

Vasili Hauryliuk
Molecular Enzymology
LU Profile Area: Proactive Ageing
eSSENCE: The e-Science Collaboration
NanoLund: Centre for Nanoscience
LTH Profile Area: Nanoscience and Semiconductor Technology



Type of address: Visiting address.

Sölvegatan 19
Rm BMC C13
221 84

Lund
Sweden

Type of address: Postal address.

Box 118
221 00

Lund
Sweden

Type of address: Postal address.

Box 117
22100

Lund
Sweden

Type of address: Visiting address.

Professorsgatan 1

Lund
Sweden

Type of address: Postal address.

Box 118
221 00

Lund
Sweden

Email: vasili.hauryliuk@med.lu.se

Mobile: +460706090493

Research

My lab is using a combination of microbiological, biochemical, next-generation sequencing and structural (cryo-EM) approaches to tackle two research directions:

- Molecular mechanisms of bacterial defence against phages
- Protein synthesis on the ribosome: antibiotics, antibiotic resistance, stress sensing and signalling, protein quality control

Qualifications

Molecular biology, PhD
2002 → 2008

Chemistry, MSci
1997 → 2002

... → 2015 Docent in Microbiology

Employment

Research team manager, Senior lecturer

Molecular Enzymology

Lund University

Lund, Sweden

2021 May 10 → present

Profile area member

LU Profile Area: Proactive Ageing

Lund University

Sweden

2023 Jan 1 → present

Researcher

eSENCE: The e-Science Collaboration

Lund University

Lund, Sweden

2024 Jan 1 → present

Principal investigator

NanoLund: Centre for Nanoscience

Lund University

Lund, Sweden

2024 Dec 10 → present

Profile area member

LTH Profile Area: Nanoscience and Semiconductor Technology

Lund University

Sweden

2024 Dec 10 → present

group leader at the Laboratory for Molecular Infection Medicine Sweden (MIMS)

Umeå University

Umeå, Sweden

2013 Jan 1 → 2021 Jan 1

Researcher

University of Tartu

Tartu, Estonia

2008 Jan 1 → 2010 Jan 1

Research outputs

Toxic small alarmone synthetase FaRel2 inhibits translation by pyrophosphorylating tRNAGly and tRNAThr

Kurata, T., Takegawa, M., Ohira, T., Syroegin, E. A., Atkinson, G. C., Johansson, M. J. O., Polikanov, Y. S., Garcia-Pino, A., Suzuki, T. & Haurlyliuk, V., 2024 Nov 15, In: *Science Advances*. 10, 46, eadr9624.

Mechanisms of neutralization of toxSAS from toxin-antitoxin modules

Dominguez-Molina, L., Kurata, T., Cepauskas, A., Echemendia-Blanco, D., Zedek, S., Talavera-Perez, A., Atkinson, G. C., Haurlyliuk, V. & Garcia-Pino, A., 2024 Jun 4, (E-pub ahead of print) In: *Nature Chemical Biology*.

Chp1 is a dedicated chaperone at the ribosome that safeguards eEF1A biogenesis

Minoia, M., Quintana-Cordero, J., Jetzinger, K., Kotan, I. E., Turnbull, K. J., Ciccarelli, M., Masser, A. E., Liebers, D., Gouarin, E., Czech, M., Haurlyliuk, V., Bukau, B., Kramer, G. & Andréasson, C., 2024 Feb 15, In: *Nature Communications*. 15, 1, 1382.

A role for the S4-domain containing protein YlmH in ribosome-associated quality control in *Bacillus subtilis*

Takada, H., Paternoga, H., Fujiwara, K., Nakamoto, J. A., Park, E. N., Dimitrova-Paternoga, L., Beckert, B., Saarma, M., Tenson, T., Buskirk, A. R., Atkinson, G. C., Chiba, S., Wilson, D. N. & Haurlyliuk, V., 2024, In: *Nucleic Acids Research*. 52, 14, gkae399.

A virally-encoded tRNA neutralizes the PARIS antiviral defence system

Burman, N., Belukhina, S., Depardieu, F., Wilkinson, R. A., Skutel, M., Santiago-Frangos, A., Graham, A. B., Livenskyi, A., Chechenina, A., Morozova, N., Zahl, T., Henriques, W. S., Buyukyoruk, M., Rouillon, C., Saudemont, B., Shyrokova, L., Kurata, T., Haurlyliuk, V., Severinov, K. & Groseille, J. & 7 others, Thierry, A., Koszul, R., Tesson, F., Bernheim, A., Bikard, D., Wiedenheft, B. & Isaev, A., 2024, In: *Nature*. 634, 8033, p. 424-431

Mechanism of phage sensing and restriction by toxin-antitoxin-chaperone systems

Mets, T., Kurata, T., Ernits, K., Johansson, M. J. O., Craig, S. Z., Evora, G. M., Buttress, J. A., Odai, R., Wallant, K. C., Nakamoto, J. A., Shyrokova, L., Egorov, A. A., Doering, C. R., Brodiazhenko, T., Laub, M. T., Tenson, T., Strahl, H., Martens, C., Harms, A. & Garcia-Pino, A. & 2 others, Atkinson, G. C. & Haurlyiuk, V., 2024, In: *Cell Host and Microbe*. 32, 7, p. 1059-1073.e8

Resolution of ribosomal stalling by EF-P and ABCF ATPases YfmR and YkpA/YbiT

Takada, H., Fujiwara, K., Atkinson, G. C., Chiba, S. & Haurlyiuk, V., 2024, In: *Nucleic Acids Research*. 52, 16, p. 9854-9866

The ABCF ATPase New1 resolves translation termination defects associated with specific tRNA^{Arg} and tRNA^{Lys} isoacceptors in the P site

Turnbull, K., Paternoga, H., von der Weth, E., Egorov, A. A., Pochopien, A. A., Zhang, Y., Nersisyan, L., Margus, T., Johansson, M. J. O., Pelechano, V., Wilson, D. N. & Haurlyiuk, V., 2024, In: *Nucleic Acids Research*. 52, 19, p. 12005-12020

The structural basis of hyperpromiscuity in a core combinatorial network of type II toxin-antitoxin and related phage defense systems

Ernits, K., Saha, C. K., Brodiazhenko, T., Chouhan, B., Shenoy, A., Buttress, J. A., Duque-Pedraza, J. J., Bojar, V., Nakamoto, J. A., Kurata, T., Egorov, A. A., Shyrokova, L., Johansson, M. J. O., Mets, T., Rustamova, A., Džigurski, J., Tenson, T., Garcia-Pino, A., Strahl, H. & Elofsson, A. & 2 others, Haurlyiuk, V. & Atkinson, G. C., 2023 Aug 15, In: *Proceedings of the National Academy of Sciences of the United States of America*. 120, 33, p. 1-12 e2305393120.

The structure of DarB in complex with RelNTD reveals nonribosomal activation of Rel stringent factors

Ainelo, A., Caballero-Montes, J., Bulvas, O., Ernits, K., Coppieters, T., Wallant, K., Takada, H., Craig, S. Z., Mazzucchelli, G., Zedek, S., Pichová, I., Atkinson, G. C., Talavera, A., Martens, C., Haurlyiuk, V. & Garcia-Pino, A., 2023 Jan 18, In: *Science Advances*. 9, 3, p. 1-14 eade4077.

Biochemical and X-ray analyses of the players involved in the faRel2/aTfaRel2 toxin-antitoxin operon

Dominguez-Molina, L., Talavera, A., Cepauskas, A., Kurata, T., Echemendia-Blanco, D., Haurlyiuk, V. & Garcia-Pino, A., 2023, In: *Acta crystallographica. Section F, Structural biology communications*. 79, 10

Escherichia coli CspA stimulates translation in the cold of its own mRNA by promoting ribosome progression

Giuliodori, A. M., Belardinelli, R., Duval, M., Garofalo, R., Schenckbecher, E., Haurlyiuk, V., Ennifar, E. & Marzi, S., 2023, In: *Frontiers in Microbiology*. 14, p. 1-16 1118329.

Genome-encoded ABCF factors implicated in intrinsic antibiotic resistance in Gram-positive bacteria: VmIR2, Ard1 and CplR

Obana, N., Takada, H., Crowe-McAuliffe, C., Iwamoto, M., Egorov, A. A., Wu, K. J. Y., Chiba, S., Murina, V., Paternoga, H., Tresco, B. I. C., Nomura, N., Myers, A. G., Atkinson, G. C., Wilson, D. N. & Haurlyiuk, V., 2023, In: *Nucleic Acids Research*. 51, 9, p. 4536-4554

Prediction of COVID-19 positive cases, a nation-wide SARS-CoV-2 wastewater-based epidemiology study

Kisand, V., Laas, P., Palmik-Das, K., Panksep, K., Tammert, H., Albrecht, L., Allemann, H., Liepkalns, L., Vooor, K., Ritz, C., Haurlyiuk, V. & Tenson, T., 2023, In: *Water Research*. 231, 119617.

Structure of SpoT reveals evolutionary tuning of catalysis via conformational constraint

Tamman, H., Ernits, K., Roghanian, M., Ainelo, A., Julius, C., Perrier, A., Talavera, A., Ainelo, H., Dugauquier, R., Zedek, S., Thureau, A., Pérez, J., Lima-Mendez, G., Hallez, R., Atkinson, G. C., Haurlyiuk, V. & Garcia-Pino, A., 2023, In: *Nature Chemical Biology*. 19, 3, p. 334-345

Uncovering new families and folds in the natural protein universe

Durairaj, J., Waterhouse, A. M., Mets, T., Brodiazhenko, T., Abdullah, M., Studer, G., Tauriello, G., Akdel, M., Andreeva, A., Bateman, A., Tenson, T., Haurlyiuk, V., Schwede, T. & Pereira, J., 2023, In: *Nature*. 622, 7983, p. 646-653

Direct activation of a bacterial innate immune system by a viral capsid protein

Zhang, T., Tamman, H., Coppieters 't Wallant, K., Kurata, T., LeRoux, M., Srikant, S., Brodiazhenko, T., Cepauskas, A., Talavera, A., Martens, C., Atkinson, G. C., Hauryliuk, V., Garcia-Pino, A. & Laub, M. T., 2022 Dec 1, In: *Nature*. 612, 7938, p. 132–140 9 p.

Synthetic oxepanoprolinamide iboxamycin is active against *Listeria monocytogenes* despite the intrinsic resistance mediated by VgaL/Lmo0919 ABCF ATPase

Brodiazhenko, T., Turnbull, K. J., Wu, K. J. Y., Hiraku, T., Tresco, B. I. C., Tenson, T., Myers, A. G. & Hauryliuk, V., 2022 Jun, In: *JAC - Antimicrobial Resistance*. 4, 3, p. 1-8 dlac061.

A hyperpromiscuous antitoxin protein domain for the neutralization of diverse toxin domains

Kurata, T., Saha, C. K., Buttress, J. A., Mets, T., Brodiazhenko, T., Turnbull, K. J., Awoyomi, O. F., Oliveira, S. R. A., Jimmy, S., Ernits, K., Delannoy, M., Persson, K., Tenson, T., Strahl, H., Hauryliuk, V. & Atkinson, G. C., 2022, In: *Proceedings of the National Academy of Sciences of the United States of America*. 119, 6, p. 1-12 e2102212119.

Clinically observed deletions in SARS-CoV-2 Nsp1 affect its stability and ability to inhibit translation

Kumar, P., Schexnaydre, E., Rafie, K., Kurata, T., Terenin, I., Hauryliuk, V. & Carlson, L.-A., 2022, In: *FEBS Letters*. 596, 9, p. 1203-1213

Expression of *Bacillus subtilis* ABCF antibiotic resistance factor VmIR is regulated by RNA polymerase pausing, transcription attenuation, translation attenuation and (p)ppGpp

Hiraku, T., Mandell, Z. F., Yakhnin, H., Glazyrina, A., Chiba, S., Kurata, T., Wu, K. J. Y., Tresco, B. I. C., Myers, A. G., Atkinson, G., Babitzke, P. & Hauryliuk, V., 2022, In: *Nucleic Acids Research*. 50, 11, p. 6174-6189 gkac497.

Sal-type ABC-F proteins: Intrinsic and common mediators of pleuromutilin resistance by target protection in staphylococci

Mohamad, M., Nicholson, D., Saha, C. K., Hauryliuk, V., Edwards, T. A., Atkinson, G. C., Ranson, N. A. & O'Neill, A. J., 2022, In: *Nucleic Acids Research*. 50, 4, p. 2128-2142 gkac058.

Structural basis for HflXr-mediated antibiotic resistance in *Listeria monocytogenes*

Koller, T. O., Turnbull, K. J., Vaitkevicius, K., Crowe-McAuliffe, C., Roghanian, M., Bulvas, O., Nakamoto, J. A., Kurata, T., Julius, C., Atkinson, G. C., Johansson, J., Hauryliuk, V. & Wilson, D. N., 2022, In: *Nucleic Acids Research*. 50, 19, p. 11285-11300

Structural basis for PoxTA-mediated resistance to phenicol and oxazolidinone antibiotics

Crowe-McAuliffe, C., Murina, V., Turnbull, K. J., Huch, S., Kasari, M., Takada, H., Nersisyan, L., Sundsfjord, A., Hegstad, K., Atkinson, G. C., Pelechano, V., Wilson, D. N. & Hauryliuk, V., 2022, In: *Nature Communications*. 13, 1860.

Structural basis of ABCF-mediated resistance to pleuromutilin, lincosamide, and streptogramin A antibiotics in Gram-positive pathogens

Crowe-McAuliffe, C., Murina, V., Turnbull, K. J., Kasari, M., Mohamad, M., Polte, C., Takada, H., Vaitkevicius, K., Johansson, J., Ignatova, Z., Atkinson, G. C., O'Neill, A. J., Hauryliuk, V. & Wilson, D. N., 2021 Dec, In: *Nature Communications*. 12, 1, 3577.

RelA-SpoT Homolog toxins pyrophosphorylate the CCA end of tRNA to inhibit protein synthesis

Kurata, T., Brodiazhenko, T., Alves Oliveira, S. R., Roghanian, M., Sakaguchi, Y., Turnbull, K. J., Bulvas, O., Takada, H., Tamman, H., Ainelo, A., Pohl, R., Rejman, D., Tenson, T., Suzuki, T., Garcia-Pino, A., Atkinson, G. C. & Hauryliuk, V., 2021 Aug 5, In: *Molecular Cell*. 81, 15, p. 3160-3170. e1-e9

Nonhydrolysable Analogues of (p)ppGpp and (p)ppApp Alarmone Nucleotides as Novel Molecular Tools

Mojr, V., Roghanian, M., Tamman, H., Do Pham, D. D., Petrová, M., Pohl, R., Takada, H., Van Nerom, K., Ainelo, H., Caballero-Montes, J., Jimmy, S., Garcia-Pino, A., Hauryliuk, V. & Rejman, D., 2021, In: *ACS Chemical Biology*. 16, 9, p. 1680-1691

Photorhabdus antibacterial Rhs polymorphic toxin inhibits translation through ADP-ribosylation of 23S ribosomal RNA

Jurénas, D., Payelleville, A., Roghanian, M., Turnbull, K. J., Givaudan, A., Brillard, J., Haurlyliuk, V. & Cascales, E., 2021, In: *Nucleic Acids Research*. 49, 14, p. 8384-8395

(p)ppGpp controls stringent factors by exploiting antagonistic allosteric coupling between catalytic domains

Roghanian, M., Van Nerom, K., Takada, H., Caballero-Montes, J., Tamman, H., Kudrin, P., Talavera, A., Dzhygyr, I., Ekström, S., Atkinson, G. C., Garcia-Pino, A. & Haurlyliuk, V., 2021, In: *Molecular Cell*. 81, 16, p. 3310-3322.e6

Ribosome association primes the stringent factor Rel for tRNA-dependent locking in the A-site and activation of (p)ppGpp synthesis

Takada, H., Roghanian, M., Caballero-Montes, J., Van Nerom, K., Jimmy, S., Kudrin, P., Trebini, F., Murayama, R., Akanuma, G., Garcia-Pino, A. & Haurlyliuk, V., 2021, In: *Nucleic Acids Research*. 49, 1, p. 444-457

RqcH and RqcP catalyze processive poly-alanine synthesis in a reconstituted ribosome-associated quality control system

Takada, H., Crowe-McAuliffe, C., Polte, C., Sidorova, Z. Y., Murina, V., Atkinson, G. C., Konevega, A. L., Ignatova, Z., Wilson, D. N. & Haurlyliuk, V., 2021, In: *Nucleic Acids Research*. 49, 14, p. 8355-8369 gkab589.

Structural Basis for Bacterial Ribosome-Associated Quality Control by RqcH and RqcP

Crowe-McAuliffe, C., Takada, H., Murina, V., Polte, C., Kasvandik, S., Tenson, T., Ignatova, Z., Atkinson, G. C., Wilson, D. N. & Haurlyliuk, V., 2021, In: *Molecular Cell*. 81, 1, p. 115-126

A nucleotide-switch mechanism mediates opposing catalytic activities of Rel enzymes

Tamman, H., Van Nerom, K., Takada, H., Vandenberg, N., Scholl, D., Polikanov, Y., Hofkens, J., Talavera, A., Haurlyliuk, V., Hendrix, J. & Garcia-Pino, A., 2020, In: *Nature Chemical Biology*. 16, p. 834-840

A widespread toxin-antitoxin system exploiting growth control via alarmone signaling

Jimmy, S., Saha, C. K., Kurata, T., Stavropoulos, C., Oliveira, S. R. A., Koh, A., Cepauskas, A., Takada, H., Rejman, D., Tenson, T., Strahl, H., Garcia-Pino, A., Haurlyliuk, V. & Atkinson, G. C., 2020, In: *Proceedings of the National Academy of Sciences of the United States of America*. 117, 19, p. 10500-10510

Hfq-Assisted RsmA Regulation Is Central to *Pseudomonas aeruginosa* Biofilm Polysaccharide PEL Expression

Irie, Y., La Mensa, A., Murina, V., Haurlyliuk, V., Tenson, T. & Shingler, V., 2020, In: *Frontiers in Microbiology*. 11, p. 1-15 482585.

In Vitro Studies of Persister Cells

Kaldalu, N., Haurlyliuk, V., Turnbull, K. J., Mensa, A. L., Putrinš, M. & Tenson, T., 2020, In: *Microbiology and Molecular Biology Reviews*. 84, 4, 00070-20.

Target protection as a key antibiotic resistance mechanism

Wilson, D. N., Haurlyliuk, V., Atkinson, G. C. & O'Neill, A. J., 2020, In: *Nature Reviews Microbiology*. 18, 11, p. 637-648

The C-Terminal RRM/ACT Domain Is Crucial for Fine-Tuning the Activation of 'Long' RelA-SpoT Homolog Enzymes by Ribosomal Complexes

Takada, H., Roghanian, M., Murina, V., Dzhygyr, I., Murayama, R., Akanuma, G., Atkinson, G. C., Garcia-Pino, A. & Haurlyliuk, V., 2020, In: *Frontiers in Microbiology*. 11, p. 1-16 277.

ABCF ATPases Involved in Protein Synthesis, Ribosome Assembly and Antibiotic Resistance: Structural and Functional Diversification across the Tree of Life

Murina, V., Kasari, M., Takada, H., Hinnu, M., Saha, C. K., Grimshaw, J. W., Seki, T., Reith, M., Putrinš, M., Tenson, T., Strahl, H., Haurlyliuk, V. & Atkinson, G. C., 2019, In: *Journal of Molecular Biology*. 431, 18, p. 3568-3590

Analysis of nucleotide pools in bacteria using HPLC-MS in HILIC mode

Zborníková, E., Knejzlík, Z., Haurlyliuk, V., Krásný, L. & Rejman, D., 2019, In: *Talanta*. 205, p. 1-10 120161.

A role for the *Saccharomyces cerevisiae* ABCF protein New1 in translation termination/recycling
Kasari, V., Pochopien, A. A., Margus, T., Murina, V., Turnbull, K., Zhou, Y., Nissan, T., Graf, M., Nováček, J., Atkinson, G. C., Johansson, M. J. O., Wilson, D. N. & Haurlyuk, V., 2019, In: *Nucleic Acids Research*. 47, 16, p. 8807-8820

Intramolecular interactions dominate the autoregulation of *Escherichia coli* stringent factor RelA
Turnbull, K. J., Dzhygyr, I., Lindemose, S., Haurlyuk, V. & Roghanian, M., 2019, In: *Frontiers in Microbiology*. 10, 1966.

Reanalysis of proteomics results fails to detect mazF-mediated stress proteins
Kaldalu, N., Maiväli, Ü., Haurlyuk, V. & Tenson, T., 2019, In: *mBio*. 10, 3, e00949-19.

Ribosome profiling analysis of eEF3-depleted *Saccharomyces cerevisiae*
Kasari, V., Margus, T., Atkinson, G. C., Johansson, M. J. O. & Haurlyuk, V., 2019, In: *Scientific Reports*. 9, p. 1-10 3037.

The Rel stringent factor from *Thermus thermophilus*: Crystallization and X-ray analysis
Van Nerom, K., Tamman, H., Takada, H., Haurlyuk, V. & Garcia-Pino, A., 2019, In: *Acta Crystallographica Section F: Structural Biology Communications*. p. 561-569

Structural basis for antibiotic resistance mediated by the *Bacillus subtilis* ABCF ATPase VmIR
Crowe-McAuliffe, C., Graf, M., Huter, P., Takada, H., Abdelshahid, M., Nováček, J., Murina, V., Atkinson, G. C., Гаврилюк, В. & Wilson, D. N., 2018 Sept 4, In: *Proceedings of the National Academy of Sciences of the United States of America*. 115, 36, p. 8978-8983 6 p.

Reply to Holden and Errington, "Type II toxin-antitoxin systems and persister cells"
Goormaghtigh, F., Fraikin, N., Putrinš, M., Haurlyuk, V., Garcia-Pino, A., Udekwa, K., Tenson, T., Kaldalu, N. & Van Melderen, L., 2018 Sept 1, In: *mBio*. 9, 5, 2 p., e01838-18.

Reassessing the role of type II toxin-antitoxin systems in formation of *Escherichia coli* type II persister cells
Goormaghtigh, F., Fraikin, N., Putrinš, M., Hallaert, T., Haurlyuk, V., Garcia-Pino, A., Sjödin, A., Kasvandik, S., Udekwa, K., Tenson, T., Kaldalu, N. & Van Melderen, L., 2018 May 1, In: *mBio*. 9, 3, 14 p., e00640-18.

Antibiotic resistance ABCF proteins reset the peptidyl transferase centre of the ribosome to counter translational arrest
Murina, V., Kasari, M., Haurlyuk, V. & Atkinson, G. C., 2018 Apr 20, In: *Nucleic Acids Research*. 46, 7, p. 3753-3763 11 p.

Structural basis for (p)ppGpp synthesis by the *Staphylococcus aureus* small alarmone synthetase RelP
Manav, M. C., Beljantseva, J., Bojer, M. S., Tenson, T., Ingmer, H., Haurlyuk, V. & Brodersen, D. E., 2018 Mar 2, In: *Journal of Biological Chemistry*. 293, 9, p. 3254-3264 11 p.

The ribosomal A-site finger is crucial for binding and activation of the stringent factor RelA
Kudrin, P., Dzhygyr, I., Ishiguro, K., Beljantseva, J., Maksimova, E., Oliveira, S. R. A., Varik, V., Payoe, R., Konevega, A. L., Tenson, T., Suzuki, T. & Haurlyuk, V., 2018 Feb 28, In: *Nucleic Acids Research*. 46, 4, p. 1973-1983

Elimination of Ribosome Inactivating Factors Improves the Efficiency of *Bacillus subtilis* and *Saccharomyces cerevisiae* Cell-Free Translation Systems
Brodiazhenko, T., Johansson, M. J. O., Takada, H., Nissan, T., Haurlyuk, V. & Murina, V., 2018, In: *Frontiers in Microbiology*. 9, 3041.

Small Alarmone Synthetases as novel bacterial RNA-binding proteins
Haurlyuk, V. & Atkinson, G. C., 2017 Dec 2, In: *RNA Biology*. 14, 12, p. 1695-1699 5 p.

HPLC-based quantification of bacterial housekeeping nucleotides and alarmone messengers ppGpp and pppGpp
Varik, V., Oliveira, S. R. A., Haurlyuk, V. & Tenson, T., 2017 Dec 1, In: *Scientific Reports*. 7, 1, 11022.

Subinhibitory concentrations of bacteriostatic antibiotics induce relA-dependent and relA-independent tolerance to β -lactams

Kudrin, P., Varik, V., Oliveira, S. R. A., Beljantseva, J., Del Peso Santos, T., Dzhygyr, I., Rejman, D., Cava, F., Tenson, T. & Haurlyiuk, V., 2017 Apr, In: *Antimicrobial Agents and Chemotherapy*. 61, 4, e02173-16.

Molecular mutagenesis of ppGpp: Turning a RelA activator into an inhibitor

Beljantseva, J., Kudrin, P., Jimmy, S., Ehn, M., Pohl, R., Varik, V., Tozawa, Y., Shingler, V., Tenson, T., Rejman, D. & Haurlyiuk, V., 2017, In: *Scientific Reports*. 7, p. 1-10 41839.

Negative allosteric regulation of *Enterococcus faecalis* small alarmone synthetase RelQ by single-stranded RNA

Beljantsev, J., Kudrin, P., Andresen, L., Shingler, V., Atkinson, G. C., Tenson, T. & Haurlyiuk, V., 2017, In: *Proceedings of the National Academy of Sciences of the United States of America*. 114, 14, p. 3726-3731

Antibacterial activity of the nitrovinylfuran G1 (Furvina) and its conversion products

Allas, Ü., Toom, L., Selyutina, A., Mäeorg, U., Medina, R., Merits, A., Rinken, A., Haurlyiuk, V., Kaldalu, N. & Tenson, T., 2016 Nov 10, In: *Scientific Reports*. 6, 36844.

Cationic bactericidal peptide 1018 does not specifically target the stringent response alarmone (p)ppGpp

Andresen, L., Tenson, T. & Haurlyiuk, V., 2016 Nov 7, In: *Scientific Reports*. 6, 36549.

Auxotrophy-based High Throughput Screening assay for the identification of *Bacillus subtilis* stringent response inhibitors

Andresen, L., Varik, V., Tozawa, Y., Jimmy, S., Lindberg, S., Tenson, T. & Haurlyiuk, V., 2016 Oct 24, In: *Scientific Reports*. 6, 35824.

Persisters—as elusive as ever

Kaldalu, N., Haurlyiuk, V. & Tenson, T., 2016 Aug 1, In: *Applied Microbiology and Biotechnology*. 100, 15, p. 6545-6553 9 p.

Aim-less translation: Loss of *Saccharomyces cerevisiae* mitochondrial translation initiation factor mIF3/Aim23 leads to unbalanced protein synthesis

Kuzmenko, A., Derbikova, K., Salvatori, R., Tankov, S., Atkinson, G. C., Tenson, T., Ott, M., Kamenski, P. & Haurlyiuk, V., 2016 Jan 5, In: *Scientific Reports*. 6, 18749.

Composition of the outgrowth medium modulates wake-up kinetics and ampicillin sensitivity of stringent and relaxed *Escherichia coli*

Varik, V., Oliveira, S. R. A., Haurlyiuk, V. & Tenson, T., 2016, In: *Scientific Reports*. 6, 22308.

Evaluation of the characteristics of leucyl-tRNA synthetase (LeuRS) inhibitor AN3365 in combination with different antibiotic classes

Monteferrante, C. G., Jirgensons, A., Varik, V., Haurlyiuk, V., Goessens, W. H. F. & Hays, J. P., 2016, In: *European Journal of Clinical Microbiology and Infectious Diseases*. 35, p. 1857-1864

The stringent factor RelA adopts an open conformation on the ribosome to stimulate ppGpp synthesis

Arenz, S., Abdelshahid, M., Sohmen, D., Payoe, R., Starosta, A. L., Berninghausen, O., Haurlyiuk, V., Beckmann, R. & Wilson, D. N., 2016, In: *Nucleic Acids Research*. 44, 13, p. 6471-6481

Recent functional insights into the role of (p)ppGpp in bacterial physiology

Haurlyiuk, V., Atkinson, G. C., Murakami, K. S., Tenson, T. & Gerdes, K., 2015 May 24, In: *Nature Reviews Microbiology*. 13, 5, p. 298-309 12 p.

Fusidic acid targets elongation factor G in several stages of translocation on the bacterial ribosome

Borg, A., Holm, M., Shiroyama, I., Haurlyiuk, V., Pavlov, M., Sanyal, S. & Ehrenberg, M., 2015 Feb 6, In: *Journal of Biological Chemistry*. 290, 6, p. 3440-3454 15 p.

From (p)ppGpp to (pp)pGpp: Characterization of regulatory effects of pGpp synthesized by the small alarmone synthetase of *Enterococcus faecalis*

Gaca, A. O., Kudrin, P., Colomer-Winter, C., Beljantseva, J., Liu, K., Anderson, B., Wang, J. D., Rejman, D., Potrykus, K., Cashel, M., Haurlyiuk, V. & Lemos, J. A., 2015, In: *Journal of Bacteriology*. 197, 18, p. 2908-2919 12 p.

An evolutionary ratchet leading to loss of elongation factors in eukaryotes

Atkinson, G. C., Kuzmenko, A., Chicherin, I., Soosaar, A., Tenson, T., Carr, M., Kamenski, P. & Haurlyiuk, V., 2014, In: BMC Evolutionary Biology. 14, p. 1-9 35.

Mitochondrial translation initiation machinery: Conservation and diversification

Kuzmenko, A., Atkinson, G. C., Levitskii, S., Zenkin, N., Tenson, T., Haurlyiuk, V. & Kamenski, P., 2014, In: Biochimie. 100, 1, p. 132-140

Mechanism of tetracycline resistance by ribosomal protection protein Tet(O)

Li, W., Atkinson, G. C., Thakor, N. S., Allas, U., Lu, C. C., Yan Chan, K., Tenson, T., Schulten, K., Wilson, K. S., Haurlyiuk, V. & Frank, J., 2013, In: Nature Communications. 4, p. 1-8 1477.

Protein biosynthesis in mitochondria

Kuzmenko, A. V., Levitskii, S. A., Vinogradova, E. N., Atkinson, G. C., Haurlyiuk, V., Zenkin, N. & Kamenski, P. A., 2013, In: Biochemistry (Moscow). 78, 8, p. 855-866

Positive allosteric feedback regulation of the stringent response enzyme RelA by its product

Shyp, V., Tankov, S., Ermakov, A., Kudrin, P., English, B. P., Ehrenberg, M., Tenson, T., Elf, J. & Haurlyiuk, V., 2012 Sept, In: EMBO Reports. 13, 9, p. 835-839

Evolutionary and genetic analyses of mitochondrial translation initiation factors identify the missing mitochondrial IF3 in *S. cerevisiae*

Atkinson, G. C., Kuzmenko, A., Kamenski, P., Vysokikh, M. Y., Lakunina, V., Tankov, S., Smirnova, E., Soosaar, A., Tenson, T. & Haurlyiuk, V., 2012 Jul, In: Nucleic Acids Research. 40, 13, p. 6122-6134 13 p.

GTPases IF2 and EF-G bind GDP and the SRL RNA in a mutually exclusive manner

Mitkevich, V. A., Shyp, V., Petrushanko, I. Y., Soosaar, A., Atkinson, G. C., Tenson, T., Makarov, A. A. & Haurlyiuk, V., 2012, In: Scientific Reports. 2, p. 1-6 843.

Single-molecule investigations of the stringent response machinery in living bacterial cells

English, B. P., Haurlyiuk, V., Sanamrad, A., Tankov, S., Dekker, N. H. & Elf, J., 2011 Aug 2, In: Proceedings of the National Academy of Sciences of the United States of America. 108, 31, p. E365-E373

An ancient family of SelB elongation factor-like proteins with a broad but disjunct distribution across archaea

Atkinson, G. C., Haurlyiuk, V. & Tenson, T., 2011, In: BMC Evolutionary Biology. 11, 1, 22.

Single molecule tracking fluorescence microscopy in mitochondria reveals highly dynamic but confined movement of Tom40

Kuzmenko, A., Tankov, S., English, B. P., Tarassov, I., Tenson, T., Kamenski, P., Elf, J. & Haurlyiuk, V., 2011, In: Scientific Reports. 1, 195.

The RelA/SpoT Homolog (RSH) superfamily: Distribution and functional evolution of ppGpp synthetases and hydrolases across the tree of life

Atkinson, G. C., Tenson, T. & Haurlyiuk, V., 2011, In: PLoS ONE. 6, 8, e23479.

Thermodynamic Characterization of ppGpp Binding to EF-G or IF2 and of Initiator tRNA Binding to Free IF2 in the Presence of GDP, GTP, or ppGpp

Mitkevich, V. A., Ermakov, A., Kulikova, A. A., Tankov, S., Shyp, V., Soosaar, A., Tenson, T., Makarov, A. A., Ehrenberg, M. & Haurlyiuk, V., 2010 Oct 8, In: Journal of Molecular Biology. 402, 5, p. 838-846

Structure of the Dom34-Hbs1 complex and implications for no-go decay

Chen, L., Muhlrud, D., Haurlyiuk, V., Cheng, Z., Lim, M. K., Shyp, V., Parker, R. & Song, H., 2010 Oct, In: Nature Structural and Molecular Biology. 17, 10, p. 1233-1240

Does the ribosome have initiation and elongation modes of translation?
Tenson, T. & Hauryliuk, V., 2009 Jun, In: *Molecular Microbiology*. 72, 6, p. 1310-1315

GTP-dependent structural rearrangement of the eRF1:eRF3 complex and eRF3 sequence motifs essential for PABP binding
Kononenko, A. V., Mitkevich, V. A., Atkinson, G. C., Tenson, T., Dubovaya, V. I., Frolova, L. Y., Makarov, A. A. & Hauryliuk, V., 2009, In: *Nucleic Acids Research*. 38, 2, p. 548-558 gkp908.

Thermodynamics of GTP and GDP Binding to Bacterial Initiation Factor 2 Suggests Two Types of Structural Transitions
Hauryliuk, V., Mitkevich, V. A., Draycheva, A., Tankov, S., Shyp, V., Ermakov, A., Kulikova, A. A., Makarov, A. A. & Ehrenberg, M., 2009, In: *Journal of Molecular Biology*. 394, 4, p. 621-626

The pretranslocation ribosome is targeted by GTP-bound EF-G in partially activated form
Hauryliuk, V., Mitkevich, V. A., Eliseeva, N. A., Petrushanko, I. Y., Ehrenberg, M. & Makarov, A. A., 2008 Oct 14, In: *Proceedings of the National Academy of Sciences of the United States of America*. 105, 41, p. 15678-15683 6 p.

Cofactor dependent conformational switching of GTPases
Hauryliuk, V., Hansson, S. & Ehrenberg, M., 2008 Aug 15, In: *Biophysical Journal*. 95, 4, p. 1704-1715 12 p.

The bacterial toxin RelE induces specific mRNA cleavage in the A site of the eukaryote ribosome
Andreev, D., Hauryliuk, V., Terenin, I., Dmitriev, S., Ehrenberg, M. & Shatsky, I., 2008 Feb, In: *RNA*. 14, 2, p. 233-239

Evolution of nonstop, no-go and nonsense-mediated mRNA decay and their termination factor-derived components
Atkinson, G. C., Baldauf, S. L. & Hauryliuk, V., 2008, In: *BMC Evolutionary Biology*. 8, 1, 290.

Evolution of translational machinery: Could translation termination come into being before elongation?
Hauryliuk, V., 2007 Oct 7, In: *Journal of Theoretical Biology*. 248, 3, p. 574-578 5 p.

GTPases of the prokaryotic translation apparatus
Hauryliuk, V., 2006 Oct, In: *Molecular Biology*. 40, 5, p. 688-701 14 p.

Class-1 release factor eRF1 promotes GTP binding by class-2 release factor eRF3
Hauryliuk, V., Zavialov, A., Kisselev, L. & Ehrenberg, M., 2006 Jul, In: *Biochimie*. 88, 7, p. 747-757 11 p.

Two-Step Selection of mRNAs in Initiation of Protein Synthesis
Hauryliuk, V. & Ehrenberg, M., 2006 Apr 21, In: *Molecular Cell*. 22, 2, p. 155-156 2 p.

Splitting of the posttermination ribosome into subunits by the concerted action of RRF and EF-G
Zavialov, A. V., Hauryliuk, V. V. & Ehrenberg, M., 2005 Jun 10, In: *Molecular Cell*. 18, 6, p. 675-686

Guanine-nucleotide exchange on ribosome-bound elongation factor G initiates the translocation of tRNAs
Zavialov, A. V., Hauryliuk, V. V. & Ehrenberg, M., 2005, In: *Journal of Biology*. 4, 9.

Prizes and Distinctions

Göran Gustafssonprisen i molekylär biologi / Göran Gustafsson prize in molecular biology
Hauryliuk, V. (Recipient), 2024 Mar 1

Ragnar Söderberg Fellow in Medicine
Hauryliuk, V. (Recipient), 2014

Science Award of the Estonian Republic
Hauryliuk, V. (Recipient), 2018

The Swedish Fernström Prize
Hauryliuk, V. (Recipient), 2019

Awards

A double tap: ribosomal protection through rRNA methylation and antibiotic displacement
Hauryliuk, V. (PI)
Swedish Research Council: SEK3,600,000.00
2024/12/01 → 2028/12/31

Projects

A double tap: ribosomal protection through rRNA methylation and antibiotic displacement
Hauryliuk, V. (PI)
Swedish Research Council
2024/12/01 → 2028/12/31

Decoding bacterial toxin-antitoxin systems: from high-throughput discovery to molecular mechanism and biotechnology
Atkinson, G. (PI), Hauryliuk, V. (Researcher) & Schüler, H. (Researcher)
Knut and Alice Wallenberg Foundation
2021/07/01 → 2026/06/30

eSSENCE@LU 10:2 - "New sequence- and structure-based computational methods to find functional domains of proteins
Atkinson, G. (PI), Egorov, A. (Research student), Hauryliuk, V. (Researcher), Bernheim, A. (Researcher), Schwede, T. (Researcher) & Pereira, J. (Researcher)
2024/01/01 → 2025/12/31

Experimental exploration of bacterial toxin-antitoxin systems
Shyrokov, O. (Researcher), Hauryliuk, V. (Supervisor) & Giske, C. (Assistant supervisor)
2022/06/01 → ...

För banbrytande studier av hur proteinsyntes regleras i bakterier
Hauryliuk, V. (PI)
Göran Gustafssons stiftelse för naturvetenskaplig och medicinsk forskning
2024/04/01 → 2028/12/31