



Thomas Jefferson University
Sidney Kimmel Medical College

tRNA Modifications in Oncogenesis and in Neurodegeneration

We seek candidates with a fresh PhD degree in molecular biology to apply bioinformatics skills to decode tRNA modifications in cancers and in neurodegeneration diseases. This candidate should have basic molecular biology skills and be able to use CRISPR techniques. tRNA modifications are the exciting frontier in the central dogma of genetic information transfer from DNA to RNA to protein, where tRNAs are the adaptors and the modifications in tRNAs control the adaptor activity.

Our position is NIH-funded at Thomas Jefferson University, Philadelphia, USA, which offers intellectual growth and the potential for long-term stability.

For more information, please see the following publications and our website:

- Nakano, Y, Gamper, H, McGuigan, H, Maharjan, S, Sun, Z, Yigit, E, Grunberg, S, Krishnan, K, Li, NS, Piccirilli, JA, Kleiner, R, Nichols, N, Hou, YM. (2025) Genome-wide profiling of tRNA modifications by Induro-tRNAseq reveals coordinated changes. **Nat Commun**, PMID: [39865096](#); PMCID: PMC11770116; DOI: [10.1038/s41467-025-56348-1](#).
- Maharjan, S, Masuda, I, Hou, YM. (2025) Acid urea polyacrylamide gel electrophoresis (AUPAGE) and Northern analysis. **Bio-Protocol**. <https://doi.org/10.21769/p2788> <https://www.bio-protocol.org/exchange/preprintdetail?type=3&id=2788&login=2>
- Fanari, O, Tavakoli, S, Qiu, Y, Makhamreh, A, Nilan, K, Akesson, S, Meseonznik, M, McCormick, CA, Block, D, Gamper, H, Jain, M, Hou, YM, Wanunu, M, Rouhanifard, SH. (2025) Probing enzyme-dependent pseudouridylation using direct RNA sequencing to assess neuronal epitranscriptome plasticity. **Cell Systems**, 2025 Mar 18:101238, doi: [10.1016/j.cels.2025.101238](#); PMID: [40118059](#); PMCID:PMC12006983
- Masuda, I, McGuigan, H, Maharjan, S., Yamaki, Y, Hou, YM. (2025) Connecting tRNA charging and decoding through the axis of nucleotide modifications at position 37. **J. Mol. Biol.** Invited review, Mar 18: 169095, doi: [10.1016/j.jmb.2025.169095](#). PMID: [40113011](#), PMCID:PMC12162217
- Szydlo, K, Santos, L, Christian, TW, Maharjan, S, Dorsey, A, Masuda, I, Jia, J, Wu, Yuan, Tan, W, Hou, YM*, Ignatova, Z*. (2025) m⁶A methylation is incorporated randomly into bacterial mRNA without specific functional benefit. *denotes co-corresponding authors. **Nucleic Acids Res**, doi: <https://doi.org/10.1093/nar/gkaf425>, PMID: [40401555](#); PMCID:PMC12096079
- Kimbrough, EM, Nguyen, HA, Li, H, Mattingly, JM, Bailey, NA, Ning, W, Gamper, H, Hou, YM, Gonzalez, RL, Dunham, CM. (2025) An RNA modification prevents extended codon-anticodon interaction from facilitating +1 frameshifting. **Nat Commun**, <https://doi.org/10.1038/s41467-025-62342-4>, PMID: [40789848](#), PMCID:PMC12340085
- Swirski, MI, Tierney, JAS, Alba, MM, Andreev, DE, Aspden, JL, Atkins, JF, Bassani-Sternberg, M, Berry, JJ, Biffo, S., Boris-Lawrie, K, Borodovsky, M, Brierley, I, Brook, M, Brunet, MA, Bujnicki, JM, Caliskan, N, Calviello, L, Carvunis, AR, Cate,

JHD, Cenik, C, Chang, KY, Chen, Y, Chothani, S, Choudhary, JS, Clark, PL, Clauwaert, J, Cooley, L, Dassi, E, Dean, K, Dieterich, C, Dikstein, R, Dinman, JD, Dmitriev, SE, Dontsova, OA, Dunham, CM, Eswarapa, SM, Farabaugh, PJ, Faridi, P, Fierro-Monti, I, Firth, AE, Gatfield, D, Gebauer, F, Gelfand, MS, Gray, NK, Green, R, Hill, CH, Hou, YM, Hubner, N, et al., and Baranov, PV. (2025) Translating a single term for translated regions. **Nature Methods**, PMID: [40890551](#), doi: [10.1038/s41592-025-02810-3](#).

Wang, B, Hoffman, RD, Hou, YM, Li, H. (2025) Structural basis for retron co-option of anti-phage ATPase-nuclease. **Nat Struct Mol Biol**, PMID: [4174277](#), doi: [10.1038/s41394-025-01702-6](#), PMCID:PMC

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Please send a cover letter, CV, and contact information of three references to:

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