LUDWIG CENTER | MIT

Ludwig Center for Molecular Oncology Updates—2018

The ***Ludwig Center for Molecular Oncology at MIT*** is focused on the processes associated with malignant progression, specifically on the mechanisms that allow cancer cells originating in primary tumors to disseminate and ultimately form metastatic colonies. This multi-step process involves a series of cell-biological and biochemical changes in malignant cells, which are being investigated at several levels. Our research includes the biological determinants that allow disseminated cancer cells to gain a foothold in foreign tissue microenvironments, where they can succeed in spawning rapidly growing metastatic colonies.

The ***Ludwig Center for Molecular Oncology at MIT*** continues to support the research of 12 Koch Institute faculty members whose work focuses on the critical problems of cancer progression and metastasis. These include Drs. Weinberg and Jacks who serve as co-leaders of the Center. They are joined by Drs. Amon, Bhatia, Gertler, Hemann, Hynes, Lees, Manalis, Regev, and Vander Heiden, who are all full members; and, Dr. Gupta, who received Pilot Project funding in 2018. Of note: Dr. Angelika Amon was awarded full membership in 2018.

Examples of faculty awards and honors received by Ludwig Center Members over the past year:

Name	Awards and Honors
Angelika Amon	Inducted into the American Academy of Arts & Sciences and received the Breakthrough Prize in Life Sciences
Sangeeta Bhatia	Inducted into the National Academy of Science and received the Xconomy 'Innovation at the Intersection' Award and the Science Club for Girls 'Catalyst' Award
Richard Hynes	Received the David Rall Medal from the National Academy of Medicine
Aviv Regev	Received the Paul Marks Prize and the International Society for Computational Biology Innovator Award
Robert Weinberg	Received the NIH Outstanding Investigator Award

Following are some structural highlights from the year:

- The annual ***Ludwig Center for Molecular Oncology at MIT Retreat*** was held at MIT's Endicott House on May 30, 2018. This is an outstanding opportunity for Ludwig Center PIs and researchers to share updates, shape future directions and explore opportunities for collaborations through scientific presentations and a poster session; 77 faculty and researchers were in attendance.

- ***Ludwig Center Principal Investigator Meetings*** Ludwig faculty meet on a quarterly basis throughout the year to discuss ongoing research. There are also multiple opportunities to discuss Ludwig-supported research including weekly "floor meetings" and "Friday Focus."

- ***Ludwig Graduate Fellowships*** were awarded to four students.

Name	Project Title
Xin Gu	"Identification and validation of SAMTOR as an S-adenosylmethionine sensor linking mTORC1 and one-carbon metabolism"

Cynthia Hajal	"Tumor cell extravasation in an *in vivo* blood-brain barrier microvascular network model"
Bashar Hamza	"Optofluidic platform for longitudinal and dynamic circulating tumor cell studies in mouse models of cancer"
Elaine Kuo	"Role of BMI1 in colon tumorigenesis and metastasis"

- ***Ludwig Center Postdoctoral Fellowships*** were awarded to ten postdoctoral associates.

Name	Project Title
Genevieve Abbruzzese	"Regulation of growth factors by the Extracellular matrix in cancer metastasis"
Banu Eskiocak	"Deciphering the tumor-natural killer cell interactions during development and metastasis of lung adenocarcinoma"
Liangliang Hao	"Protease-activated detection and imaging of tumor progression and metastasis"
Brendan Horton	"Interrogating tissue-specific immune responses against metastatic pancreatic cancer"
Augusto Tentori	"Quantitative, multiplex microRNA heterogeneity profiling in tumor sections using microwell arrays"
Elen Torres	"The role of Mena in local mRNA translation in breast cancer metastasis"
Marianna Trakala	"Relevance of the aneuploid microenvironment in cancer progression and metastasis"
Nicholas Truex	"Delivering cancer vaccines with a protective antigen delivery system"
Bert van de Kooij	"Delineating the function of mitotic serine/threonine kinases in adhesion site signaling and cell migration"
Jacomina Zweemer	"Is apoptosis-induced migration via the AXL-receptor leading to *in vivo* metastasis?"

Most important is the research that comes from Ludwig Center members as demonstrated in the following publications since our last report:

Publications

Tang YC, Yuwen H, Wang K, Bruno PM, Bullock K, Deik AA, Santaguida S, Trakala M, Pfau SJ, Zhong N, Huang T, Wang L, Clish CB, **Hemann MT**, **Amon A**. Aneuploid cell survival relies upon sphingolipid homeostasis. Cancer Res, *77*:5272-5286, 2017. PMID28775166; PMC5772763; 10.1158/0008-5472.CAN-17-0049

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Expenditures

Use of ***Ludwig Center for Molecular Oncology at MIT*** funds are focused on Faculty Research including direct support for research through use of the Koch Institute Swanson Biotechnology Center Core Facilities, Pilot Projects to support novel research projects and fellowships for graduate students and postdoctoral associates. Support for the Ludwig Center in Fiscal Year 2018 was broken down as indicated in the chart below.