

Curriculum Vitae
Edita Kriukiene



Contacts

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Education

1996 MSc Biochemistry, Vilnius University, Vilnius, Lithuania.
2007 PhD, Biochemistry, Institute of Biotechnology, Vilnius University, Vilnius, Lithuania.

Positions and Employment

2022 09 – present Research Professor, Department of Biological DNA Modification, Institute of Biotechnology, Life Sciences Center.
2015–present Group Leader, Epigenomics group, Department of Biological DNA Modification, Institute of Biotechnology, Life Sciences Center, Vilnius University, Lithuania
2012-2022 Senior Scientist, Department of Biological DNA Modification, Institute of Biotechnology, Vilnius University, Vilnius, Lithuania
2011–05 Visiting scientist, Krembil Family Epigenetics laboratory, Centre for Addiction and Mental Health (CAMH), University of Toronto, Toronto, Canada
2008-2011 Postdoctoral Researcher at Department of Biological DNA Modification, Institute of Biotechnology, Vilnius, Lithuania
1998-2007 PhD student/Research Fellow (including 1.5 year maternity leave) at Laboratory of Prokaryotic Gene Engineering, Institute of Biotechnology, Vilnius, Lithuania

Fellowships 2000-2001 Doctoral fellowship of the Lithuanian Council of Science.

Honors **2013** Rector's Outstanding Scientist Award, Vilnius University.
 2015 Prize for the best project in Applied Sciences (3 authors), Vilnius University.
 2020 Rector's Outstanding Scientist Award, Vilnius University.

Current fields of interest

Targeted DNA labeling, DNA modifying enzymes, enzyme engineering, nontypical methyltransferase reactions, synthetic SAM cofactors
Epigenomics of higher and lower eukaryotes, DNA and RNA modifications, methods for DNA modification profiling in genomic DNA, next generation sequencing
Single-cell epigenomics, DNA modification and RNA profiling in individual cells
Epigenetic marker discovery
Epigenetic analysis of cell-free DNA for disease diagnostics
Developmental and cancer epigenomics

Training

2008 09 15-17 2014 TATAA Biocenter – Training course in real-time PCR, Freising, Germany
Ion Torrent Proton System. Hands-on Training and Data Analysis by Life
Technologies; Vilnius, Lithuania

Research funding and project involvement

2021-2024 S-MIP-21-1. DNA modification and chromatin dynamics during growth and differentiation of healthy and malignant cells. Research Council of Lithuania. Role: PI.

2016.09-2023.02 European research Council (ERC-AdG-2016, 742654) "Single-cell temporal tracking of epigenetic DNA marks" (EpiTrack). PI: Prof. S. Klimašauskas. Role: senior researcher.

2018-2022 09.3.3-LMT-K-712-01-0041 European Social Fund, the activity measure No. 09.3.3-LMT-K-712 "Improvement of researchers' qualification by implementing world-class R&D projects" under grant agreement with the Research Council of Lithuania. "Single molecule TOP-seq – an innovative technological platform for early non-invasive diagnostics of cancer and other epigenetic disorders". Role: PI.

Results:

1. Daniūnaitė K, Jarmalaitė S, Kriukienė E. (2018) Epigenomic technologies for deciphering circulating tumor DNA. *Curr Opin Biotechnol.* 55:23-29. **IF 8.3**, Q1.
2. Licytė J, Gibas P, Skardziute K, Stankevicius V, Ruksenaite A, Kriukiene E. (2020) A bisulfite-free approach for base-resolution analysis of genomic 5-carboxylcytosine. *Cell Reports*, 32, 108155. **IF 9.4**. Q1.
3. Gordevičius J, Narmontė M, Gibas P, Kvederavičiūtė K, Tomkutė V, Paluoja P, Krjutškov K, Salumets A, Kriukienė E. (2020) Identification of fetal unmodified and 5-hydroxymethylated CGs in maternal cell-free DNA for non-invasive prenatal testing, *Clin Epigenetics*, 12, 153. **IF 6.03**. Q1.
4. Ličytė J., Kvederavičiūtė K., Rukšėnaitė A., Godliauskaitė E., Gibas P., Tomkutė V., Petraitytė G., Masevičius V., Klimašauskas S., Kriukienė E. (2022) Distribution and regulatory roles of oxidized 5-methylcytosines in DNA and RNA of the Basidiomycete fungi *Laccaria bicolor* and *Coprinopsis cinerea*. *Open Biol.* 12: 210302. <https://doi.org/10.1098/rsob.210302>. **IF 5.93**. Q1.

Tarptautinė patentinė paraiška:

4. Kriukiene E., Gordevicius J., Narmonte M., Gibas P. Methods and compositions for noninvasive prenatal diagnosis through targeted covalent labeling of genomic sites", PCT/IB2020/053011, WO2021198726.

2017-2020/11 MIP-17-58. Project title: "A technology for single-cell analysis of genomic DNA modification. Neuroblastoma epigenetic heterogeneity". Research Council of Lithuania. Role: PI.

Results:

1. Gibas P, Narmontė M, Staševskij Z, Gordevičius J, Klimašauskas S, Kriukienė E. (2020) Precise genomic mapping of 5-hydroxymethylcytosine via covalent tether-directed sequencing. *PLoS Biol.* Apr 10;18(4):e3000684, **IF 8.1**, Q1.
2. Narmonte M., Gibas P. Daniūnaitė K., Gordevičius J., Kriukiene E. (2021). Multiomics Analysis of Neuroblastoma Cells Reveals a Diversity of Malignant Transformations. *Front Cell Dev Biol* 9, 727353.

2013-2016 MIP-045/2013. Project title: "Genome wide analysis of CpG sites", funded by the Research Council of Lithuania. Role: PI

Results:

1. Z. Staševskij, P. Gibas, J. Gordevičius, E. Kriukienė* and S. Klimašauskas*. (2017) Tethered Oligonucleotide-Primed sequencing, TOP-seq: a high-resolution economical approach for DNA epigenome profiling. *Mol Cell*, 65, 1-11. **IF 14.708, Q1.** * - corresponding authors.
2. V. Labrie, O. J. Buske, E. Oh, R. Jeremian, C. Ptak, G. Gasiūnas, A. Maleckas, R. Petereit, A. Žvirbliene, K. Adamonis, E. Kriukienė, K. Koncevičius, J. Gordevičius, A. Nair, A. Zhang, S. Ebrahimi, G. Oh, V. Šikšnys, L. Kupčinskas, M. Brudno, and A. Petronis. (2016) Lactase nonpersistence is directed by DNA-variation-dependent epigenetic aging. *Nature Struct. Mol. Biol.* 23: 566-573. **IF 13.338, Q1.**
3. US patent application: Saulius Klimasauskas, Zdislav Stasevskij, Edita Kriukiene, NUCLEIC ACID PRODUCTION AND SEQUENCE ANALYSIS. US Continuation Application No. 15/072,677; M-Tag Primer US CON. Published 2017-01-19, US2017016055 (A1).

2010-2012 National Institutes of Health (NIH, USA), R21HG005758. “Approaches for genomic mapping of 5-hydroxymethylcytosine a novel epigenetic mark in mammalian DNA”. PI: S.Klimašauskas. Role: senior researcher

Results:

1. Khare T., Pai S., Koncevicus K., Pal M., Kriukienė E., Liutkevičiūtė Z et al, Klimasauškas S., Petronis A. (2012) 5-hmC in the brain is abundant in synaptic genes and shows differences at the exon-intron boundary. *Nat Struct Mol Biol.* 19, 1037-43. **IF 11.902, Q1.**

2011-2015 Project title: “Molecular tools for epigenomics and transcriptomics”, funded by the European Social Fund under the Global Grant measure VP13.1ŠMM07K01105. Role: senior researcher. PI. S.Klimašauskas.

Results:

1. Liutkevičiūtė Z., Kriukienė E., Ličytė J, Rudytė M, Urbanavičiūtė G, Klimašauskas S. (2014) Direct decarboxylation of 5-carboxylcytosine by DNA C5-methyltransferases. *J Am Chem Soc.* 136, 5884-7. **IF 12.113, Q1.**
2. Kriukienė E., Z. Liutkevičiūtė and S. Klimašauskas. (2012) 5-Hydroxymethylcytosine – the elusive epigenetic mark in mammalian DNA. *Chemical Society Reviews*, 41, 6916–6930. **IF 24.892, Q1.**
3. Liutkevičiūtė Z., Kriukienė E., Grigaitytė I., Masevičius V., Klimašauskas S. Methyltransferase-directed derivatization of 5-hydroxymethylcytosine in DNA. (2011) *Angew Chem Int Edit.* 50, 2090-3. *Angew Chem.* (2011), 123, 2138-2141. **IF 13.455, Q1.**

2008-2010 National Institutes of Health (NIH, USA) R21HG004535, “Methylome Profiling via DNA Methyltransferase-directed Labeling”. Role: senior researcher. PI: S. Klimašauskas.

Results:

1. Kriukienė E. et al., DNA unmethylome profiling by covalent capture of CpG sites (2013) *Nat Com*, 4:2190, DOI: 10.1038. **IF 10.742, Q1.**
2. Patent applications. Klimašauskas S., Kriukienė E., Urbanavičiūtė G., Petronis A., Khare T., Wang S.-C. Analysis of methylation sites. GB1119904.9, EP2594651 (A1), US2013130922 (A1).

2005-2006 Lithuanian science and studies foundation “Functional-structural studies of MnlI restriction endonuclease” PI: Dr. R. Rimšėlienė. Role: research associate.

Results:

1. **Kriukienė E.** Domain organization and metal ion requirement of the type IIS restriction endonuclease MnlI. (2006) *FEBS Letters* 580, 6115-6122.
2. **Kriukienė E.**, Lubienė J., Lagunavicius A., Lubys A. MnlI-The member of H-N-H subtype of Type IIS restriction endonucleases. (2005) *Biochim. Biophys. Acta* 1751, 194-204.

2003-2004 Contract project in applied biotechnology (UAB “Fermentas”) “Nonspecific mutagenesis of Eco57I restriction-modification enzymes using microemulsions”

Results:

1. Jurėnaitė-Urbanavičienė S., Šerkšnaitė J., Kriukienė E., Giedrienė J., Venclovas C., Lubys A. Generation of DNA cleavage specificities of type II restriction endonucleases by reassortment of target recognition domains. (2007) *Proc. Natl. Acad. Sci. USA* 104, 10358-10363.
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Summary of scientific results

Patents (4 US, 2 EU, 1 LT)

- Klimašauskas S., Liutkevičiūtė Z., **Kriukienė E.** Derivatization of biomolecules by covalent coupling of non-cofactor compounds using methyltransferases. EP2414528 (B1), US8822146 (B2).
- Klimašauskas S., Liutkevičiūtė Z., **Kriukienė E.** Conversion of alpha-hydroxyalkylated residues in biomolecules using methyltransferases. US8889352 (B2), US9505797 (B2), EP2414527 (B1), LT5706 (B).
- Klimašauskas S., Staševskij Z., **Kriukienė E.**, Nucleic acid production and sequence analysis. US patent US-9988673-B2 (2018-06-05).

Patent applications

- Klimašauskas S., **Kriukienė E.**, Urbanavičiūtė G., Petronis A., Khare T., Wang S.-C. Analysis of methylation sites. GB1119904.9, EP2594651 (A1), US2013130922 (A1).
- Kriukienė E.**, Gordevičius J., Narmonte M., Gibas P. Methods and compositions for noninvasive prenatal diagnosis through targeted covalent labeling of genomic sites”, PCT/IB2020/053011, WO2021198726.

Publications

1. Ličytė J., Kvederavičiūtė K., Rukšėnaitė A., Godliauskaitė E., Gibas P., Tomkutė V., Petraitytė G., Masevičius V., Klimašauskas S., Kriukienė E. (2022) Distribution and regulatory roles of oxidized 5-methylcytosines in DNA and RNA of the Basidiomycete fungi *Laccaria bicolor* and *Coprinopsis cinerea*. *Open Biol.* 12: 210302. <https://doi.org/10.1098/rsob.210302>. **IF 5.93**. Q1.
2. Narmonte M., Gibas P., Daniūnaitė K., Gordevičius J., **Kriukiene E.** (2021). Multiomics Analysis of Neuroblastoma Cells Reveals a Diversity of Malignant Transformations. *Front Cell Dev Biol* 9, 727353. **IF 6.68**. Q1. doi: 10.3389/fcell.2021.727353.
3. Gordevičius J., Narmontė M., Gibas P., Kvederavičiūtė K., Tomkutė V., Paluoja P., Krjutškov K., Salumets A, **Kriukienė E.** (2020) Identification of fetal unmodified and 5-hydroxymethylated CGs in maternal cell-free DNA for non-invasive prenatal testing, *Clin Epigenetics*, 12, 153. **IF 6.03**. Q1. doi: 10.1186/s13148-020-00938-x.
4. Ličytė J, Gibas P, Skardžiūtė K, Stankevičius V, Rukšėnaitė A, **Kriukienė E.** (2020) A bisulfite-free approach for base-resolution analysis of genomic 5-carboxylcytosine. *Cell Reports*, **IF 9.4**. 32:108155. doi: 10.1016/j.celrep.2020.108155.
5. Gibas P, Narmontė M, Staševskij Z, Gordevičius J, Klimašauskas S, **Kriukienė E.** (2020) Precise genomic mapping of 5-hydroxymethylcytosine via covalent tether-directed sequencing. *PLoS Biol.* 18(4):e3000684. **IF 8.3**. doi: 10.1371/journal.pbio.3000684.
6. Daniūnaitė K, Jarmalaitė S, **Kriukienė E.** (2019) Epigenomic technologies for deciphering circulating tumor DNA. *Curr Opin Biotechnol.* 55:23-29. **IF 8.3**. doi: 10.1016/j.copbio.2018.07.002.
7. Staševskij Z., Gibas P., Gordevičius J., **Kriukienė E.*** and Klimašauskas S.* (2017) Tethered Oligonucleotide-Primed sequencing, TOP-seq: a high-resolution economical approach for DNA epigenome profiling. *Mol Cell*, 65, 1-11. * - corresponding authors. **IF 14.708**. doi: 10.1016/j.molcel.2016.12.012.
8. Labrie V., Buske O. J, Oh E., Jeremian R., Ptak C., Gasiūnas G., Maleckas A., Petereit R., Žvirbliene A., Adamonis K., **Kriukienė E.**, Koncevičius K., Gordevičius J., Nair A., Zhang A., Ebrahimi S., Oh G., Šikšnys V., Kupčinskas L., Brudno M., and Petronis A. (2016) Lactase nonpersistence is directed by DNA-variation-dependent epigenetic aging. *Nature Struct. Mol. Biol.* 23: 566-573. **IF 13.338**. doi: 10.1038/nsmb.3227.

9. Tomkuvienė M, **Kriukienė E**, Klimašauskas S. (2016) DNA Labeling Using DNA Methyltransferases. *Adv Exp Med Biol.* 945, 511-535. **IF 2.5**. doi: 10.1007/978-3-319-43624-1_19.
10. Liutkevičiūtė Z. & **Kriukienė E.**, Ličytė J, Rudytė M, Urbanavičiūtė G, Klimašauskas S. (2014) Direct decarboxylation of 5-carboxylcytosine by DNA C5-methyltransferases. *J Am Chem Soc.* 136, 5884-7. **IF 12.113**. doi: 10.1021/ja5019223.
11. **Kriukiene E.**, Labrie V., Khare T., Urbanavičiūtė G., Lapinaitė A., Koncevičius K., Li D., Wang T., Pai S., Ptak C., Gordevičius J., Wang SC., Petronis A., Klimašauskas S. (2013) DNA unmethylome profiling by covalent capture of CpG sites. *Nat Commun*, 4:2190. **IF 10.742**. doi: 10.1038/ncomms3190.
12. Khare T., Pai S., Koncevicus K., Pal M., **Kriukienė E.**, Liutkevičiūtė Z., Irimia M., Jia P., Ptak C., Xia M., Tice R., Tochigi M., Morera S., Nazarians A., Belsham D., Wong A.H., Blencowe B.J., Wang S.C., Kapranov P., Kustra R., Labrie V., Klimasauskas S., Petronis A. (2012) 5-hmC in the brain is abundant in synaptic genes and shows differences at the exon-intron boundary. *Nat Struct Mol Biol.* 19, 1037-43. **IF 11.902**. doi: 10.1038/nsmb.2372.
13. **Kriukienė E.**, Liutkevičiūtė Z., Klimašauskas S. (2012) 5-Hydroxymethylcytosine - the elusive epigenetic mark in mammalian DNA. *Chem Soc Rev.*, 41, 6916-30. **IF 24.892**. doi: 10.1039/c2cs35104h.
14. Liutkevičiūtė Z., **Kriukienė E.**, Grigaitytė I., Masevičius V., Klimašauskas S. Methyltransferase-directed derivatization of 5-hydroxymethylcytosine in DNA. (2011) *Angew Chem Int Edit.* 50, 2090-3. *Angew Chem.* (2011), 123, 2138-2141. **IF 9.24**. doi: 10.1002/anie.201007169.
15. Jakubauskas A. **Kriukienė E.** Trinkūnaitė L., Šapranauskas S. Jurėnaitė-Urbanavičienė S., Lubys A. Bioinformatic and partial functional analysis of pEspA and pEspB, two plasmids from *Exiguobacterium arabatum* sp. nov. RFL1109. (2009) *Plasmid.* 61, 52-64. doi: 10.1016/j.plasmid.2008.09.004.
16. Klimašauskas S., Gerasimaitė R., Urbanavičiūtė G., **Kriukienė E.**, Lukinavičius G., Petronis A., Epigenome profiling via DNA methyltransferase-directed labeling (2008) *Cellular Oncology*, 30, 232.
17. Jurėnaitė-Urbanavičienė S., Šerkšnaitė J., **Kriukienė E.**, Giedrienė J., Venclovas C., Lubys A.. Generation of DNA cleavage specificities of type II restriction endonucleases by reassortment of target recognition domains. (2007) *Proc. Natl. Acad. Sci. USA* 104, 10358-10363. **IF 9.6**. doi: 10.1073/pnas.0610365104.
18. **Kriukienė E.** Domain organization and metal ion requirement of the type IIS restriction endonuclease MnlI. (2006) *FEBS Letters* 580, 6115-6122. **IF 3.7**. doi: 10.1016/j.febslet.2006.09.075.
19. **Kriukienė E.**, Lubienė J., Lagunavicius A., Lubys A. MnlI-The member of H-N-H subtype of Type IIS restriction endonucleases. (2005) *Biochim. Biophys. Acta* 1751, 194-204. **IF 2.5**. doi: 10.1016/j.bbapap.2005.06.006.

Conferences

18 international leading conferences on Epigenetics and DNA modifying enzymes with poster/oral presentations.

Supervision

Supervised 14 BSc and MSc projects. The research of supervised students was evaluated with the highest score. Currently supervising 3 PhD students.

BSc/MSc students:

Gintarė Merkevičiūtė, (2000-2001) Vilnius University, BSc in Biochemistry, score 10.
 Audronė Lapinaitė, (2008-2009) Vilnius University, MSc in Biochemistry, score 10.
 Indrė Grigaitytė (2011-2012) Vilnius University, MSc in Biochemistry, score 10.
 Agnė Vaillionytė (2013-2014), Vilnius University, diploma in Molecular Biology, score 10.
 Milda Rudytė (Narmontė) (2012-2014), Vilnius University, BSc in Biochemistry, Cum Laude, score 10.

Milda Rudytė (Narmontė) (2014-2016), Vilnius University, MSc in Biochemistry, Magna Cum Laude, score 10.
Ieva Stirblytė (2014-2016), Vilnius University, MSc in Biochemistry, Magna Cum Laude, score 10.
Mantas Šarauskas (2014-2016), Vilnius University, BSc in Biochemistry, score 10.
Mantas Šarauskas (2016-2017) Vilnius University, MSc studies in Biochemistry, score 10.
Liepa Kazlauskaitė (2017-2018) Vilnius University, BSc studies in Genetics. score 10.
Kotryna Skardžiūtė (2016-2018) Vilnius University, BSc in Molecular Biology, score 10.
Eglė Godliauskaitė (2018-2019) Vilnius University, MSc studies in Biochemistry, score 10.
Kotryna Skardžiūtė (2018-2020) Vilnius University, MSc in Molecular Biology, score 10.
Antanas Petkus (2021-current) Vilnius University, BSc studies in Genetics.

PhD students:

Janina Ličytė (2013-2018), biochemistry, Vilnius University, PhD project: “New approaches for profiling of epigenetic DNA modifications”. Expected defense of PhD thesis in 2022.

Milda Narmontė (2016-2021), biochemistry, Vilnius University, PhD project: “Single-cell epigenomics. DNA modification analysis in NB”. Expected defense of PhD thesis in 2022.

Kotryna Skardžiūtė (2020-current) biochemistry, Vilnius University, PhD project: “DNA modification and chromatin dynamics in development”.
