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Graduate School of Biomedical Sciences

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CHEMICAL BIOLOGY PROGRAM

The Gabriela Chiosis Lab

Gabriela Chiosis, PhD

Professor

The goal of my program is to investigate stressor maladaptation mechanisms such as they occur in several diseases. Our approach takes advantage of the way nature has evolved to control such stressors, and that is by a unique usage of the chaperome, referred here as the epichaperome. The epichaperome, which we discovered, is structurally, dynamically and functionally distinct from the housekeeping chaperome, and my lab has pioneered an approach to take advantage of such features. By using innovative methods, we develop small molecule chemical toolsets specifically targeted to the epichaperome; these act as “sensors” of the epichaperome, and in turn, of the chronic stressor-associated proteome-wide malfunctions. By the use of these unique toolsets we aim to understand, diagnose and treat cellular processes associated with chronic stressors. We address multiple mechanistic and biochemical questions less amenable to approaches that treat the chaperome as monolithic entity (*i.e.* the classical biochemical and genetic tools). We investigate in endogenous systems, both at the cellular and the organismal level, the inherent proteome changes and mechanisms that lead to disease, *i.e*. we can understand. By sensing disease states through the chemical toolsets, we go beyond investigation; we identify, measure and quantify, *i.e.* we can diagnose. By attacking the epichaperome specifically, we perturb the disease-causing proteome, and in turn revert or slow the disease phenotype, *i.e*. we can treat.

View Lab Overview (https://www.sloankettering.edu/research-areas/labs/gabriela-chiosis/overview)

Research Projects

- Protein-protein interaction networks in disease
- Mechanisms of disease
- Epichaperomes in Neurodegenerative Diseases
- Paradigms for Precision Medicine
- Development of Chemical Probes

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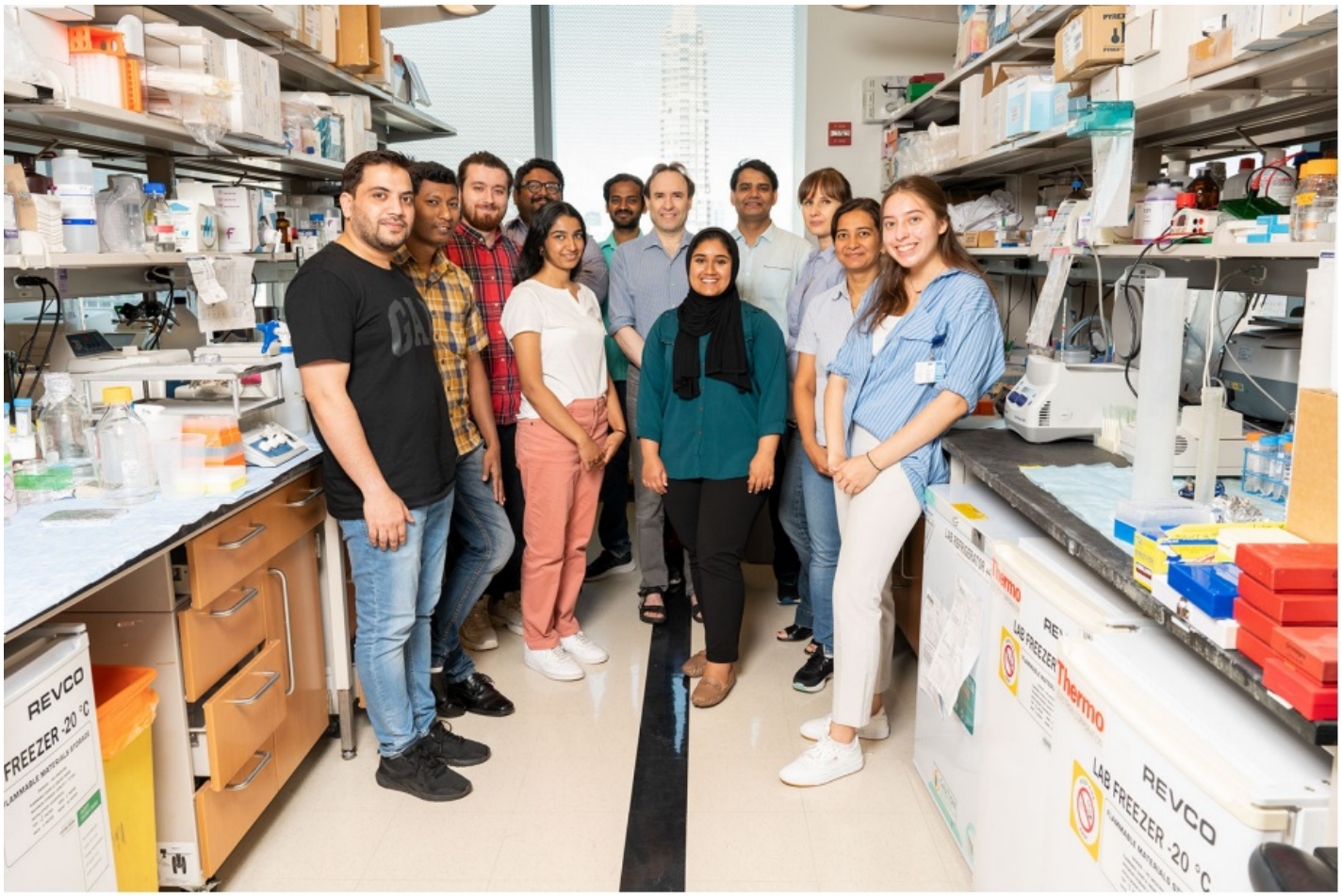
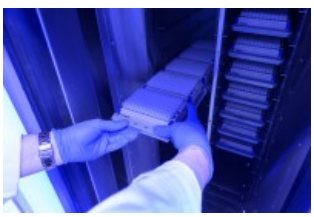
Keep up with the Chiosis Lab on Twitter! (https://twitter.com/chiosislabmskcc)



Featured News

[MSK Research Highlights, November 6, 2024]

New MSK research marks a potential advance against RAS-driven cancers; breaks down data silos to better predict cancer outcomes with the help of artificial intelligence (AI); identifies two enzymes vital for maintaining brain health; uncovers how changes to “helper” proteins drive cancer cell survival; develops a new model for investigating lung cancer metastasis; and uses AI to improve outcome predictions in sarcoma.



MSK Research Highlights, June 29, 2023

New MSK research discovered ferroptosis regulators that suggest therapeutic opportunities against hormone receptor-positive cancers; examined how tumor-associated macrophages might be turned against cancer; acquired new insights into joint inflammation in rheumatoid arthritis; developed a systems-level platform called epichaperomics to map changes in interactors among thousands of proteins involved in cancer-related processes; and investigated how artificial intelligence could help diagnose an invasive form of breast cancer.

IN THE LAB

Experimental Drug Targets Misbehaving Proteins in Brain Cancer and Alzheimer's Disease

Memorial Sloan Kettering researchers are studying how drugs that reverse malfunctioning proteins may treat disease.

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Publications Highlights

Phosphorylation-driven epichaperome assembly is a regulator of cellular adaptability and proliferation. Roychowdhury, T., McNutt, S.W., Pasala, C. et al. Phosphorylation-driven epichaperome assembly is a regulator of cellular adaptability and proliferation. Nat Commun 15, 8912 (2024). https://doi.org/10.1038/s41467-024-53178-5 . https://www.nature.com/articles/s41467-024-53178-5

The epichaperome is an integrated chaperome network that facilitates tumour survival. Rodina A, Wang T, Yan P, Gomes ED, Dunphy MP, Pillarsetty N, Koren J, Gerecitano JF, Taldone T, Zong H, Caldas-Lopes E, Alpaugh M, Corben A, Riolo M, Beattie B, Pressl C, Peter RI, Xu C, Trondl R, Patel HJ, Shimizu F, Bolaender A, Yang C, Panchal P, Farooq MF, Kishinevsky S, Modi S, Lin O, Chu F, Patil S, Erdjument-Bromage H, Zanzonico P, Hudis C, Studer L, Roboz GJ, Cesarman E, Cerchietti L, Levine R, Melnick A, Larson SM,

Lewis JS, Guzman ML, Chiosis G. Nature. 2016 Oct 5. doi: 10.1038/nature19807.

Paralog-selective Hsp90 inhibitors define tumor-specific regulation of HER2. Patel PD, Yan P, Seidler PM, Patel HJ, Sun W, Yang C, Que NS, Taldone T, Finotti P, Stephani RA, Gewirth DT, Chiosis G. Nat Chem Biol. 2013 Sep 1. doi: 10.1038/nchembio.1335. [Epub ahead of print]

Identification of an allosteric pocket on human hsp70 reveals a mode of inhibition of this therapeutically important protein. Rodina A, Patel PD, Kang Y, Patel Y, Baaklini I, Wong MJ, Taldone T, Yan P, Yang C, Maharaj R, Gozman A, Patel MR, Patel HJ, Chirico W, Erdjument-Bromage H, Talele TT, Young JC, Chiosis G. Chem Biol. 2013 Dec 19;20(12):1469-80. doi: 10.1016/j.chembiol.2013.10.008. Epub 2013 Nov 14.

Affinity-based proteomics reveal cancer-specific networks coordinated by Hsp90. Moulick K, Ahn JH, Zong H, Rodina A, Cerchietti L, Gomes DaGama EM, Caldas-Lopes E, Beebe K, Perna F, Hatzi K, Vu LP, Zhao X, Zatorska D, Taldone T, Smith-Jones P, Alpaugh M, Gross SS, Pillarsetty N, Ku T, Lewis JS, Larson SM, Levine R, Erdjument-Bromage H, Guzman ML, Nimer SD, Melnick A, Neckers L, Chiosis G. Nat Chem Biol. 2011 Sep 25;7(11):818-26. doi: 10.1038/nchembio.670.

View All Publications

People

Gabriela Chiosis, PhD

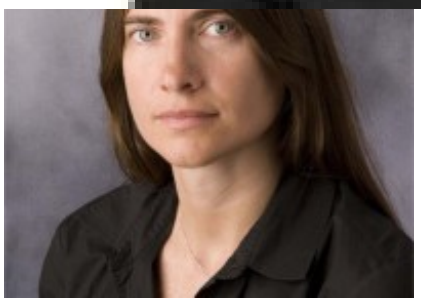
Professor

- The Chiosis lab uses a unique chemical biology approach to understand, diagnose, and treat cellular processes associated with chronic molecular stress with the ultimate goal of developing novel therapeutic options for use in the clinic.
- PhD, Columbia University

chiosisg@mskcc.org
Email Address

646-888-2235
Office Phone

Members



Gabriela Chiosis
Laboratory Head

Anna Rodina
Senior Research Scientist

Lab Alumni

Lab Affiliations

Achievements

AACR – Cancer Research and Prevention Career Development Award in Translational Lung Cancer Research, in Memory of Duffy Wall

Sahil Sharma
Senior Research Scientist

Shujuan Wang
Senior Research Scientist

Chander Digwal
Research Associate

Susan G. Komen Breast Cancer Translational Research Award

Sadik Bay
Research Associate

Frederick R. Adler Chair for Junior Faculty

Award for Drug Discovery Research for Frontotemporal Dementia

Chiranjeevi Pasala
Research Associate

Souparna Chakrabarty
Research Scholar

Palak Panchal
Research Technician

Top 5 percent cited author in Biology and Biochemistry 2010 (analysis by Thomson Reuters)

Translated from bench-to-bedside the Hsp90 inhibitor PU-H71 and the non-invasive companion diagnostic 124I-PU-H71 PET assay

Julia Ashmead
Senior Research Administrative Assistant

Lab News & Events

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Postdoctoral researcher-translational research/biomedicine

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Get in Touch

chiosisg@mskcc.org
Lab Head Email

646-888-2235
Office Phone

646-422-0416
Office Fax

646-888-2216/2238
Lab Phone

Chiosis Lab

Chiosis Lab Twitter

Instagram

Gabriela Chiosis Twitter

Disclosures

Members of the MSK Community often work with pharmaceutical, device, biotechnology, and life sciences companies, and other organizations outside of MSK, to find safe and effective cancer treatments, to improve patient care, and to educate the health care community. These activities outside of MSK further our mission, provide productive collaborations, and promote the practical application of scientific discoveries.

MSK requires doctors, faculty members, and leaders to report ("disclose") the relationships and financial interests they have with external entities. As a commitment to transparency with our community, we make that information available to the public. Not all disclosed interests and relationships present conflicts of interest. MSK reviews all disclosed interests and relationships to assess whether a conflict of interest exists and whether formal COI management is needed.

Gabriela Chiosis discloses the following relationships and financial interests:

- Samus Therapeutics LLC
  Equity; Intellectual Property Rights

The information published here is a complement to other publicly reported data and is for a specific annual disclosure period. There may be differences between information on this and other public sites as a result of different reporting periods and/or the various ways relationships and financial interests are categorized by organizations that publish such data.

This page and data include information for a specific MSK annual disclosure period (January 1, 2024 through disclosure submission in spring 2025). This data reflects interests that may or may not still exist. This data is updated annually.

Learn more about MSK's COI policies here . For questions regarding MSK's COI-related policies and procedures, email MSK's Compliance Office at ecoi@mskcc.org .

View all disclosures (https://www.sloankettering.edu/disclosures)