FASEB Summer Research Conferences Folic Acid, Vitamin B12 and One-Carbon Metabolism, Virtual Conference, August 17-19: Metabolic sensors of dietary folate in the regulation of malignant tumors and metastasis

2022 FASEB Summer Research Conferences Folic Acid, Vitamin B12 and One-Carbon Metabolism Conference, August 14-19, Ashville, NC: Structure and function of putative tumor suppressor ALDH1L1

ABSTRACT PRESENTATIONS

2023

Abdellatef A, **Krupenko S.** Lentivirus-induced ALDH1L1 knock-in inhibits proliferation and migration and activates apoptosis of human A549 lung adenocarcinoma cells [abstract]. In: Proceedings of the AACR-NCI-EORTC Virtual International Conference on Molecular Targets and Cancer Therapeutics; 2023 Oct 11-15; Boston, MA. Philadelphia (PA): AACR; Mol Cancer Ther 2023;22(12 Suppl): Abstract nr LB_B03.

*****Fogle HM, You M, Sharma J, McCormac J, Krupenko N, **Krupenko S.** Loss of folate enzyme ALDH1L1 promotes cancer cell proliferation and xenograft tumor growth [abstract]. In: Proceedings of the AACR-NCI-EORTC Virtual International Conference on Molecular Targets and Cancer Therapeutics; 2023 Oct 11-15; Boston, MA. Philadelphia (PA): AACR; Mol Cancer Ther 2023;22(12 Suppl):Abstract nr LB_B09.

You M, Sharma J, *****Fogle H, McCormac J, Krupenko N, **Krupenko S.** ALDH1L2 controls high-fat diet induced obesity-linked pathways in female mice. American Society for Nutrition, 2023 July 22-25, Boston, MA. USA.