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Group Leader, Supervisor for doctoral programme, University Lecturer
Molecular and Integrative Biosciences Research Programme
RNAcious laboratory

Doctoral Programme in Microbiology and Biotechnology

Doctoral Programme in Integrative Life Science

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Qualifications

Molecular Biology, Title of Docent (Adjunct Professor), Faculty of Biological and Environmental Sciences

Award Date: 18 Jun 2014

Molecular Virology, Doctor of Philosophy, Molecular mechanisms of bacteriophage phi6 RNA dependent RNA polymerase and its utilization in biotechnology., Faculty of Biological and Environmental Sciences

1 Nov 2005 → 31 Dec 2010

Award Date: 18 Jan 2011

General Microbiology, Master of Science, Expression and purification of RNA-dependent RNA polymerases from novel RNA viruses, Faculty of Biological and Environmental Sciences

1 Feb 2005 → 31 Oct 2005

Award Date: 19 Oct 2005

Principal Investigator

Period : 01.09.2016 - * in Molecular and Integrative Biosciences Research Programme

Employment

University Lecturer

Molecular and Integrative Biosciences Research Programme

University of Helsinki

Finland

15 Oct 2019 → present

Group Leader

RNAcious laboratory

University of Helsinki

1 Sept 2016 → present

Supervisor for doctoral programme

Doctoral Programme in Microbiology and Biotechnology

University of Helsinki

Finland

1 Jan 2020 → present

Supervisor for doctoral programme

Doctoral Programme in Integrative Life Science

University of Helsinki

Finland

1 Aug 2017 → present

Visiting Scientist

Max Planck Institute for Molecular Biomedicine
Germany

1 Jan 2016 → 31 Aug 2016

Postdoctoral Research Fellow

Max Planck Institute for Molecular Biomedicine
Germany

1 Mar 2012 → 31 Dec 2015

Publications

Purification of micrococcal nuclease for use in ribosomal profiling of high-salinity extremophiles

Gregorova, P., Isada, M., DiRuggiero, J. & Sarin, P., 17 Dec 2024, In: Journal of Biological Chemistry. 301, 1, 108020.

Long noncoding RNA EPCART regulates translation through PI3K/AKT/mTOR pathway and PDCD4 in prostate cancer

Kohvakka, A., Sattari, M., Nättinen, J., Aapola, U., Gregorova, P., Tammela, T. L. J., Uusitalo, H., Sarin, P., Visakorpi, T. & Latonen, L., 15 Aug 2024, In: Cancer Gene Therapy. 31, 10, p. 1536-1546 11 p.

Deciphering the RNA Modification Landscape in Arabidopsis Chloroplast tRNAs and rRNAs Reveals a Blend of Ancestral and Acquired Characteristics

Golebiewska, K., Gregorova, P., Sarin, P. & Gawronski, P., 15 Jun 2024, (Submitted).

Global analysis of aging-related protein structural changes uncovers enzyme-polymerization-based control of longevity

Paukštytė, J., López Cabezas, R. M., Feng, Y., Tong, K., Schnyder, D., Elomaa, E., Gregorova, P., Doudin, M., Särkkä, M., Sarameri, J., Lippi, A., Vihinen, H., Juutila, J., Nieminen, A., Törönen, P., Holm, L., Jokitalo, E., Krisko, A., Huiskonen, J. & Sarin, L. P. & 4 others, Hietakangas, V., Picotti, P., Barral, Y. & Saarikangas, J., 21 Sept 2023, In: Molecular Cell. 83, 18, p. 3360-3376

Novel Insights into the Mechanisms of Microbial Transcription and Translation

Sarin, P., 30 Jun 2023, In: Microorganisms. 11, 7, 3 p., 1720.

Bacteriophage Infection of the Marine Bacterium *Shewanella glacialimarina* Induces Dynamic Changes in tRNA Modifications

Lampi, M., Gregorova, P., Qasim, M. S., Ahlblad, N. C. V. & Sarin, P., Feb 2023, In: Microorganisms. 11, 2, 16 p., 355.

Proteiniinien rakennemuutosten kartoittaminen paljastaa, miten solut ikääntyvät

Paukštytė, J., López Cabezas, R. M., Feng, Y., Tong, K., Schnyder, D., Elomaa, E., Gregorova, P., Doudin, M., Särkkä, M., Sarameri, J., Lippi, A., Vihinen, H., Juutila, J., Nieminen, A., Törönen, P., Holm, L., Jokitalo, E., Krisko, A., Huiskonen, J. & Sarin, L. P. & 4 others, Hietakangas, V., Picotti, P., Barral, Y. & Saarikangas, J., 2023, In: Duodecim. 139, 19, p. 1575 1 p.

Learning from the Invaders: What Viruses Teach Us about RNA-Based Regulation in Microbes

Sarin, P., 25 Oct 2022, In: Microorganisms. 10, 11, 7 p., 2106.

An improved RT-qPCR method for direct quantification of enveloped RNA viruses

Gregorova, P., Heinonen, M.-M. K. & Sarin, P., 1 Jun 2022, In: MethodsX. 9, 9 p., 101737.

Cold-active *Shewanella glacialimarina* TZS-4T nov. features a temperature-dependent fatty acid profile and putative sialic acid metabolism

Qasim, M. S., Lampi, M., Heinonen, M.-M. K., Garrido-Zabala, B., Bamford, D., Käkelä, R., Roine, E. & Sarin, P., 1 Oct 2021, In: Frontiers in Microbiology. 12, 13 p., 737641.

Developmental tissue differentiation of tRNA modification dynamics in European dewberry (*Rubus caesius* L.) callus formation and growth

Hotti, H., Qasim, M. S., Kalaniemi, S. M. & Sarin, P., 21 Jul 2021.

Post-transcriptional transfer RNA modifications as modulators of heterologous protein production

Hotti, H. & Sarin, P., 3 Jul 2021.

Broad-range RNA modification analysis of complex biological samples using rapid C18-UPLC-MS

Gregorova, P., Sipari, N. & Sarin, P., 2021, In: *RNA Biology*. 18, 10, p. 1382-1389 8 p.

Nano LC-MS using capillary columns enables accurate quantification of modified ribonucleosides at low femtomol levels. Sarin, L. P., Kienast, S. D., Leufken, J., Ross, R. L., Dziergowska, A., Debiec, K., Sochacka, E., Limbach, P. A., Fufezan, C., Drexler, H. C. & Leidel, S. A., Oct 2018, In: *RNA*. 24, 10, p. 1403-1417 15 p.

Transfer RNA modification and infection – implications for pathogenicity and host responses

Koh, C. S. & Sarin, L. P., Apr 2018, In: *Biochimica et Biophysica Acta. Gene Regulatory Mechanisms*. 1861, 4, p. 419-432 14 p.

tRNA modification as a virulence factor in pathogenic *Candida* species

Böttcher, B., Morgner, B., Sarin, L. P., Allert, S., Jacobsen, I. D., Drexler, H. C., Leidel, S. A. & Brunke, S., Aug 2017, In: *Mycoses*. 60, SI, p. 13-14 1 p.

pyQms enables universal and accurate quantification of mass spectrometry data

Leufken, J., Niehues, A., Sarin, L. P., Wessel, F., Hippler, M., Leidel, S. A. & Fufezan, C., 20 Jul 2017, In: *Molecular & Cellular Proteomics*. 16, 10, p. 1736-1745 10 p.

An evolutionary approach uncovers a diverse response of tRNA 2-thiolation to elevated temperatures in yeast.

Alings, F., Sarin, L. P., Fufezan, C., Drexler, H. C. & Leidel, S. A., 21 Feb 2015, In: *RNA*. 21, 2, p. 202-212 10 p.

Efficient double-stranded RNA production methods for utilization in plant virus control

Voloudakis, A. E., Holeva, M. C., Sarin, L. P., Bamford, D., Vargas, M., Poranen, M. & Tenllado, F., 2015, *Plant Virology Protocols: New Approaches to Detect Viruses and Host Responses*. Uyeda, I. & Masuta, C. (eds.). USA: Humana press, Vol. 1236. p. 255-274 20 p. (Methods in Molecular Biology).

Modify or die?--RNA modification defects in metazoans.

Sarin, L. P. & Leidel, S. A., 2014, In: *RNA Biology*. 11, 12, p. 1555-1567 12 p.

High-throughput purification of double-stranded RNA molecules using convective interaction media monolithic anion exchange columns

Romanovskaya, A., Sarin, L. P., Bamford, D. & Poranen, M., 31 Jan 2013, In: *Journal of Chromatography. A*. 1278, p. 54-60 7 p.

Structure of a VP1-VP3 complex suggests how birnaviruses package the VP1 polymerase

Bahar, M. W., Sarin, L. P., Graham, S. C., Pang, J., Bamford, D. H., Stuart, D. I. & Grimes, J. M., 2013, In: *Journal of Virology*. 87, 6, p. 3229-3236 8 p.

The C-terminal priming domain is strongly associated with the main body of bacteriophage phi6 RNA-dependent RNA polymerase

Sarin, L. P., Wright, S., Chen, Q., Degerth, L. H., Stuart, D. I., Grimes, J. M., Bamford, D. H. & Poranen, M. M., 10 Oct 2012, In: *Virology*. 432, 1, p. 184-193 10 p.

Incoming influenza A virus evades early host recognition, while influenza B virus induces interferon expression directly upon entry

Österlund, P., Strengell, M., Sarin, L. P., Poranen, M. M., Fagerlund, R., Melen, K. & Julkunen, I., Oct 2012, In: Journal of Virology. 86, 20, p. 11183-11193 11 p.

Bacteriophage phi6 nucleocapsid surface protein 8 interacts with virus-specific membrane vesicles containing major envelope protein 9

Sarin, L. P., Hirvonen, J. J., Laurinmaki, P., Butcher, S. J., Bamford, D. H. & Poranen, M. M., 2012, In: Journal of Virology. 86, 9, p. 5376-5379 4 p.

Innate Immune Responses in Human Monocyte-Derived Dendritic Cells Are Highly Dependent on the Size and the 5' Phosphorylation of RNA Molecules

Jiang, M., Osterlund, P., Sarin, L. P., Poranen, M. M., Bamford, D. H., Guo, D. & Julkunen, I., 2011, In: Online Journal of Immunology. 187, 4, p. 1713-1721 9 p.

The N-Terminus of the RNA Polymerase from Infectious Pancreatic Necrosis Virus Is the Determinant of Genome Attachment

Graham, S. C., Sarin, L. P., Bahar, M. W., Myers, R. A., Stuart, D. I., Bamford, D. H. & Grimes, J. M., 2011, In: PLoS Pathogens. 7, 6, p. e1002085 11 p.

Molecular mechanisms of bacteriophage phi6 RNA-dependent RNA polymerase and its utilization in biotechnology

Sarin, L. P., 2010, Helsinki: University of Helsinki. 62 p.

Insights into the pre-initiation events of bacteriophage phi6 RNA-dependent RNA polymerase: towards the assembly of a productive binary complex

Sarin, L. P., Poranen, M. M., Lehti, N. M., Ravantti, J. J., Koivunen, M. R. L., Aalto, A. P., Van Dijk, A. A., Stuart, D. I., Grimes, J. M. & Bamford, D. H., 2009, In: Nucleic Acids Research. 37, 4, p. 1182-1192 11 p.

Structure-function insights into the RNA-dependent RNA polymerase of the dsRNA bacteriophage 6

Koivunen, M. R. L., Sarin, L. P. & Bamford, D. H., 2008, *Segmented double-stranded RNA viruses: edited by John T. Patton*. Norfolk, UK: Caister Academic Press, p. 239-257 19 p.

Large-scale production of dsRNA and siRNA pools for RNA interference utilizing bacteriophage phi6 RNA-dependent RNA polymerase

Aalto, A., Sarin, L. P., Van Dijk, A. A., Saarma, M., Poranen, M. M., Arumäe, U. & Bamford, D. H., 2007, In: RNA. 13, 3, p. 422-429 8 p.

Identification of mutations causing temperature-sensitive defects in Semliki forest virus RNA synthesis

Lulla, V., Merits, A., Sarin, P., Kääriäinen, L., Keränen, S. & Ahola, T., 2006, In: Journal of Virology. 80, 6, p. 3108-3111 4 p.

Projects

Center of Excellence in Virus Research (CoE_VIRRES)

Bamford, D. H. (Principal Investigator), Bamford, J. (Participant), Butcher, S. (Principal Investigator), Oksanen, H. M. (Principal Investigator), Poranen, M. (Principal Investigator), Roine, E. (Principal Investigator), Kainov, D. (Principal Investigator), Tuma, R. (Participant), Ravantti, J. (Participant), Huiskonen, J. (Participant), Jääliñoja, H. (Participant), Ora, A. (Participant), Hattula, K. (Participant), Ziedaite, G. (Participant), Romanovskaya, A. (Participant), Lisal, J. (Participant), Buivydas, A. (Participant), Redder, P. (Participant), Domanska, A. (Participant), Vilen, S. (Participant), Manole, V. (Participant), Happonen, L. (Participant), Seitsonen, J. (Participant), Liljeroos, L. (Participant), Suchanova, B. (Participant), Falck, S. (Participant), Daugelavicius, R. (Participant), Golubtsov, A. (Participant), Yuan, P. (Participant), Anastasina, M. (Participant), Karhu, N. J. (Participant), Koivunen, M. (Participant), Laurinavicius, S. (Participant), Wallin, A. (Participant), Aalto, A. P. (Participant), Sarin, P. (Participant), Atanasova, N. (Participant), Sun, X. (Participant), Pietilä, M. (Participant), Krupovic, M. (Participant), Cvirkaite-Krupovic, V. (Participant), Kukkaro, P. (Participant) & Pirttimaa, M. (Participant) 25/02/2011 → 31/12/2016

ProteRNA: Enhanced Production of Heterologous Proteins Following Translational Fine-Tuning by Optimized Post-Transcriptional RNA Modification

Sarin, P. (Principal Investigator), Qasim, M. S. (Participant), Abendroth, U. (Participant), Pedor, J. K. (Participant), Kalaniemi, S. M. (Participant) & Heinonen, M.-M. K. (Participant)

01/09/2019 → 31/08/2025

CHEMODI: Modulation of post-transcriptional transfer RNA modification as an enhancer of chemotherapeutic agents

Sarin, P. (Project manager), Gregorova, P. (Participant), Heinonen, M.-M. K. (Participant), Nordman, E. M. (Participant), Gregorova, P. (Participant) & Laarne, M. M. (Participant)

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01/05/2022 → 30/04/2025

PROMOTE: Post-transcriptional RNA modifications as modulators of translation and infection.

Sarin, P. (Project manager), Gregorova, P. (Participant), Heinonen, M.-M. K. (Participant), Hodge, Y. (Participant), Kirkinen, T. A. (Participant), Mikhailava, N. (Participant), Nordman, E. M. (Participant), Radešić, M. (Participant), Rajaveräjä, A.-E. (Participant), Willman, A. (Participant) & Yaman, E. (Participant)

Academy of Finland

01/09/2023 → 31/08/2027

TUPA: Solutions for increased societal safety and individual health during pandemics

Gregorova, P. (Participant), Heinonen, M.-M. K. (Participant) & Sarin, P. (Principal Investigator)

Business Finland

01/10/2020 → 31/03/2021

The role of translational misregulation in tumorigenesis

Sarin, P. (Principal Investigator), Gregorova, P. (Participant) & Rayamajhi Thapa, R. (Participant)

01/05/2017 → 30/04/2020

Transfer RNA modifications as modulators of translation.

Sarin, P. (Principal Investigator), Koh, C. S. (Participant), Gregorova, P. (Participant), Hotti, H. (Participant), Rayamajhi Thapa, R. (Participant), Abendroth, U. (Participant) & Lampi, M. (Participant)

SUOMEN AKATEMIA, Academy of Finland

01/09/2016 → 31/08/2021

Translational adaptation to directed evolution by post-transcriptional RNA modifications

Hotti, H. (Project manager) & Sarin, P. (Principal Investigator)

01/09/2018 → 31/08/2021

Translation and neoplasia – the multifaceted role of post-transcriptional transfer RNA modification

Sarin, P. (Project manager), Gregorova, P. (Participant), Gregorova, P. (Participant), Heinonen, M.-M. K. (Participant) & Laarne, M. M. (Participant)

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01/05/2020 → 31/12/2022