



Judith Frydman

Donald Kennedy Chair in the School of Humanities and Sciences and
Professor of Genetics

Biology

Bio

ACADEMIC APPOINTMENTS

- Professor, Biology
- Professor, Genetics
- Member, Bio-X
- Member, Wu Tsai Human Performance Alliance
- Faculty Fellow, Sarafan ChEM-H
- Member, Stanford Cancer Institute
- Member, Wu Tsai Neurosciences Institute

PROGRAM AFFILIATIONS

- Center for Latin American Studies

LINKS

- Lab Website: <https://web.stanford.edu/group/frydman>

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

The long term goal of our research is to understand how proteins fold in living cells. My lab uses a multidisciplinary approach to address fundamental questions about molecular chaperones, protein folding and degradation. In addition to basic mechanistic principles, we aim to define how impairment of cellular folding and quality control are linked to disease, including cancer and neurodegenerative diseases and examine whether reengineering chaperone networks can provide therapeutic strategies.

Teaching

COURSES

2025-26

- Biochemistry & Molecular Biology: BIO 83 (Aut)
- Proteostasis: From Basic Principles to Aging and Neurodegeneration: BIO 211 (Win)

2024-25

- Biochemistry & Molecular Biology: BIO 83 (Aut)

2023-24

- Proteostasis: From Basic Principles to Aging and Neurodegeneration: BIO 211 (Win)

2022-23

- Proteostasis: From Basic Principles to Aging and Neurodegeneration: BIO 211 (Win)

STANFORD ADVISEES

Doctoral Dissertation Reader (AC)

Darren Lam, Micah Olivas, Caroline Scheuing

Postdoctoral Faculty Sponsor

Dan Cao, Yiyang Li, Sabyasachi Sarkar, Ivana Vujkovic Bukvin, Bowen Xu, Shuhao Zhang

Orals Evaluator

Sanket Gupte

Doctoral Dissertation Advisor (AC)

Korbin Kleczko

Doctoral (Program)

Korbin Kleczko

GRADUATE AND FELLOWSHIP PROGRAM AFFILIATIONS

- Biology (School of Humanities and Sciences) (Phd Program)
- Biophysics (Phd Program)
- Cancer Biology (Phd Program)

Publications

PUBLICATIONS

- **NAC controls nascent chain fate through tunnel sensing and chaperone action.** *Nature*
Lee, J. H., Rabl, L., Gamberdinger, M., Goyal, V., Khakzar, K. M., Barbosa, N. M., Abramovich, J., Morales-Polanco, F., Köhler, A. K., Samatova, E., Rodnina, M. V., Deuerling, E., Frydman, et al
2025
- **Altered translation elongation contributes to key hallmarks of aging in the killifish brain.** *Science (New York, N.Y.)*
Di Fraia, D., Marino, A., Lee, J. H., Kelmer Sacramento, E., Baumgart, M., Bagnoli, S., Balla, T., Schalk, F., Kamrad, S., Guan, R., Caterino, C., Giannuzzi, C., Tomaz da Silva, et al
2025; 389 (6759): eadk3079
- **Proteostasis and lysosomal repair deficits in transdifferentiated neurons of Alzheimer's disease.** *Nature cell biology*
Chou, C. C., Vest, R., Prado, M. A., Wilson-Grady, J., Paulo, J. A., Shibuya, Y., Moran-Losada, P., Lee, T. T., Luo, J., Gygi, S. P., Kelly, J. W., Finley, D., Wernig, et al
2025
- **In situ analysis reveals the TRiC duty cycle and PDCD5 as an open-state cofactor.** *Nature*
Xing, H., Rosenkranz, R. R., Rodriguez-Aliaga, P., Lee, T. T., Majtner, T., Böhm, S., Turoňová, B., Frydman, J., Beck, M.
2024
- **Brain malformations and seizures by impaired chaperonin function of TRiC.** *Science (New York, N.Y.)*
Kraft, F., Rodriguez-Aliaga, P., Yuan, W., Franken, L., Zajt, K., Hasan, D., Lee, T. T., Flex, E., Hentschel, A., Innes, A. M., Zheng, B., Julia Suh, D. S., Knopp, et al
2024; 386 (6721): 516-525

- **A machine learning approach uncovers principles and determinants of eukaryotic ribosome pausing.** *Science advances*
Aguilar Rangel, M., Stein, K., Frydman, J.
2024; 10 (42): eado0738
- **Polyglutamine-mediated ribotoxicity disrupts proteostasis and stress responses in Huntington's disease.** *Nature cell biology*
Aviner, R., Lee, T., Masto, V. B., Li, K. H., Andino, R., Frydman, J.
2024
- **A hierarchical assembly pathway directs the unique subunit arrangement of TRiC/CCT.** *Molecular cell*
Betancourt Moreira, K., Collier, M. P., Leitner, A., Li, K. H., Lachapel, I. L., McCarthy, F., Opoku-Nsiah, K. A., Morales-Polanco, F., Barbosa, N., Gestaut, D., Samant, R. S., Roh, S., Frydman, et al
2023
- **High-resolution mapping reveals the mechanism and contribution of genome insertions and deletions to RNA virus evolution.** *Proceedings of the National Academy of Sciences of the United States of America*
Aguilar Rangel, M., Dolan, P. T., Taguwa, S., Xiao, Y., Andino, R., Frydman, J.
2023; 120 (31): e2304667120
- **Novel Mode of nanoLuciferase Packaging in SARS-CoV-2 Virions and VLPs Provides Versatile Reporters for Virus Production.** *Viruses*
Gullberg, R. C., Frydman, J.
2023; 15 (6)
- **Nuclear and cytoplasmic spatial protein quality control is coordinated by nuclear-vacuolar junctions and perinuclear ESCRT.** *Nature cell biology*
Sontag, E. M., Morales-Polanco, F., Chen, J. H., McDermott, G., Dolan, P. T., Gestaut, D., Le Gros, M. A., Larabell, C., Frydman, J.
2023
- **Structural visualization of the tubulin folding pathway directed by human chaperonin TRiC/CCT.** *Cell*
Gestaut, D., Zhao, Y., Park, J., Ma, B., Leitner, A., Collier, M., Pintilie, G., Roh, S. H., Chiu, W., Frydman, J.
2022; 185 (25): 4770-4787.e20
- **A campaign targeting a conserved Hsp70 binding site uncovers how subcellular localization is linked to distinct biological activities.** *Cell chemical biology*
Shao, H., Taguwa, S., Gilbert, L., Shkedi, A., Sannino, S., Guerriero, C. J., Gale-Day, Z. J., Young, Z. T., Brodsky, J. L., Weissman, J., Gestwicki, J. E., Frydman, J.
2022
- **Ageing exacerbates ribosome pausing to disrupt cotranslational proteostasis** *Nature*
Stein, K. C., Morales-Polanco, F., Leinden, J. v., Rainbolt, K. T., Frydman, J.
2022
- **Cotranslational prolyl hydroxylation is essential for flavivirus biogenesis** *NATURE*
Aviner, R., Li, K. H., Frydman, J., Andino, R.
2021
- **CryoEM reveals the stochastic nature of individual ATP binding events in a group II chaperonin.** *Nature communications*
Zhao, Y., Schmid, M. F., Frydman, J., Chiu, W.
2021; 12 (1): 4754
- **Cryo-electron tomography provides topological insights into mutant huntingtin exon 1 and polyQ aggregates.** *Communications biology*
Galaz-Montoya, J. G., Shahmoradian, S. H., Shen, K., Frydman, J., Chiu, W.
2021; 4 (1): 849
- **Structural and functional dissection of reovirus capsid folding and assembly by the prefoldin-TRiC/CCT chaperone network** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
Knowlton, J. J., Gestaut, D., Ma, B., Taylor, G., Seven, A., Leitner, A., Wilson, G. J., Shanker, S., Yates, N. A., Prasad, B., Aebersold, R., Chiu, W., Frydman, et al
2021; 118 (11)
- **Principles of dengue virus evolvability derived from genotype-fitness maps in human and mosquito cells.** *eLife*
Dolan, P. T., Taguwa, S., Rangel, M. A., Acevedo, A., Hagai, T., Andino, R., Frydman, J.

2021; 10

- **Proteostasis in Viral Infection: Unfolding the Complex Virus-Chaperone Interplay** *COLD SPRING HARBOR PERSPECTIVES IN BIOLOGY*
Aviner, R., Frydman, J.
2020; 12 (3)
- **Differentiation Drives Widespread Rewiring of the Neural Stem Cell Chaperone Network.** *Molecular cell*
Vonk, W. I., Rainbolt, T. K., Dolan, P. T., Webb, A. E., Brunet, A. n., Frydman, J. n.
2020
- **THE CHAPERONIN TRiC/CCT ASSOCIATES WITH PREFOLDIN THROUGH A CONSERVED ELECTROSTATIC INTERFACE ESSENTIAL FOR CELLULAR PROTEOSTASIS**
Gestaut, D., Roh, S., Ma, B., Pintile, G., Joachimiak, L., Leitner, A., Walztheini, T., Aebersold, R., Chiu, W., Frydman, J.
WILEY.2019: 44
- **Dual Role of Ribosome-Binding Domain of NAC as a Potent Suppressor of Protein Aggregation and Aging-Related Proteinopathies** *MOLECULAR CELL*
Shen, K., Gamerdinger, M., Chan, R., Gense, K., Martin, E. M., Sachs, N., Knight, P. D., Schloemer, R., Calabrese, A. N., Stewart, K. L., Leiendecker, L., Baghel, A., Radford, et al
2019; 74 (4): 729+
- **The Chaperonin TRiC/CCT Associates with Prefoldin through a Conserved Electrostatic Interface Essential for Cellular Proteostasis** *CELL*
Gestaut, D., Roh, S., Ma, B., Pintilie, G., Joachimiak, L. A., Leitner, A., Walzthoeni, T., Aebersold, R., Chiu, W., Frydman, J.
2019; 177 (3): 751+
- **The ATP-powered gymnastics of TRiC/CCT: an asymmetric protein folding machine with a symmetric origin story.** *Current opinion in structural biology*
Gestaut, D., Limatola, A., Joachimiak, L., Frydman, J.
2019; 55: 50–58
- **The ATP-powered gymnastics of TRiC/CCT: an asymmetric protein folding machine with a symmetric origin story** *CURRENT OPINION IN STRUCTURAL BIOLOGY*
Gestaut, D., Limatola, A., Joachimiak, L., Frydman, J.
2019; 55: 50–58
- **Proteostasis in Viral Infection: Unfolding the Complex Virus-Chaperone Interplay.** *Cold Spring Harbor perspectives in biology*
Aviner, R., Frydman, J.
2019
- **Zika Virus Dependence on Host Hsp70 Provides a Protective Strategy against Infection and Disease.** *Cell reports*
Taguwa, S., Yeh, M., Rainbolt, T. K., Nayak, A., Shao, H., Gestwicki, J. E., Andino, R., Frydman, J.
2019; 26 (4): 906
- **Nascent Polypeptide Domain Topology and Elongation Rate Direct the Cotranslational Hierarchy of Hsp70 and TRiC/CCT.** *Molecular cell*
Stein, K. C., Kriel, A. n., Frydman, J. n.
2019
- **Distinct proteostasis circuits cooperate in nuclear and cytoplasmic protein quality control.** *Nature*
Samant, R. S., Livingston, C. M., Sontag, E. M., Frydman, J.
2018; 563 (7731): 407-411
- **Hsp90 shapes protein and RNA evolution to balance trade-offs between protein stability and aggregation** *NATURE COMMUNICATIONS*
Geller, R., Pechmann, S., Acevedo, A., Andino, R., Frydman, J.
2018; 9: 1781
- **Lysosome activation clears aggregates and enhances quiescent neural stem cell activation during aging** *SCIENCE*
Leeman, D. S., Hebestreit, K., Ruetz, T., Webb, A. E., McKay, A., Pollina, E. A., Dulken, B. W., Zhao, X., Yeo, R. W., Ho, T. T., Mahmoudi, S., Devarajan, K., Passegue, et al
2018; 359 (6381): 1277–82
- **An information theoretic framework reveals a tunable allosteric network in group II chaperonins.** *Nature structural & molecular biology*

- Lopez, T., Dalton, K., Tomlinson, A., Pande, V., Frydman, J.
2017; 24 (9): 726-733
- **Structure and Dynamics of the Huntingtin Exon-1 N-Terminus: A Solution NMR Perspective.** *Journal of the American Chemical Society*
Baias, M., Smith, P. E., Shen, K., Joachimiak, L. A., Zerko, S., Kozminski, W., Frydman, J., Frydman, L.
2017; 139 (3): 1168-1176
 - **Mechanisms and Functions of Spatial Protein Quality Control.** *Annual review of biochemistry*
Sontag, E. M., Samant, R. S., Frydman, J.
2017
 - **Control of the structural landscape and neuronal proteotoxicity of mutant Huntingtin by domains flanking the polyQ tract** *ELIFE*
Shen, K., Calamini, B., Fauerbach, J. A., Ma, B., Shahmoradian, S. H., Lachapei, I. L., Chiu, W., Lo, D. C., Frydman, J.
2016; 5
 - **Cotranslational signal-independent SRP preloading during membrane targeting** *NATURE*
Chartron, J. W., Hunt, K. C., Frydman, J.
2016; 536 (7615): 224-?
 - **Delayed emergence of subdiffraction-sized mutant huntingtin fibrils following inclusion body formation.** *Quarterly reviews of biophysics*
Sahl, S. J., Lau, L., Vonk, W. I., Weiss, L. E., Frydman, J., Moerner, W. E.
2016; 49
 - **Defining Hsp70 Subnetworks in Dengue Virus Replication Reveals Key Vulnerability in Flavivirus Infection.** *Cell*
Taguwa, S., Maringer, K., Li, X., Bernal-Rubio, D., Rauch, J. N., Gestwicki, J. E., Andino, R., Fernandez-Sesma, A., Frydman, J.
2015; 163 (5): 1108-1123
 - **Defining Hsp70 Subnetworks in Dengue Virus Replication Reveals Key Vulnerability in Flavivirus Infection.** *Cell*
Taguwa, S., Maringer, K., Li, X., Bernal-Rubio, D., Rauch, J. N., Gestwicki, J. E., Andino, R., Fernandez-Sesma, A., Frydman, J.
2015; 163 (5): 1108-1123
 - **Local slowdown of translation by nonoptimal codons promotes nascent-chain recognition by SRP in vivo.** *Nature structural & molecular biology*
Pechmann, S., Chartron, J. W., Frydman, J.
2014; 21 (12): 1100-1105
 - **Local slowdown of translation by nonoptimal codons promotes nascent-chain recognition by SRP in vivo** *NATURE STRUCTURAL & MOLECULAR BIOLOGY*
Pechmann, S., Chartron, J. W., Frydman, J.
2014; 21 (12): 1100-1105
 - **The Structural Basis of Substrate Recognition by the Eukaryotic Chaperonin TRiC/CCT** *CELL*
Joachimiak, L. A., Walzthoeni, T., Liu, C. W., Aebersold, R., Frydman, J.
2014; 159 (5): 1042-1055
 - **The structural basis of substrate recognition by the eukaryotic chaperonin TRiC/CCT.** *Cell*
Joachimiak, L. A., Walzthoeni, T., Liu, C. W., Aebersold, R., Frydman, J.
2014; 159 (5): 1042-1055
 - **Interplay between chaperones and protein disorder promotes the evolution of protein networks.** *PLoS computational biology*
Pechmann, S., Frydman, J.
2014; 10 (6)
 - **Sorting out the trash: the spatial nature of eukaryotic protein quality control** *CURRENT OPINION IN CELL BIOLOGY*
Sontag, E. M., Vonk, W. I., Frydman, J.
2014; 26: 139-146
 - **Spatial sequestration of misfolded proteins by a dynamic chaperone pathway enhances cellular fitness during stress.** *Nature cell biology*
Escusa-Toret, S., Vonk, W. I., Frydman, J.
2013; 15 (10): 1231-1243

- **Spatial sequestration of misfolded proteins by a dynamic chaperone pathway enhances cellular fitness during stress** *NATURE CELL BIOLOGY*
Escusa-Toret, S., Vonk, W. I., Frydman, J.
2013; 15 (10): 1231-U253
- **Principles of cotranslational ubiquitination and quality control at the ribosome.** *Molecular cell*
Duttler, S., Pechmann, S., Frydman, J.
2013; 50 (3): 379-393
- **The Ribosome as a Hub for Protein Quality Control** *MOLECULAR CELL*
Pechmann, S., Willmund, F., Frydman, J.
2013; 49 (3): 411-421
- **Evolutionary conservation of codon optimality reveals hidden signatures of cotranslational folding.** *Nature structural & molecular biology*
Pechmann, S., Frydman, J.
2013; 20 (2): 237-243
- **Evolutionary conservation of codon optimality reveals hidden signatures of cotranslational folding** *NATURE STRUCTURAL & MOLECULAR BIOLOGY*
Pechmann, S., Frydman, J.
2013; 20 (2): 237-243
- **The Cotranslational Function of Ribosome-Associated Hsp70 in Eukaryotic Protein Homeostasis** *CELL*
Willmund, F., del Alamo, M., Pechmann, S., Chen, T., Albanese, V., Dammer, E. B., Peng, J., Frydman, J.
2013; 152 (1-2): 196-209
- **TRiC's tricks inhibit huntingtin aggregation.** *eLife*
Shahmoradian, S. H., Galaz-Montoya, J. G., Schmid, M. F., Cong, Y., Ma, B., Spiess, C., Frydman, J., Ludtke, S. J., Chiu, W.
2013; 2
- **A Gradient of ATP Affinities Generates an Asymmetric Power Stroke Driving the Chaperonin TRiC/CCT Folding Cycle** *CELL REPORTS*
Reissmann, S., Joachimiak, L. A., Chen, B., Meyer, A. S., Nguyen, A., Frydman, J.
2012; 2 (4): 866-877
- **Systematic Functional Prioritization of Protein Posttranslational Modifications** *CELL*
Beltrao, P., Albanese, V., Kenner, L. R., Swaney, D. L., Burlingame, A., Villen, J., Lim, W. A., Fraser, J. S., Frydman, J., Krogan, N. J.
2012; 150 (2): 413-425
- **The Molecular Architecture of the Eukaryotic Chaperonin TRiC/CCT** *STRUCTURE*
Leitner, A., Joachimiak, L. A., Bracher, A., Moenkemeyer, L., Walzthoeni, T., Chen, B., Pechmann, S., Holmes, S., Cong, Y., Ma, B., Ludtke, S., Chiu, W., Hartl, et al
2012; 20 (5): 814-825
- **Cellular Strategies of Protein Quality Control** *COLD SPRING HARBOR PERSPECTIVES IN BIOLOGY*
Chen, B., Retzlaff, M., Roos, T., Frydman, J.
2011; 3 (8)
- **Defining the Specificity of Cotranslationally Acting Chaperones by Systematic Analysis of mRNAs Associated with Ribosome-Nascent Chain Complexes** *PLOS BIOLOGY*
del Alamo, M., Hogan, D. J., Pechmann, S., Albanese, V., Brown, P. O., Frydman, J.
2011; 9 (7)
- **Dual Action of ATP Hydrolysis Couples Lid Closure to Substrate Release into the Group II Chaperonin Chamber** *CELL*
Douglas, N. R., Reissmann, S., Zhang, J., Chen, B., Jakana, J., Kumar, R., Chiu, W., Frydman, J.
2011; 144 (2): 240-252
- **A ribosome-anchored chaperone network that facilitates eukaryotic ribosome biogenesis** *JOURNAL OF CELL BIOLOGY*
Albanese, V., Reissmann, S., Frydman, J.
2010; 189 (1): 69-U105

- **Mechanism of folding chamber closure in a group II chaperonin** *NATURE*
Zhang, J., Baker, M. L., Schroeder, G. F., Douglas, N. R., Reissmann, S., Jakana, J., Dougherty, M., Fu, C. J., Levitt, M., Ludtke, S. J., Frydman, J., Chiu, W.
2010; 463 (7279): 379-U130
- **The chaperonin TRiC blocks a huntingtin sequence element that promotes the conformational switch to aggregation** *NATURE STRUCTURAL & MOLECULAR BIOLOGY*
Tam, S., Spiess, C., Auyeung, W., Joachimiak, L., Chen, B., Poirier, M. A., Frydman, J.
2009; 16 (12): 1279-U98
- **The Hsp90 mosaic: a picture emerges** *NATURE STRUCTURAL & MOLECULAR BIOLOGY*
Mayer, M. P., Prodromou, C., Frydman, J.
2009; 16 (1): 2-6
- **Defining the TRiC/CCT interactome links chaperonin function to stabilization of newly made proteins with complex topologies** *NATURE STRUCTURAL & MOLECULAR BIOLOGY*
Yam, A. Y., Xia, Y., Lin, H. J., Burlingame, A., Gerstein, M., Frydman, J.
2008; 15 (12): 1255-1262
- **Misfolded proteins partition between two distinct quality control compartments** *NATURE*
Kaganovich, D., Kopito, R., Frydman, J.
2008; 454 (7208): 1088-U36
- **Mechanism of lid closure in the eukaryotic chaperonin TRiC/CCT** *NATURE STRUCTURAL & MOLECULAR BIOLOGY*
Booth, C. R., Meyer, A. S., Cong, Y., Topf, M., Sali, A., Ludtke, S. J., Chiu, W., Frydman, J.
2008; 15 (7): 746-753
- **Diverse cellular functions of the Hsp90 molecular chaperone uncovered using systems approaches** *CELL*
McClellan, A. J., Xia, Y., Deutschbauer, A. M., Davis, R. W., Gerstein, M., Frydman, J.
2007; 131 (1): 121-135
- **Essential function of the built-in lid in the allosteric regulation of eukaryotic and archaeal chaperonins** *NATURE STRUCTURAL & MOLECULAR BIOLOGY*
Reissmann, S., Parnot, C., Booth, C. R., Chiu, W., Frydman, J.
2007; 14 (5): 432-440
- **Evolutionary constraints on chaperone-mediated folding provide an antiviral approach refractory to development of drug resistance** *GENES & DEVELOPMENT*
Geller, R., Vignuzzi, M., Andino, R., Frydman, J.
2007; 21 (2): 195-205
- **Identification of the TRiC/CCT substrate binding sites uncovers the function of subunit diversity in eukaryotic** *MOLECULAR CELL*
Spiess, C., Miller, E. J., McClellan, A. J., Frydman, J.
2006; 24 (1): 25-37
- **The chaperonin TRiC controls polyglutamine aggregation and toxicity through subunit-specific interactions** *NATURE CELL BIOLOGY*
Tam, S., Geller, R., Spiess, C., Frydman, J.
2006; 8 (10): 1155-U211
- **Systems analyses reveal two chaperone networks with distinct functions in eukaryotic cells** *CELL*
Albanese, V., Yam, A. Y., Baughman, J., Parnot, C., Frydman, J.
2006; 124 (1): 75-88
- **Protein quality control: chaperones culling corrupt conformations** *NATURE CELL BIOLOGY*
McClellan, A. J., Tam, S., Kaganovich, D., Frydman, J.
2005; 7 (8): 736-741
- **Folding and quality control of the VHL tumor suppressor proceed through distinct chaperone pathways** *CELL*
McClellan, A. J., Scott, M. D., Frydman, J.
2005; 121 (5): 739-748

- **Mechanism of the eukaryotic chaperonin: protein folding in the chamber of secrets** *TRENDS IN CELL BIOLOGY*
Spiess, C., Meyer, A. S., Reissmann, S., Frydman, J.
2004; 14 (11): 598-604
- **Tumorigenic mutations in VHL disrupt folding in vivo by interfering with chaperonin binding** *MOLECULAR CELL*
Feldman, D. E., Spiess, C., Howard, D. E., Frydman, J.
2003; 12 (5): 1213-1224
- **Closing the folding chamber of the eukaryotic chaperonin requires the transition state of ATP hydrolysis** *CELL*
Meyer, A. S., Gillespie, J. R., Walther, D., Millet, I. S., Doniach, S., Frydman, J.
2003; 113 (3): 369-381
- **Where chaperones and nascent polypeptides meet** *NATURE STRUCTURAL BIOLOGY*
Albanese, V., Frydman, J.
2002; 9 (10): 716-718
- **Molecular chaperones and the art of recognizing a lost cause** *NATURE CELL BIOLOGY*
McClellan, A. J., Frydman, J.
2001; 3 (2): E51-E53
- **Folding of newly translated proteins in vivo: The role of molecular chaperones** *ANNUAL REVIEW OF BIOCHEMISTRY*
Frydman, J.
2001; 70: 603-647
- **The interaction of the chaperonin tailless complex polypeptide 1 (TCP1) ring complex (TRiC) with ribosome-bound nascent chains examined using photo-cross-linking** *JOURNAL OF CELL BIOLOGY*
McCallum, C. D., Do, H., Johnson, A. E., Frydman, J.
2000; 149 (3): 591-601
- **Formation of the VHL-elongin BC tumor suppressor complex is mediated by the chaperonin TRiC** *MOLECULAR CELL*
Feldman, D. E., Thulasiraman, V., Ferreyra, R. G., Frydman, J.
1999; 4 (6): 1051-1061
- **Co-translational domain folding as the structural basis for the rapid de novo folding of firefly luciferase** *NATURE STRUCTURAL BIOLOGY*
Frydman, J., Erdjument-Bromage, H., Tempst, P., Hartl, F. U.
1999; 6 (7): 697-705
- **In vivo newly translated polypeptides are sequestered in a protected folding environment** *EMBO JOURNAL*
Thulasiraman, V., Yang, C. F., Frydman, J.
1999; 18 (1): 85-95
- **Principles of chaperone-assisted protein folding: Differences between in vitro and in vivo mechanisms** *SCIENCE*
Frydman, J., Hartl, F. U.
1996; 272 (5267): 1497-1502
- **FOLDING OF NASCENT POLYPEPTIDE-CHAINS IN A HIGH-MOLECULAR-MASS ASSEMBLY WITH MOLECULAR CHAPERONES** *NATURE*
Frydman, J., Nimmegern, E., Ohtsuka, K., Hartl, F. U.
1994; 370 (6485): 111-117
- **Survey of the human proteostasis network: the ubiquitin-proteasome system.** *bioRxiv : the preprint server for biology*
Elsasser, S., Powers, E. T., Stoeger, T., Sui, X., Kurtzbard, R. D., Martínez-Botía, P., Wangeline, M. A., Gama, A. R., Huttlin, E. L., Elia, L. P., Kelly, J. W., Gestwicki, J. E., Frydman, et al
2026
- **Structural and mechanistic insights into translation dynamics in Huntington's disease**
Abramovich, J., Lee, J., Bukvin, I., Aviner, R., Frost, A., Frydman, J.
WILEY.2025
- **Towards bespoke chaperones for Huntington's disease: Understanding the molecular determinants of HTT binding to CCT1**
Kleczo, K., Chan, R., Shen, K., Schulte-Bisping, M., Wu, C., Thompson, L., Joachimiak, L., Frydman, J.

WILEY.2025

- **Dissecting the molecular mechanisms underlying MDPL genetic disorder using a novel yeast-based model**
Maccaroni, S., Morales-Polanco, F., Wangeline, M., Murdocca, M., Spitalieri, P., Novelli, G., Sangiuolo, F., Frydman, J.
SPRINGER NATURE.2025: 414
- **NAC controls nascent chain fate through tunnel sensing and chaperone action.** *bioRxiv : the preprint server for biology*
Lee, J. H., Rabl, L., Gamberdinger, M., Goyal, V., Khakzar, K. M., Barbosa, N. M., Abramovich, J., Morales-Polanco, F., Köhler, A. K., Samatova, E., Rodnina, M. V., Deuerling, E., Frydman, et al
2025
- **Dissection of the conformational switch that regulates huntingtin's aggregation and toxicity**
Rodriguez-Aliaga, P., Sosa, R. P., Bustamante, C., Frydman, J.
CELL PRESS.2025
- **BPS2025-Brain malformations and seizures by impaired function of TRiC chaperonin folding machinery**
Rodriguez-Aliaga, P., Kraft, F., Yuan, W., Pak, S., Frydman, J., Elbracht, M., Kurth, I.
CELL PRESS.2025: 174A
- **Brain malformations and seizures by impaired function of TRiC chaperonin folding machinery**
Rodriguez-Aliaga, P., Kraft, F., Yuan, W., Pak, S., Frydman, J., Elbracht, M., Kurth, I.
CELL PRESS.2025: 391A
- **Chaperones cooperatively orchestrate the shaping of β -propeller structure**
Lim, S., Gestaut, D., Roh, S., Frydman, J.
CELL PRESS.2025: 211A
- **Brain malformations and seizures by impaired function of TRiC chaperonin folding machinery**
Rodriguez-Aliaga, P., Kraft, F., Yuan, W., Pak, S., Frydman, J., Elbracht, M., Kurth, I.
CELL PRESS.2025: 174A
- **Proteostasis and lysosomal repair deficits in transdifferentiated neurons of Alzheimer's disease.** *bioRxiv : the preprint server for biology*
Chou, C. C., Vest, R., Prado, M. A., Wilson-Grady, J., Paulo, J. A., Shibuya, Y., Moran-Losada, P., Lee, T. T., Luo, J., Gygi, S. P., Kelly, J. W., Finley, D., Wernig, et al
2025
- **Cancers adapt to their mutational load by buffering protein misfolding stress.** *eLife*
Tilk, S., Frydman, J., Curtis, C., Petrov, D. A.
2024; 12
- **Human tNeurons reveal aging-linked proteostasis deficits driving Alzheimer's phenotypes.** *Research square*
Chou, C. C., Vest, R., Prado, M. A., Wilson-Grady, J., Paulo, J. A., Shibuya, Y., Moran-Losada, P., Lee, T. T., Luo, J., Gygi, S. P., Kelly, J. W., Finley, D., Wernig, et al
2024
- **BDNF and TRiC-inspired reagent rescue cortical synaptic deficits in a mouse model of Huntington's disease.** *Neurobiology of disease*
Gu, Y., Pope, A., Smith, C., Carmona, C., Johnstone, A., Shi, L., Chen, X., Santos, S., Bacon-Brenes, C. C., Shoff, T., Kleczko, K. M., Frydman, J., Thompson, et al
2024: 106502
- **SARS-CoV-2 Nsp1 cooperates with initiation factors EIF1 and 1A to selectively enhance translation of viral RNA.** *PLoS pathogens*
Aviner, R., Lidsky, P. V., Xiao, Y., Tassetto, M., Kim, D., Zhang, L., McAlpine, P. L., Elias, J., Frydman, J., Andino, R.
2024; 20 (2): e1011535
- **A structural vista of phospho-ducin-like PhLP2A-chaperonin TRiC cooperation during the ATP-driven folding cycle.** *Nature communications*
Park, J., Kim, H., Gestaut, D., Lim, S., Opoku-Nsiah, K. A., Leitner, A., Frydman, J., Roh, S.
2024; 15 (1): 1007
- **Human transdifferentiated neurons reveal lysosomal repair deficits in Alzheimer's disease**
Chou, C., Frydman, J.
ACADEMIC PRESS INC ELSEVIER SCIENCE.2024

- **A lethal mitonuclear incompatibility in complex I of natural hybrids.** *Nature*
Moran, B. M., Payne, C. Y., Powell, D. L., Iverson, E. N., Donny, A. E., Banerjee, S. M., Langdon, Q. K., Gunn, T. R., Rodriguez-Soto, R. A., Madero, A., Baczenas, J. J., Kleczko, K. M., Liu, et al
2024
- **Impaired biogenesis of basic proteins impacts multiple hallmarks of the aging brain.** *bioRxiv : the preprint server for biology*
Di Fraia, D., Marino, A., Lee, J. H., Kelmer Sacramento, E., Baumgart, M., Bagnoli, S., Tomaz da Silva, P., Kumar Sahu, A., Siano, G., Tiessen, M., Terzibasi-Tozzini, E., Gagneur, J., Frydman, et al
2024
- **Transdifferentiation: A Novel Tool for Disease Modeling and Translational Applications in Alzheimer's Disease**
Chou, C., Vest, R., Prado, M. A., Wilson-Grady, J., Paulo, J. A., Shibuya, Y., Moran-Losada, P., Lee, T., Luo, J., Gygi, S. P., Kelly, J. W., Finley, D. P., Wernig, et al
WILEY.2023: S205-S206
- **SARS-CoV-2 Nsp1 regulates translation start site fidelity to promote infection.** *bioRxiv : the preprint server for biology*
Aviner, R., Lidsky, P. V., Xiao, Y., Tassetto, M., Zhang, L., McAlpine, P. L., Elias, J., Frydman, J., Andino, R.
2023
- **The unfolded protein response of the endoplasmic reticulum supports mitochondrial biogenesis by buffering non-imported proteins.** *Molecular biology of the cell*
Knöringer, K., Groh, C., Krämer, L., Stein, K. C., Hansen, K. G., Zimmermann, J., Morgan, B., Herrmann, J. M., Frydman, J., Boos, F.
2023: mbcE23050205
- **A structural vista of phosducin-like PhLP2A-chaperonin TRiC cooperation during the ATP-driven folding cycle.** *bioRxiv : the preprint server for biology*
Park, J., Kim, H., Gestaut, D., Lim, S., Leitner, A., Frydman, J., Roh, S. H.
2023
- **A Comprehensive Enumeration of the Human Proteostasis Network. 2. Components of the Autophagy-Lysosome Pathway.** *bioRxiv : the preprint server for biology*
Elsasser, S., Elia, L. P., Morimoto, R. I., Powers, E. T., Finley, D., Costa, B., Budron, M., Tokuno, Z., Wang, S., Iyer, R. G., Barth, B., Mockler, E., Finkbeiner, et al
2023
- **CryoET reveals organelle phenotypes in huntington disease patient iPSC-derived and mouse primary neurons.** *Nature communications*
Wu, G. H., Smith-Geater, C., Galaz-Montoya, J. G., Gu, Y., Gupte, S. R., Aviner, R., Mitchell, P. G., Hsu, J., Miramontes, R., Wang, K. Q., Geller, N. R., Hou, C., Danita, et al
2023; 14 (1): 692
- **Fragment-based computational design of antibodies targeting structured epitopes.** *Science advances*
Aguilar Rangel, M., Bedwell, A., Costanzi, E., Taylor, R. J., Russo, R., Bernardes, G. J., Ricagno, S., Frydman, J., Vendruscolo, M., Sormanni, P.
2022; 8 (45): eabp9540
- **Small molecule C381 targets the lysosome to reduce inflammation and ameliorate disease in models of neurodegeneration.** *Proceedings of the National Academy of Sciences of the United States of America*
Vest, R. T., Chou, C. C., Zhang, H., Haney, M. S., Li, L., Laqtom, N. N., Chang, B., Shuken, S., Nguyen, A., Yerra, L., Yang, A. C., Green, C., Tanga, et al
2022; 119 (11): e2121609119
- **Dissecting the structural basis of Huntingtin pathogenesis: one molecule at the time**
Rodriguez-Aliaga, P., Sosa, R. P., Bustamante, C., Frydman, J.
CELL PRESS.2022: 22
- **Targeted protein degradation: from small molecules to complex organelles-a Keystone Symposia report ANNALS OF THE NEW YORK ACADEMY OF SCIENCES**
Cable, J., Weber-Ban, E., Clausen, T., Walters, K. J., Sharon, M., Finley, D. J., Gu, Y., Hanna, J., Feng, Y., Martens, S., Simonsen, A., Hansen, M., Zhang, et al
2022
- **Cotranslational Mechanisms of Protein Biogenesis and Complex Assembly in Eukaryotes** *Annual Reviews of Biomedical Data Science*

Morales-Polanco, F., Lee, J. H., Barbosa, N. M., Frydman, J.
2022; 5

- **Small molecule C381 targets the lysosome to reduce inflammation and ameliorate disease in models of neurodegeneration** *Proc Natl Acad Sci U S A*.
Vest*, R. T., Chou*, C., Zhang, H., Haney, M. S., Li, L., Laqtom, N. N., Chang, B., Shuken, S., Nguyen, A., Yerra, L., Yang, A. C., Green, C., Tanga, et al
2022; 119 (11): e2121609119
- **A defective viral genome strategy elicits broad protective immunity against respiratory viruses.** *Cell*
Xiao, Y., Lidsky, P. V., Shirogane, Y., Aviner, R., Wu, C., Li, W., Zheng, W., Talbot, D., Catching, A., Doitsh, G., Su, W., Gekko, C. E., Nayak, et al
2021
- **A very special chaperonin: How does TRiC/CCT achieve tubulin folding?**
Gestaut, D., Zhao, Y., Park, J., Ma, B., Leitner, A., Collier, M., Aebersold, R., Roh, S., Chiu, W., Frydman, J.
WILEY.2021: 149
- **CryoEM reveals the stochastic nature of individual ATP binding events in a group II chaperonin.**
Zhao, Y., Schmid, M. F., Frydman, J., Chiu, W.
WILEY.2021: 144
- **Native mass spectrometry analyses of chaperonin complex TRiC/CCT reveal subunit N-terminal processing and re-association patterns.** *Scientific reports*
Collier, M. P., Moreira, K. B., Li, K. H., Chen, Y., Itzhak, D., Samant, R., Leitner, A., Burlingame, A., Frydman, J.
2021; 11 (1): 13084
- **Structural and functional dissection of reovirus capsid folding and assembly by the prefoldin-TRiC/CCT chaperone network.** *Proceedings of the National Academy of Sciences of the United States of America*
Knowlton, J. J., Gestaut, D., Ma, B., Taylor, G., Seven, A. B., Leitner, A., Wilson, G. J., Shanker, S., Yates, N. A., Prasad, B. V., Aebersold, R., Chiu, W., Frydman, et al
2021; 118 (11)
- **Disease-related Huntingtin seeding activities in cerebrospinal fluids of Huntington's disease patients.** *Scientific reports*
Lee, C. Y., Wang, N., Shen, K., Stricos, M., Langfelder, P., Cheon, K. H., Cortes, E. P., Vinters, H. V., Vonsattel, J. P., Wexler, N. S., Damoiseaux, R., Frydman, J., Yang, et al
2020; 10 (1): 20295
- **REP-X: An Evolution-guided Strategy for the Rational Design of Cysteine-less Protein Variants.** *Scientific reports*
Dalton, K., Lopez, T., Pande, V., Frydman, J.
2020; 10 (1): 2193
- **Dynamics and clustering of IRE1 α during ER stress.** *Proceedings of the National Academy of Sciences of the United States of America*
Rainbolt, T. K., Frydman, J.
2020
- **Multi-scale 3D Cryo-Correlative Microscopy for Vitrified Cells.** *Structure (London, England : 1993)*
Wu, G. H., Mitchell, P. G., Galaz-Montoya, J. G., Hecksel, C. W., Sontag, E. M., Gangadharan, V. n., Marshman, J. n., Mankus, D. n., Bisher, M. E., Lytton-Jean, A. K., Frydman, J. n., Czymmek, K. n., Chiu, et al
2020
- **ALTERNATIVE FORMS OF ENERGY MODULATE GROUP II CHAPERONIN ACTIVITY**
Goncalves, K., Lopez, T., Frydman, J.
WILEY.2019: 94
- **Methods for measuring misfolded protein clearance in the budding yeast *Saccharomyces cerevisiae*.** *Methods in enzymology*
Samant, R. S., Frydman, J.
2019; 619: 27-45
- **Dosage compensation plans: protein aggregation provides additional insurance against aneuploidy.** *Genes & development*
Samant, R. S., Mastro, V. B., Frydman, J. n.
2019; 33 (15-16): 1027-30

- **Methods for measuring misfolded protein clearance in the budding yeast *Saccharomyces cerevisiae*** *Methods in Enzymology*
Samant, R. S., Frydman, J.
2019; in press
- **Huntingtin's N-Terminus Rearrangements in the Presence of Membranes: A Joint Spectroscopic and Computational Perspective** *ACS CHEMICAL NEUROSCIENCE*
Levy, G. R., Shen, K., Gavrilov, Y., Smith, P. E. S., Levy, Y., Chan, R., Frydman, J., Frydman, L.
2019; 10 (1): 472–81
- **The stop and go traffic regulating protein biogenesis: how translation kinetics control proteostasis.** *The Journal of biological chemistry*
Stein, K. C., Frydman, J.
2018
- **A Viral Protein Restricts *Drosophila* RNAi Immunity by Regulating Argonaute Activity and Stability** *CELL HOST & MICROBE*
Nayak, A., Kim, D., Trnka, M. J., Kerr, C. H., Lidsky, P. V., Stanley, D. J., Rivera, B., Li, K. H., Burlingame, A. L., Jan, E., Frydman, J., Gross, J. D., Andino, et al
2018; 24 (4): 542–+
- **The TRiC chaperonin controls reovirus replication through outer-capsid folding** *NATURE MICROBIOLOGY*
Knowlton, J. J., Fernandez de Castro, I., Ashbrook, A. W., Gestaut, D. R., Zamora, P. F., Bauer, J. A., Forrest, J., Frydman, J., Risco, C., Dermody, T. S.
2018; 3 (4): 481–93
- **Time-Resolved Measurement of the ATP-Dependent Motion of the Group II Chaperonin by Diffracted Electron Tracking** *INTERNATIONAL JOURNAL OF MOLECULAR SCIENCES*
Ogawa, N., Yamamoto, Y. Y., Abe, K., Sekiguchi, H., Sasaki, Y. C., Ishikawa, A., Frydman, J., Yohda, M.
2018; 19 (4)
- **Proteostasis Function and Dysfunction: The Folding Machines that Maintain Proteome Health**
Frydman, J.
CELL PRESS.2018: 544A–545A
- **Protein misfolding in neurodegenerative diseases: implications and strategies.** *Translational neurodegeneration*
Sweeney, P., Park, H., Baumann, M., Dunlop, J., Frydman, J., Kopito, R., McCampbell, A., LeBlanc, G., Venkateswaran, A., Nurmi, A., Hodgson, R.
2017; 6: 6-?
- **Multivalent contacts of the Hsp70 Ssb contribute to its architecture on ribosomes and nascent chain interaction** *NATURE COMMUNICATIONS*
Hanebuth, M. A., Kityk, R., Fries, S. J., Jain, A., Kriel, A., Albanese, V., Frickey, T., Peter, C., Mayer, M. P., Frydman, J., Deuerling, E.
2016; 7
- **xTract: software for characterizing conformational changes of protein complexes by quantitative cross-linking mass spectrometry.** *Nature methods*
Walzthoeni, T., Joachimiak, L. A., Rosenberger, G., Röst, H. L., Malmström, L., Leitner, A., Frydman, J., Aebersold, R.
2015; 12 (12): 1185–1190
- **xTract: software for characterizing conformational changes of protein complexes by quantitative cross-linking mass spectrometry.** *Nature methods*
Walzthoeni, T., Joachimiak, L. A., Rosenberger, G., Röst, H. L., Malmström, L., Leitner, A., Frydman, J., Aebersold, R.
2015; 12 (12): 1185–90
- **The Mechanism and Function of Group II Chaperonins.** *Journal of molecular biology*
Lopez, T., Dalton, K., Frydman, J.
2015; 427 (18): 2919–2930
- **The Dynamic Conformational Cycle of the Group I Chaperonin C-Termini Revealed via Molecular Dynamics Simulation** *PLOS ONE*
Dalton, K. M., Frydman, J., Pande, V. S.
2015; 10 (3)
- **Parkinson's Disease Genes VPS35 and EIF4G1 Interact Genetically and Converge on α -Synuclein.** *Neuron*

- Dhungel, N., Eleuteri, S., Li, L., Kramer, N. J., Chartron, J. W., Spencer, B., Kosberg, K., Fields, J. A., Stafa, K., Adame, A., Lashuel, H., Frydman, J., Shen, et al
2015; 85 (1): 76-87
- **The significance of Hsp70 subnetwork for Dengue virus lifecycle.** *Uirusu*
Taguwa, S., Frydman, J.
2015; 65 (2): 179-186
 - **The dynamic conformational cycle of the group I chaperonin C-termini revealed via molecular dynamics simulation.** *PloS one*
Dalton, K. M., Frydman, J., Pande, V. S.
2015; 10 (3)
 - **Super-resolution fluorescence of huntingtin reveals growth of globular species into short fibers and coexistence of distinct aggregates.** *ACS chemical biology*
Duum, W. C., Jiang, Y., Shen, K., Frydman, J., Moerner, W. E.
2014; 9 (12): 2767-2778
 - **Proteostatic Control of Telomerase Function through TRiC-Mediated Folding of TCAB1** *CELL*
Freund, A., Zhong, F. L., Venteicher, A. S., Meng, Z., Veenstra, T. D., Frydman, J., Artandi, S. E.
2014; 159 (6): 1389-1403
 - **A Direct Regulatory Interaction between Chaperonin TRiC and Stress-Responsive Transcription Factor HSF1** *CELL REPORTS*
Neef, D. W., Jaeger, A. M., Gomez-Pastor, R., Willmund, F., Frydman, J., Thiele, D. J.
2014; 9 (3): 955-966
 - **Chemical cross-linking/mass spectrometry targeting acidic residues in proteins and protein complexes** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
Leitner, A., Joachimiak, L. A., Unverdorben, P., Walzthoeni, T., Frydman, J., Foerster, F., Aebersold, R.
2014; 111 (26): 9455-9460
 - **Chemical cross-linking/mass spectrometry targeting acidic residues in proteins and protein complexes.** *Proceedings of the National Academy of Sciences of the United States of America*
Leitner, A., Joachimiak, L. A., Unverdorben, P., Walzthoeni, T., Frydman, J., Förster, F., Aebersold, R.
2014; 111 (26): 9455-9460
 - **Modulation of STAT3 folding and function by TRiC/CCT chaperonin.** *PLoS biology*
Kasembeli, M., Lau, W. C., Roh, S., Eckols, T. K., Frydman, J., Chiu, W., Tweardy, D. J.
2014; 12 (4)
 - **TRiC's tricks inhibit huntingtin aggregation** *ELIFE*
Shahmoradian, S. H., Galaz-Montoya, J. G., Schmid, M. F., Cong, Y., Ma, B., Spiess, C., Frydman, J., Ludtke, S. J., Chiu, W.
2013; 2
 - **The role of mutational robustness in RNA virus evolution.** *Nature reviews. Microbiology*
Lauring, A. S., Frydman, J., Andino, R.
2013; 11 (5): 327-336
 - **Hsp90 Inhibitors Exhibit Resistance-Free Antiviral Activity against Respiratory Syncytial Virus** *PLOS ONE*
Geller, R., Andino, R., Frydman, J.
2013; 8 (2)
 - **Exogenous delivery of chaperonin subunit fragment ApiCCT1 modulates mutant Huntingtin cellular phenotypes** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
Sontag, E. M., Joachimiak, L. A., Tan, Z., Tomlinson, A., Housman, D. E., Glabe, C. G., Potkin, S. G., Frydman, J., Thompson, L. M.
2013; 110 (8): 3077-3082
 - **Cellular Inclusion Bodies of Mutant Huntingtin Exon 1 Obscure Small Fibrillar Aggregate Species** *SCIENTIFIC REPORTS*
Sahl, S. J., Weiss, L. E., Duim, W. C., Frydman, J., Moerner, W. E.
2012; 2
 - **State of the Science: An Update on Renal Cell Carcinoma** *MOLECULAR CANCER RESEARCH*

- Jonasch, E., Futreal, P. A., Davis, I. J., Bailey, S. T., Kim, W. Y., Brugarolas, J., Giaccia, A. J., Kurban, G., Pause, A., Frydman, J., Zurita, A. J., Rini, B. I., Sharma, et al
2012; 10 (7): 859-880
- **Broad action of Hsp90 as a host chaperone required for viral replication** *BIOCHIMICA ET BIOPHYSICA ACTA-MOLECULAR CELL RESEARCH*
Geller, R., Taguwa, S., Frydman, J.
2012; 1823 (3): 698-706
 - **Symmetry-free cryo-EM structures of the chaperonin TRiC along its ATPase-driven conformational cycle** *EMBO JOURNAL*
Cong, Y., Schroeder, G. F., Meyer, A. S., Jakana, J., Ma, B., Dougherty, M. T., Schmid, M. F., Reissmann, S., Levitt, M., Ludtke, S. L., Frydman, J., Chiu, W.
2012; 31 (3): 720-730
 - **Heterozygous Yeast Deletion Collection Screens Reveal Essential Targets of Hsp90** *PLOS ONE*
Franzosa, E. A., Albanese, V., Frydman, J., Xia, Y., McClellan, A. J.
2011; 6 (11)
 - **Sensing cooperativity in ATP hydrolysis for single multisubunit enzymes in solution** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
Jiang, Y., Douglas, N. R., Conley, N. R., Miller, E. J., Frydman, J., Moerner, W. E.
2011; 108 (41): 16962-16967
 - **Sub-diffraction imaging of huntingtin protein aggregates by fluorescence blink-microscopy and atomic force microscopy.** *Chemphyschem*
Dum, W. C., Chen, B., Frydman, J., Moerner, W. E.
2011; 12 (13): 2387-2390
 - **Sub-Diffraction Imaging of Huntingtin Protein Aggregates by Fluorescence Blink-Microscopy and Atomic Force Microscopy** *CHEMPHYSICHEM*
Dum, W. C., Chen, B., Frydman, J., Moerner, W. E.
2011; 12 (13): 2386-2389
 - **Cryo-EM Structure of a Group II Chaperonin in the Prehydrolysis ATP-Bound State Leading to Lid Closure** *STRUCTURE*
Zhang, J., Ma, B., DiMaio, F., Douglas, N. R., Joachimiak, L. A., Baker, D., Frydman, J., Levitt, M., Chiu, W.
2011; 19 (5): 633-639
 - **Trivalent Arsenic Inhibits the Functions of Chaperonin Complex** *GENETICS*
Pan, X., Reissman, S., Douglas, N. R., Huang, Z., Yuan, D. S., Wang, X., McCaffery, J. M., Frydman, J., Boeke, J. D.
2010; 186 (2): 725-U434
 - **Crystal Structures of a Group II Chaperonin Reveal the Open and Closed States Associated with the Protein Folding Cycle** *JOURNAL OF BIOLOGICAL CHEMISTRY*
Pereira, J. H., Ralston, C. Y., Douglas, N. R., Meyer, D., Knee, K. M., Goulet, D. R., King, J. A., Frydman, J., Adams, P. D.
2010; 285 (36): 27958-27966
 - **Action of the Chaperonin GroEL/ES on a Non-native Substrate Observed with Single-Molecule FRET** *JOURNAL OF MOLECULAR BIOLOGY*
Kim, S. Y., Miller, E. J., Frydman, J., Moerner, W. E.
2010; 401 (4): 553-563
 - **4.0 angstrom Resolution Cryo-EM Structure of the Mammalian Chaperonin TRiC/CCT Reveals its Unique Subunit Arrangement**
Cong, Y., Baker, M. L., Jakana, J., Woolford, D., Miller, E. J., Reissmann, S., Kumar, R. N., Redding-Johanson, A. M., Batth, T. S., Mukhopadhyay, A., Ludtke, S. J., Frydman, J., Chiu, et al
FEDERATION AMER SOC EXP BIOL.2010
 - **4.0-angstrom resolution cryo-EM structure of the mammalian chaperonin TRiC/CCT reveals its unique subunit arrangement** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
Cong, Y., Baker, M. L., Jakana, J., Woolford, D., Miller, E. J., Reissmann, S., Kumar, R. N., Redding-Johanson, A. M., Batth, T. S., Mukhopadhyay, A., Ludtke, S. J., Frydman, J., Chiu, et al
2010; 107 (11): 4967-4972
 - **Conformational Change of a Group II Chaperonin in Different States Revealed by Single-particle Cryo-EM**

Zhang, J., Baker, M. L., Schroeder, G., Douglas, N. R., Jakana, J., Fu, C. J., Levitt, M., Ludtke, S. J., Frydman, J., Chiu, W.
ADENINE PRESS.2009: 844–44

- **The Predicted Structure of the Headpiece of the Huntingtin Protein and Its Implications on Huntingtin Aggregation** *JOURNAL OF MOLECULAR BIOLOGY*
Kelley, N. W., Huang, X., Tam, S., Spiess, C., Frydman, J., Pande, V. S.
2009; 388 (5): 919-927
- **Conformational Changes of Eukaryotic Chaperonin TRiC/CCT in the Nucleotide Cycle Revealed by CryoEM**
Cong, Y., Schroeder, G. F., Jakana, J., Reissmann, S., Levitt, M., Ludtke, S. J., Frydman, J., Chiu, W.
FEDERATION AMER SOC EXP BIOL.2009
- **Rocking Motion of the Equatorial Domains of a Group II Chaperonin between Two Biochemical States Revealed by Single-Particle Cryo-EM at Near-atomic and Subnanometer Resolutions**
Zhang, J., Baker, M., Schroeder, G., Douglas, N., Jakana, J., Fu, C., Levitt, M., Ludtke, S., Frydman, J., Chiu, W.
FEDERATION AMER SOC EXP BIOL.2009
- **Hardware-based anti-Brownian electrokinetic trap (ABEL trap) for single molecules: Control loop simulations and application to ATP binding stoichiometry in multi-subunit enzymes.** *Proceedings - Society of Photo-Optical Instrumentation Engineers*
Jiang, Y. n., Wang, Q. n., Cohen, A. E., Douglas, N. n., Frydman, J. n., Moerner, W. E.
2008; 7038: 1–12
- **Hardware-based anti-Brownian electrokinetic trap (ABEL trap) for single molecules: Control loop simulations and application to ATP binding stoichiometry in multi-subunit enzymes** *Conference on Optical Trapped and Optical Micromanipulation V*
Jiang, Y., Wang, Q., Cohen, A. E., Douglas, N., Frydman, J., Moerner, W. E.
SPIE-INT SOC OPTICAL ENGINEERING.2008
- **Modeling of possible subunit arrangements in the eukaryotic chaperonin TRiC** *PROTEIN SCIENCE*
Miller, E. J., Meyer, A. S., Frydman, J.
2006; 15 (6): 1522-1526
- **Chaperonin GroEL and its mutant D87K protect from ischemia in vivo and in vitro** *5th Neurobiology of Aging Conference*
Xu, L. J., Dayal, M., Ouyang, Y. B., Sun, Y. J., Yang, C. F., Frydman, J., Giffard, R. G.
ELSEVIER SCIENCE INC.2006: 562–69
- **Probing the sequence of conformationally induced polarity changes in the molecular chaperonin GroEL with fluorescence spectroscopy** *JOURNAL OF PHYSICAL CHEMISTRY B*
Kim, S. Y., Semyonov, A. N., TWIEG, R. J., Horwich, A. L., Frydman, J., Moerner, W. E.
2005; 109 (51): 24517-24525
- **Hsp110 cooperates with different cytosolic Hsp70 systems in a pathway for de novo folding** *JOURNAL OF BIOLOGICAL CHEMISTRY*
Yam, A. Y., Albanese, V., Lin, H. T., Frydman, J.
2005; 280 (50): 41252-41261
- **The cotranslational contacts between ribosome-bound nascent polypeptides and the subunits of the hetero-oligomeric chaperonin TRiC probed by photocross-linking** *JOURNAL OF BIOLOGICAL CHEMISTRY*
Etchells, S. A., Meyer, A. S., Yam, A. Y., Roobol, A., Miao, Y. W., Shao, Y. L., Carden, M. J., Skach, W. R., Frydman, J., Johnson, A. E.
2005; 280 (30): 28118-28126
- **Actin mutations in hypertrophic and dilated cardiomyopathy cause inefficient protein folding and perturbed filament formation** *FEBS JOURNAL*
Vang, S., Corydon, T. J., Borglum, A. D., Scott, M. D., Frydman, J., Mogensen, J., Gregersen, N., Bross, P.
2005; 272 (8): 2037-2049
- **The Hsp70 and TRiC/CCT chaperone systems cooperate in vivo to assemble the von Hippel-Lindau tumor suppressor complex** *MOLECULAR AND CELLULAR BIOLOGY*
Melville, M. W., McClellan, A. J., Meyer, A. S., Darveau, A., Frydman, J.
2003; 23 (9): 3141-3151
- **Aberrant protein folding as the molecular basis of cancer.** *Methods in molecular biology (Clifton, N.J.)*
Scott, M. D., Frydman, J.

2003; 232: 67-76

- **Review: Cellular substrates of the eukaryotic chaperonin TRiC/CCT** *JOURNAL OF STRUCTURAL BIOLOGY*
Dunn, A. Y., Melville, M. W., Frydman, J.
2001; 135 (2): 176-184
- **Protein folding in vivo: the importance of molecular chaperones** *CURRENT OPINION IN STRUCTURAL BIOLOGY*
Feldman, D. E., Frydman, J.
2000; 10 (1): 26-33
- **Purification of the cytosolic chaperonin TRiC from bovine testis.** *Methods in molecular biology (Clifton, N.J.)*
Ferreyra, R. G., Frydman, J.
2000; 140: 153-160
- **Folding assays. Assessing the native conformation of proteins.** *Methods in molecular biology (Clifton, N.J.)*
Thulasiraman, V., Ferreyra, R. G., Frydman, J.
2000; 140: 169-177
- **Monitoring actin folding. Purification protocols for labeled proteins and binding to DNase I-sepharose beads.** *Methods in molecular biology (Clifton, N.J.)*
Thulasiraman, V., Ferreyra, R. G., Frydman, J.
2000; 140: 161-167
- **Directionality of polypeptide transfer in the mitochondrial pathway of chaperone-mediated protein folding** *BIOLOGICAL CHEMISTRY*
Heyrovska, N., Frydman, J., Hohfeld, J., Hartl, F. U.
1998; 379 (3): 301-309
- **Chaperones get in touch: The hip-hop connection** *TRENDS IN BIOCHEMICAL SCIENCES*
Frydman, J., Hohfeld, J.
1997; 22 (3): 87-92
- **TCP20, A SUBUNIT OF THE EUKARYOTIC TRiC CHAPERONIN FROM HUMANS AND YEAST** *JOURNAL OF BIOLOGICAL CHEMISTRY*
Li, W. Z., Lin, P., Frydman, J., Boal, T. R., Cardillo, T. S., RICHARD, L. M., Toth, D., Lichtman, M. A., Hartl, F. U., Sherman, F., Segel, G. B.
1994; 269 (28): 18616-18622
- **FUNCTION IN PROTEIN FOLDING OF TRiC, A CYTOSOLIC RING COMPLEX CONTAINING TCP-1 AND STRUCTURALLY RELATED SUBUNITS** *EMBO JOURNAL*
Frydman, J., Nimmegern, E., ERDJUMENTBROMAGE, H., Wall, J. S., Tempst, P., Hartl, F. U.
1992; 11 (13): 4767-4778
- **AN ATP-STABILIZED INHIBITOR OF THE PROTEASOME IS A COMPONENT OF THE 1500-KDA UBIQUITIN CONJUGATE-DEGRADING COMPLEX** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
Driscoll, J., Frydman, J., Goldberg, A. L.
1992; 89 (11): 4986-4990