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Date Prepared: March 23, 2020

Education, Training and Professional Positions

Assistant Professor 1/2020 – Present
University of Texas Southwestern, Medical Center

Instructor 1/2018 – 12/2019
Massachusetts General Hospital, Harvard Medical School

Post-Doctoral Research Fellow 6/2014 – 12/2017
Massachusetts General Hospital, Harvard Medical School, Boston

Ph.D in Molecular Epidemiology and Biostatistics 1/2011 - 4/2014
Harvard Medical School, Boston - University of Genova, Italy

Residency in General Surgery 1/2005 - 12/2010
University of Genova, Italy

Medical School with honors (*Summa cum laude*) 9/1998 - 7/2004
University of Genova, Italy

Laboratory Research Experience

David T. Ting MD (mentor), Daniel A. Haber MD PhD (co-mentor), and Shyamala Maheswaran PhD (co-mentor): Cancer Center, Massachusetts General Hospital, Harvard Medical School, Boston, MA, USA
Post-Doctoral Research Fellow
(1) Defining the role of tumor stroma on single cell heterogeneity and tumor progression in pancreatic cancer; (2) Characterization of circulating tumor cells; (3) Generation of human xenografts in zebrafish as a novel animal model for cancer research.

Andrew L. Warshaw MD FACS FRCSE (Hon), Cristina R. Ferrone MD, Carlos Fernandez Del Castillo MD: Department of Surgery, Massachusetts General Hospital, Harvard Medical School, Boston, MA, USA
Ph.D. Student - Clinical Research Fellow
(1) Development of a new drug-eluting platform to treat pancreatic cancer; (2) Discovery of novel prognostic biomarkers for gastrointestinal tumors.

Silvio De Flora, MD, PhD, and Roberto Gasparini, MD: University of Genova, Public Health Department, Genova, Italy
Ph.D. Student
(1) Mechanisms of mutagenesis in human cancer; (2) Epigenetic alterations in solid tumors.

Clinical Research Experience

Department of Surgery: University of Genova, Italy
Resident - MD student
(1) Robotic surgical anastomosis (MD Thesis); (2) Physio-Pathology of outlet obstruction syndrome; (3) Regenerative medicine to improve wound healing.

Awards and Honors

MGH ECOR Fund for Medical Discovery (FMD) Postdoctoral Fellowship Award	01/2018
Hirshberg Foundation for Pancreatic Cancer Research - Seed Grant Award	11/2017
Best Research Annual Award, MGH, Cancer Center	09/2016
American-Italian Cancer Foundation Post-Doctoral Fellowship Award	07/2015
MIT $100K Award Finalist, PanTher Therapeutics	05/2015
Medal for academic achievements (MD Thesis)	07/2004

Board Certification

Board Certified in General Surgery	12/2010
Board Certificated in Emergency Territorial Medicine	07/2010
Medical Doctor License	10/2004

Entrepreneurship & Patents

Launching a Biotech Company, Panther Therapeutics® (http://www.panthertx.com/)	05/2015
Co-inventor (Patent Number: *US9301926 B2*) of a novel drug delivery device to treat pancreatic cancer	04/2014

Invited Speaker (selected): Meetings and Seminars

- Weill Cornell, Seminar, NYC, USA. October 21st, 2019
- UT Southwestern, Seminar. TX, USA. August 1st, 2019
- Pancreatic Diseases Gordon Conferences. Sunday River. ME, USA. June 20th, 2019
- Broad Institute. Epigenomic Seminar. Cambridge. MA, USA. April 29th, 2019
- Humanitas University. Seminar, Milan, Italy. December 21th, 2018.
- Memorial Sloan Kettering Cancer Center. Seminar, NYC, USA. July 17th, 2018
- University of Nebraska Medical Center, Special Seminar, NE, USA July 10th, 2018
- American Pancreatic Association (APA), Annual Meeting. San Diego, (CA). November 11th, 2017
- MGH Cancer Center Retreat, Waterville Valley, NH, USA. September 26th, 2017.
- American college of Surgeon, Annual Meeting. Washington, D.C. USA. October 7th, 2013.
- American college of Surgeon, Annual Meeting, Chicago, IL, USA. October 1st, 2012.

List of Peer-Reviewed and Under-Submission Publications

1. Porter RL, Magnus NKC, Thapar V, Morris R, Szabolcs A, Neyaz A, Kulkarni AS, Tai E, Chougule A, Hillis A, Golczer G, Guo H, Yamada T, Kurokawa T, Yashaswini C, **Ligorio M**, Vo KD, Nieman L, Liss AS, Deshpande V, Lawrence MS, Maheswaran S, Fernandez-Del Castillo C, Hong TS, Ryan DP, O'Dwyer PJ, Drebin JA, Ferrone CR, Haber DA, Ting DT. Epithelial to mesenchymal plasticity and differential response to therapies in pancreatic ductal adenocarcinoma. ***PNAS*** (**2020**) Jan 21;117(3):1818.

2. **Ligorio M***, Sil S*, Malagon-Lopez J, Nieman LT, Misale S, Di Pilato M, Ebright RY, Karabacak M, Kulkarni A, Liu A, Vincent Jordan N, Franses JW, Philipp J, Kreuzer J, Desai N, Arora KS, Rajurkar M, Horwitz E, Neyaz A, Tai E, Magnus NKC, Vo KD, Yashaswini CN, Marangoni F, Boukhali M, Fatherree JP, Damon LJ, Xega K, Desai R, Choz M, Bersani F, Langenbucher A, Thapar V, Morris R, Wellner UF, Schilling O, Lawrence MS, Liss AS, Rivera MN, Deshpande V, Benes CH, Maheswaran S, Haber DA, Fernandez-Del-Castillo C, Ferrone CR, Haas W, Aryee MJ, Ting DT. Stromal Microenvironment Shapes the Intratumoral Architecture of Pancreatic Cancer. ***Cell*** **(2019***)* Jun 27;178(1):160-175.

***Equal Contribution**

3. Di Pilato M, Kim EY, Cadilha BL, Misale S, Zappulli V, Pruessmann JN, Usmani SM, Carrizosa E, Mani V, Seruggia D, **Ligorio M**, Warner R, Medoff BD, Marangoni F, and Mempel TR. Targeting the CBM signalosome induces Treg to prime the tumor environment 2 for effective immune checkpoint therapy**.** ***Nature*** **(2019)**.

4. Yan C, Brunson DC, Tang Q, Do D, Iftimia NA, Moore JC, Hayes MN, Welker AM, Garcia EG, Dubash TD, Benjamin XH, Drapkin BJ, Myers DT, Phat S, Volorio A, Marvin DL, **Ligorio M**, Dershowitz L, McCarthy KM, Karabacak MN, Fletcher JA, Sgroi DC, Iafrate AJ, Maheswaran S, Dyson NJ, Haber DA, Rawls FJ, Langenau DM. Imaging tumor heterogeneity and therapy responses at single cell resolution using human xenografts grown in immune deficient zebrafish. ***Cell*** **(*2019*)**

5. Rajurkar M, Parikh A, Solovyov A, Kulkarni AS, Vo KD, Tai E, Lu C, Nieman LT, Desai N, Arora KS, **Ligorio M**, Thapar V, Deshpande V, Ferrone CR, Rivera MN, Hong TS, Greenbaum BD, Ting DT. Inhibition of Cancer Repeat RNA Retroviral Mimicry Triggers Necroptotic Immuno-surveillance. (*Manuscript under submission*).

6. Potter RL, Magnus NC, Morris R, Thapar V, Szabolcs A, Tai E, Hillis A, Kulkarni AS, Chougule A, Yashaswini C, **Ligorio M**, Vo KD, Deshpande V, Fernandez-Del Castillo C, Ferrone CR, Lawrence MS, O'Dwyer PJ, Bebrin J, Ting D. Differential Effects of Vitamin D on Pancreatic Cancer Subtypes. (*PNAS - manuscript submitted*).

7. Franses JW, Philipp J, Missios P, Liu A, Yashaswini C, Kulkarni AS, **Ligorio M**, Zhu H, Maheswaran S, Haber DA, Daley GQ, Ting DT. LIN28B directly contributes to pancreatic cancer pathogenesis via a let-7/HMGA2 pathway. (*Nature Cancer - manuscript submitted*).

8. Geller L T, Barzily-Rokni M, Danino T, Jonas O H, Shental N, Nejman D, Gavert N, Zwang Y, Cooper Z A, Shee K, Thaiss C A, Reuben A, Livny J, Avraham R, Frederick D T, **Ligorio M**, Chatman K, Johnston S E, Mosher C M, Brandis A, Fuks G, Gurbatri C, Gopalakrishnan V, Kim M, Hurd M, Katz M, Fleming J, Maitra A, Smith D A, Skalak M, Bu J, Michaud M, Trauger S A, Barshack I, Golan T, Sandbank J, Flaherty K T, Mandinova A, Garrett W S, Thayer S P, Ferrone C R, Huttenhower C, Bhatia S N, Gevers D, Wargo J A, Golub T R, Straussman R. Intra-tumor bacteria elicit drug resistance in pancreatic ductal adenocarcinoma. ***Science (2017).*** Sep 15;357(6356):1156-1160

9. Villani* V, Mahadevan* K, **Ligorio* M**, Fernandez-del Castillo C, Ting D, Sabbatino F, Zhang I, Vangel M, Ferrone S, Warshaw A, Lillemoe K, Wargo J, Deshpande# V, Ferrone# C. Phosphorylated histone H3 (PHH3) is a superior proliferation marker for prognosis of pancreatic neuroendocrine tumors. **Annals of Surgical Oncology (2016)**. Dec; 23(Suppl 5):609-617

***Equal Contribution.**

10. Vincent N, Bardia A, Wittner B, Benes C, **Ligorio M**, Zheng Y, Yu M, Sundaresan T, Desai R, O'Keefe R, Ebright R, Boukhali M, Sil S, Kapur R, Sgroi D, Ting D, Toner M, Ramaswamy S,

Haas W, Maheswaran S, Haber D. Heterogeneity of HER2 expression in circulating breast cancer cells identifies functionally distinct populations. ***Nature (2016)***. Sep 1;537(7618):102-106

11. Indolfi* L, **Ligorio* M**, Ting* D, Bersani F, Aceto N, Deshpande V, Ferrone C, Haber D, Langer R[#], Clark J[#], Edelman E[#]. A Tunable Delivery Platform to Provide Local Chemotherapy for Pancreatic Ductal Adenocarcinoma. ***Biomaterials*** (***2016)***. Jul; 93:71-82

***Equal Contribution.**

12. Ting D, Wittner B, **Ligorio M**, Vincent Jordan N, Shah A, Miyamoto D, Aceto N, Bersani F, Brannigan B, Xega K, Ciciliano J, Zhu H, MacKenzie O, Trautwein J, Arora K, Shahid M, Ellis H, Qu N, Bardeesy N, Rivera M, Deshpande V, Ferrone C, Kapur R, Ramaswamy S, Shioda T, Toner M, Maheswaran S, Haber D. Single Cell RNA-sequencing Identifies Extracellular Matrix Gene Expression by Pancreatic Circulating Tumor Cells. ***Cell Reports*** **(*2014*)** Sep.; 25;8(6):1905-18.

13. Son J, Lyssiotis CA, Ying H, Wang X, Hua S, **Ligorio M**, Perera RM, Ferrone CR, Mullarky E, Shyh-Chang N, Kang Y, Fleming JB, Bardeesy N, Asara JM, Haigis MC, DePinho RA, Cantley LC, Kimmelman AC. Glutamine supports pancreatic cancer growth through a KRAS-regulated metabolic pathway. ***Nature*** (***2013***) Apr; 496(7443): 101-5.

14. Cecchini S, Correa-Gallego C, Desphande V, **Ligorio M**, Dursun A, Wargo J, Fernàndez-del Castillo C, Warshaw AL, Ferrone CR. Superior prognostic importance of perineural invasion vs. lymph node involvement after curative resection of duodenal adenocarcinoma. ***J Gastrointest Surg*** (***2012***) Jan; 16(1): 113-20.

15. **Ligorio M**, Izzotti A, Pulliero A, Arrigo P. Mutagens interfere with microRNA maturation by inhibiting DICER. An *in silico* biology analysis. ***Mutat Res***. (***2011***) Dec 1; 717(1-2): 116-28.

16. Reboa G, Gipponi M, **Ligorio M**, Marino P, Lantieri F. The impact of stapled transanal rectal resection on anorectal function in patients with obstructed defecation syndrome. ***Dis Colon Rectum*** (***2009***) Sep; 52(9): 1598-604.

17. Scala M, Gipponi M, Pasetti S, Dellachá E, **Ligorio M**, Villa G, Margarino G, Giannini G, Strada P. Clinical applications of autologous cryoplatelet gel for the reconstruction of the maxillary sinus. A new approach for the treatment of chronic oro-sinusal fistula. ***In Vivo*** (***2007***) May-Jun; 21(3): 541-7.

Research Support

Active

Cancer Prevention & Research Institute of Texax
CPRIT **Ligorio (PI)** 02/2020-12/2023
Principal Investigator $2,000,000
Targeting tumor architecture as a novel therapeutic strategy for pancreatic cancer.
Targeting therapies against tumor architecture (stroma compartment) have proven efficacy in preclinical studies and have led to ongoing clinical trials. This is the proof-of-concept of the existence of tissue-specific properties that regulate tumor architecture during tumor progression. This proposed study aims at identifying the mechanisms that regulate tumor tissue homeostasis (e.g. the multicellular dynamics during tumor evolution) to find novel therapeutic strategies for patient with pancreatic cancer.
Role: ***Principal Investigator (PI)***

Re-Submitted *(03/05/2020)*

NIH, RO1 Grant **Ligorio (PI)** 09/2020-09/2025
Principal Investigator $1,750,000
Targeting tumor architecture as a novel therapeutic strategy for pancreatic cancer.
Targeting therapies against tumor architecture (stroma compartment) have proven efficacy in preclinical studies and have led to ongoing clinical trials. This is the proof-of-concept of the existence of tissue-specific properties that regulate tumor architecture during tumor progression. This proposed study aims at identifying the mechanisms that regulate tumor tissue homeostasis (e.g. the multicellular dynamics during tumor evolution) to find novel therapeutic strategies for patient with pancreatic cancer.
Role: ***Principal Investigator (PI)***

Completed

MGH ECOR Fund for Medical Discovery (FMD) **Ligorio (PI)** 01/2018-12/2018
Postdoctoral Fellowship Award $75,000
Targeting an Aggressive Cancer Cell Subpopulation in Pancreatic Adenocarcinoma.
The overall goal of this project is to eliminate the DP cells ($Ki67^{+}/FN1^{+}$) by simultaneously targeting MAPK and STAT3 knocking out via CRISPR or by pharmacologically inhibiting these pathways with trametinib (MAPK) and pyrimethamine (STAT3). Moreover, we will define the role of the DP phenotype in PDAC chemoresistance (primary vs. acquired chemoresistance).
Role: ***Principal Investigator (PI)***

Hirshberg Foundation for Pancreatic Cancer Research **Ligorio (PI)** 11/2017-12/2018
Seed Grant $50,000
Discovering Novel Therapeutic Strategies for Patients with Pancreatic Cancer.
The overall goal of this project is to eliminate the DP cells ($Ki67^{+}/FN1^{+}$) by simultaneously targeting MAPK and STAT3 knocking out via CRISPR or by pharmacologically inhibiting these pathways with trametinib (MAPK) and pyrimethamine (STAT3). Moreover, we will define the role of the DP phenotype in PDAC chemoresistance (primary vs. acquired chemoresistance).
Role: ***Principal Investigator (PI)***

American-Italian Cancer Foundation **Ligorio (PI)** 8/2015-7/31/2017
Postdoctoral Fellowship Award $80,000
Role of Cancer Associated Fibroblasts (CAFs) in Pancreatic Cancer Progression
The overall goal of this project is to understand how CAFs affect pancreatic cancer circulating tumor cells (CTCs) and metastasis. A deeper understanding of the cancer-stroma interaction will help elucidate the major determinants implicated in tumor progression and identify novel molecular vulnerabilities that can be therapeutically targeted to improve the dismal prognosis of patients with pancreatic cancer.
Role: ***Principal Investigator (PI)***

Warshaw Institute for Pancreatic Cancer Research Ting (PI) 8/2016-8/2017
Andrew L. Warshaw, M.D., Institute for Pancreatic Cancer Research $50,000
Understanding the Heterogeneous Response of Pancreatic Cancer to Stroma
The goal of this project is to better define the different biological behavior of epithelial vs. mesenchymal pancreatic subtypes to stroma, which determine tumor growth and dissemination.
Role: ***Co-Investigator***

Warshaw Institute for Pancreatic Cancer Research Ting (PI) 7/2014-6/2015
Andrew L. Warshaw, M.D., Institute for Pancreatic Cancer Research $50,000

Role of Cancer Associated Fibroblasts in Pancreatic Cancer Progression
The goal of this project is to understand the contribution of cancer associated fibroblasts in tumor growth and dissemination.
Role: ***Co-Investigator***

Bridge Project Langer, Edelman & Clark (PIs) 3/2012-6/20
MIT Koch Institute & DF/HCC $650,000
Development of a Pancreatobiliary Chemotherapy Eluting Stent for Pancreatic Adenocarcinoma
This is a multi-disciplinary project involving researchers at MIT Koch Institute and Dana-Farber/Harvard Cancer Center to develop a controlled released chemotherapy local delivery platform with a polymer-coated pancreatobiliary stent scaffold. My role is in the overall coordination of PIs and researchers between MIT and MGH as well as execution of mouse model experiments at the MGH Cancer Center.
Role: ***PhD Student***

Warshaw Institute for Pancreatic Cancer Research Ferrone (PI) 5/2012-5/2013
Andrew L. Warshaw, M.D., Institute for Pancreatic Cancer Research $50,000
Epithelial-to-mesenchymal transition (EMT) as a prognostic factor for survival and chemosensitivity in pancreatic adenocarcinoma (PDAC)
To evaluate EMT status as a prognostic factor in PDAC patients, and analyze the role of EMT in response to gemcitabine, 5-FU, oxaliplatin, irinotecan and FOLFIRINOX in a panel of PDAC cell lines.
Role: ***PhD Student***

References

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