



IUBMB Focused Meeting on Aminoacyl-tRNA Synthetases: AARS 2023 Program

Sunday, June 4, 2023	
Registration	3:00 pm-8:30 pm
Welcome Cocktails	4:00 pm–6:00 pm
Dinner	6:30 pm-8:00 pm
Alexandra Newton, University of California San Diego Opening remarks from the IUBMB president	8:00 pm-8:10 pm
Patrick O'Donoghue & Ilka Heinemann, The University of Western Ontario Opening remarks from the Organizers	8:10 pm-8:20 pm
Keynote 1 Nahum Sonenberg, McGill University <i>The mRNA 5' cap-binding protein, eIF4E2 (4EHP) links with the AARS and miRNA</i>	8:20 pm–9:00 pm 1 <i>apparatuses</i>
Monday, June 5, 2023	
Session A: <i>AARS Biochemistry</i> Session Chair: Tamara Hendrickson, Wayne State University	
Opening remarks from the Chair	8:55 am-9:00 am
Michael Ibba, Chapman University Divergent changes in the synthetic and proofreading activities of aminoacyl-tRNAs required for a concerted response to oxidative stress	9:00 am–9:20 am synthetases are
Marie Sissler, Centre National de la Recherche Scientifique Mitochondrial threonyl-tRNA synthetase (TARS2)-related disorders	9:20 am–9:40 am
Thomas Carell, Ludwig Maximilian University The prebiotic origin of the RNA nucleosides and translation	9:40 am–10:00 am
Hubert Becker, University of Strasbourg Saccharomyces organellar echoforms of cytosolic aminoacyl-tRNA synthetases: no	10:00 am–10:20 am t simply mislocated
Ita Gruic–Solvj, University of Zagreb Mupirocin hyper-resistance secured by naturally altered class I signature motif	10:20 am–10:40 am
Coffee Break	10:40 am–11:00 am





Magali Frugier, Centre National de la Recherche Scientifique Two aminoacyl-tRNA synthetase complexes, membrane localization and unusual role many questions remain about tRNA biology in Plasmodium	11:00 am–11:20 am <i>in tRNA import:</i>
Natalia Mora, Radboud University Loss of function mechanisms in CMT2D	11:20 am–11:30 am
Julian Ross, University of Vienna, Institute of Molecular Biotechnology Functional characterization of a phenylalanyl-tRNA-synthetase-based selfish element tropicalis	11:30 am–11:50 am <i>in the nematode C</i> .
Lunch	11:50 am-1:15 pm
Session B: Synthetic Biology & Orthogonal Translation	
Session Chair: Jiqiang Ling, University of Maryland Opening remarks from the Chair	1:15 pm-1:20 pm
Keynote 2 Dieter Söll, Yale University <i>Pyrrolysine and Selenocysteine - different designs to manifest the genetic code</i>	1:20 pm–2:00 pm
Ren Nakazaki, The University of Tokyo Translational regulation mediated by ligand-induced tRNA activation	2:00 pm –2:20 pm
Xiang-Lei Yang, Scripps Research Probing the physiological role of nuclear tRNA synthetases in mammals	2:20 pm-2:40 pm
Jeffrey Tharp, Indiana University School of Medicine Split aminoacyl–tRNA synthetases for proximity-induced stop codon suppression	2:40 pm-3:00 pm
Margaret A. Schmitt Rapid evaluation of sense codon reassignment potential by the M. barkeri pyrrolysyl-the	3:00 pm–3:10 pm RNA/aaRS pair
Yane-Shih Wang, Academia Sinica X-ray crystal structure of wild type G1PylRS reveals multiple binding modes and chird accommodate pyrrolysine and noncanonical amino acids	3:10 pm–3:30 pm al degeneracy to
Coffee Break	3:30 pm–3:50 pm

Wei Lu, University of Tokyo3:50 pm-4:10 pmDevelopment of aminoacylation ribozymes capable of peptide elongation in one-pot in vitro translation





Natalie Krahn, Yale University4:10 pm-4:30 pmWithout a recruitment domain, pyrrolysyl-tRNA synthetase requires a rigid tRNA identity structure for
recognition

Session C: AARS genomics & tRNAomics Session Chair: I luís Ribas de Pouplana, IRB Barcelona	
Opening remarks from the Chair	4:35 am-4:40 pm
<i>EMBO Young Investigator Lecture</i> Danny Nedialkova, Max Planck Institute of Biochemistry <i>Transfer RNA pools in human cells are controlled by selective gene expression</i>	4:40 pm–5:00 pm
Todd Lowe, University of California, Santa Cruz The complexity leap in tRNA evolution in vertebrates	5:00 pm–5:20 pm
Joe Chihade, Carleton College Novel features of helminth aminoacyl-tRNA synthetases	5:20 pm–5:40 pm
Jordan Douglas, University of Auckland Rethinking the taxonomy of AARS hierarchical modularity	5:40 pm–6:00 pm
Dinner	6:00 pm-7:30 pm

Tuesday, June 6, 2023

Session D1: AARSs in health and disease Session Chair: Haissi Cui, University of Toronto	
Opening remarks from the Chair	8:55 am-9:00 am
Rob Burgess, The Jackson Laboratory Rescue of tRNA synthetase-associated neuropathy by inhibiting GCN2 or supplementing	9:00 am–9:20 am g tRNA expression
Karin Musier-Forsyth, The Ohio State University Role of aminoacyl-tRNA synthetases in HIV-1 lifecycle	9:20 am–9:40 am
Sunghoon Kim, Yonsei University An oncogenic variant of aminoacyl-tRNA synthetase-interacting multi-functional protein novel target to control KRAS-driven cancer	9:40 am–10:00 am n 2 (AIMP2) as a
Albena Jordanova, VBI–University of Antwerpen 10 Unraveling the non-aminoacylation functions of tyrosyl-tRNA synthetase: insights from peripheral neuropathies	0:00 am–10:20 am <i>inherited</i>





Paul Fox, Cleveland Clinic Defective m ⁶ A methylation of EPRS1 mRNA in hypomyelinating leukodystrophy patient	0:20 am–10:40 am s
Coffee break	0:40 am–11:00 am
AARS patient panel1Victoria Mok Siu, The University of Western Ontario (panel chair)1	1:00 am-12:00 pm
Lunch	12:00 pm-1:25 pm
Session D2: AARSs in health and disease Session Chair: Michael Ibba, Chapman University Opening remarks from the Chair	1:25 pm-1:30 pm
Victoria Mok Siu, The University of Western Ontario Clinical strategies in the management of individuals with HARS (His-tRNA synthetase)	1:30 pm–1:50 pm syndrome
Marisa Mendes, Amsterdam UMC Thermal characterization of human aminoacyl-tRNA synthetases in health and disease	1:50 pm-2:10 pm
Christina Nemeth Mertz, Kennedy Krieger Institute The LBSL transcriptome: distinct and divergent gene expression profiles based on DAP	2:10 pm–2:30 pm RS2 mutation
Rachel Heilmann, The Rory Belle Foundation Insights into NARSI-Associated Disease: A preliminary genotype–phenotype review by research advocates	2:30 pm–2:50 pm patient and
Justin Wang, The Scripps Research Institute Seryl-tRNA synthetase inhibits breast cancer metastasis possibly through blocking Wnt	2:50 pm–3:10 pm signaling
Coffee	3:10 pm-3:25 pm
Session E: AARS & tRNA Therapeutics	
Session Chair: John Nick Fisk, University of Colorado, Denver Opening remarks from the Chair	3:25 pm–3:30 pm
Leslie Nangle, aTyr Pharma Clinical proof-of-concept for a novel therapeutic based on histidyl-tRNA synthetase for	3:30 pm–3:50 pm

interstitial lung diseases





9:00 am-9:20 am

Sarah Wilhelm, The University of Western Ontario Histidine supplementation can escalate of rescue HARS deficiency in a Charcot-Marie- model	3:50 pm-4:10 pm Tooth disease
Edmund Grace, Oxford Drug Design A novel class of Gram-negative antibacterial agents targeting leucyl-tRNA synthetase	4:10 pm-4:30 pm
Min-Xin Guan, Zhejiang University Nuclear modifier mitochondrial tyrosyl-tRNA synthetase allele correction restored retin specific deficiencies in Leber's hereditary optic neuropathy	4:30 pm–4:50 pm al ganglion cells–
Ralph Mazitschek, Harvard Medical School Development of novel ProRS inhibitors for malaria	4:50 pm–5:10 pm
Alice Hadchouel, Hôpital Universitaire Necker-Enfants Malades Methionine supplementation as a game-changer for severe pulmonary alveolar proteine MARS1 mutations	5:10 pm–5:30pm osis related to
Guillaume Hoffmann, National Institute of Health and Medical Research (Inserm) Institute for Advanced Biosciences (IAB) Adenosine–dependent activation mechanism of prodrugs targeting an aminoacyl-tRNA	5:30 pm–5:50 pm synthetase
Trinayan Kashyap, hC Bioscience, Inc. Anticodon engineered tRNA rescues expression of tumor suppressor proteins, resulting inhibition of metastatic colorectal cancer models in vivo	5:50 pm–6:10 pm in growth
Dinner	6:10 pm–7:30 pm
Keynote 3 Paul Schimmel, Scripps Research Back to AARS beginnings and the layers of deep learning that followed	7:30 pm–8:10 pm
Poster Session & Social	8:10 pm–9:45 pm
Wednesday, June 7, 2023	
Session F1: Structure, evolution, and cellular function of AARSs & tRNAs	
Session Chair: Yane-Shih Wang, Academia Sinica Opening remarks from the Chair	8:55 am-9:00 am

Lluís Ribas de Pouplana, IRB Barcelona Saturation of tRNA sequence space restricts genetic code growth





Aaron Voigt, University Clinic RWTH Aachen PolyQure: Increasing translational error-rate by TRMT2A-inhibition, an avenue to c	9:20 am–9:40 am cure polyQ diseases?
Rasangi Tennakoon, The University of Western Ontario Inhibiting polyglutamine aggregation with mistranslating tRNAs	9:40 am–9:50 am
Elizabeth Kalotay, University of New South Wales Novel pre-clinical HBSL models to enable proof-of-concept for AAV-mediated DARS	9:50 am–10:00 am I gene therapy
Shigeyuki Yokoyama, RIKEN Structure-based engineering of Methanomethylophilus alvus and ISO4-G1 PylRSs for expanded cell-free protein synthesis	10:00 am–10:20 am r genetic-code-
Rylan Watkins, The Ohio State University Trypanosoma brucei prolyl-tRNA synthetase and a trans–editing domain maintain pr translational fidelity	10:20 am–10:40 am coline codon
Coffee Break	10:40 am-11:00 am
Keynote 4 Zoya Ignatova, Universität Hamburg <i>Charcot-Marie-Tooth disease linked to mutations in aminoacyl-tRNA synthetases: tR.</i> <i>pathology (and cure)</i>	11:00 am–11:40 am NA-centered view of
Industry panel aTyr Pharma, hC Bioscience, Oxford Drug Design, BioCon	11:40 am-12:40 pm
Lunch	12:40 pm–2:00 pm
Excursion	2:00 pm-5:00 pm
Pinery Provincial Park Buses to Pinery: pickup at Oakwood – 2:00 pm Buses back to Oakwood: pickup at Pinery – 5:00 pm	
<i>Dinner @ Hessenland</i> Buses to Hessenland for dinner: pickup at Oakwood – 5:45 pm Buses back to Oakwood: pickup at Hessenland – 9:00 pm	5:30 pm-8:00 pm





Thursday, June 8, 2023

Session F2: <i>Structure, evolution, and cellular function of AARSs & tRNAs</i> Session Chair: Todd Lowe, University of California Santa Cruz	
Opening remarks from the Chair	8:55 am-9:00 am
Umesh Varshney, Indian Institute of Science, Bangalore IF3 interaction with initiator-tRNA elbow modulates translation initiation and growth Escherichia coli	9:00 am–9:20 am h fitness in
Jiqiang Ling, University of Maryland, College Park Coordination of aminoacylation and editing in proteotoxic stress	9:20 am–9:40 am
Yoav S. Arava, Technion – Israel Institute of Technology <i>tRNA-related modification and anticodon stem loop structure underlie translation reg</i> <i>aaRS</i>	9:40 am–10:00 am gulation by yeast
Qi Chen, University of Utah, School of Medicine Puzzles and solutions in resolving RNA modifications in tRNA-derived small RNAs	10:00 am-10:20 am
Parker Murphy, University of Maryland, College Park Investigating the cellular impacts of translational fidelity mutations	10:20 am-10:30 am
Peter Rozik, The University of Western Ontario Elucidating tRNA-dependent mistranslation rates in living cells	10:30 am–10:40 am
Coffee break	10:40 am-11:00 am
Ru-Juan Liu, ShanghaiTech University Molecular basis of human Trmt13 in tRNA modification and transcriptional regulation	11:00 am–11:20 am
Bastien Muller, National Institute of Health and Medical Research (Inserm) Institute for Advanced Biosciences (IAB) Structural basis of the resistance mechanisms by an antibiotic targeting leucyl-tRNA drug resistant gram-negative bacteria	11:20 am–11:40 am synthetase of multi–
Tong Zhou, University of Nevada, Reno School of Medicine Exploring the tRNA fragmentation principles across multiple species	11:40 pm-12:00 pm
Lunch	12:00 pm-1:25 pm





Session G: AARSs beyond translation	
Chairs opening remarks	1:25 pm-1:30 pm
Jie Chen, University of Illinois at Urbana–Champaign Threnonyl-tRNA synthetase regulates signal transducer and activator of transcription 3	1:30 pm-1:50 pm
Luis Povoas, IRB Barcelona Control of cell cycle progression by a (multifunctional) mitochondrial protein	1:50 pm-2:00 pm
Haissi Cui, University of Toronto Arg-tRNA synthetase links inflammatory metabolism to RNA splicing and nuclear traffic	2:00 pm–2:20 pm cking via SRRM2
Susan Martinis, University of Illinois at Urbana-Champaign Novel function of LARS in maintenance of gastric carcinoma cell homeostasis	2:20 pm-2:40 pm
Keisuke Wakasugi, The University of Tokyo Tryptophan depletion induces high-affinity tryptophan uptake mediated by tryptophanyl into human cells	2:40 pm–3:00 pm - <i>tRNA synthetase</i>
Mathew Sajish, University of South Carolina Nuclear TyrRS stimulates topoisomerase 1-induced single strand DNA breaks to protect induced neurotoxicity in primary cortical neurons	3:00 pm–3:20 pm t against tyrosine–
Coffee break	3:20 pm-3:40 pm
Myung Hee Kim, Korea Research Institute of Bioscience and Biotechnology A gut-associated bacterial tRNA synthetase acting as an immune modulator	3:40 pm-4:00 pm
Debjit Khan, Lerner Research Institute, Cleveland Clinic Foundation A viral pan-end RNA element and unconventional host aminoacyl–tRNA synthetase com SARS-CoV-2 regulon	4:00 pm–4:20 pm aplex define a
Mirim Jin, Gachon University Tryptophan-dependent and -independent secretions of tryptophanyl- tRNA synthetase: Pathophysiological implications for innate immune responses	4:20 pm-4:40 pm
Jung Min Han, Yonsei University Regulation of the metabolic fate of leucine by leucyl–tRNA synthetase 1	4:40 pm-5:00 pm
Dinner	5:00 pm-6:30 pm





Keynote 5 Faiza Fakhfakh University of Sfay	6:30 pm_7:10 pm
Mutations in aARS genes revealed by next-generation sequencing in mitochondr molecular investigations	rial diseases: Clinical and
Keynote 6	7.10
<i>tRNAs, ribosome stalling, and neuronal function</i>	/:10 pm-/:50 pm
Closing remarks & Presentation prizes Patrick O'Donoghue & Ilka Heinemann, The University of Western Ontario	7:50 pm–8:15 pm
Friday, June 9, 2023	
<i>To-go breakfast</i> (front desk)	5:15 am-6:30 am
Breakfast	6:30 am-10:00 am
Bus departures to Toronto Person International Airport	
Bus 1 – 6:00 am	

Bus 2-9:00 am