CAMB 7010: The Tumor Microenvironment

Directors: Ahmed Diab, PhD, Guilherme Nader, PhD, Ronny Drapkin, MD, PhD

Thursdays 3:30-5:30 pm
Stellar Chance 204

Syllabus Spring 2025

Class Format:

- Students can meet with the assigned faculty prior to their presentation to discuss papers, slide deck, and any questions they may have.
- Students present background (30-40 minutes).
- 10-minute break
- Students present key data in paper(s) (45-50 minutes).
- Feedback from Ahmed, Guilherme, and Ronny to presenters only (10 minutes).

Each week, students that are not presenting that week will submit **two questions** they would like to discuss concerning impact/novelty/implications and/or general questions about the papers to Ahmed, Guilherme, and Ronny before or on the day of class.

If a student misses a class they are still expected to read the papers and submit their questions.

Course Grade: 40% assigned presentations, 40% overall class participation (and weekly questions), and 20% News and Views Article.

Classes:

(1/09/25) Class 1: Organizational Meeting

(1/23/25) Class 2: Inflammation and Tumor Progression (Guilherme)

Liudahl et al. "**Leukocyte Heterogeneity in Pancreatic Ductal Adenocarcinoma: Phenotypic and Spatial Features Associated with Clinical Outcome",** *Cancer Discovery* (2021).

Frittoli et al., "**Tissue fluidification promotes a cGAS-STING cytosolic DNA response in invasive breast cancer**" *Nature Materials* (2023).

(1/30/25) Class 3: Metastatic Niche (Ronny)

Lee et al. "**Hepatocytes Direct the Formation of a Pro-metastatic Niche in the Liver**", *Nature* (2019).

Fane et al. "**Stromal Changes in the Aged Lung Induce an Emergence From Melanoma Dormancy**", *Nature* (2022).

(2/06/25) Class 4: The Tumor Stroma, Cancer Associated Fibroblasts (Guilherme)

Barbazan et al., "Cancer-associated fibroblasts actively compress cancer cells and modulate mechanotransduction", *Nature Communications* (2023).

(2/13/25) Class 5: Crosstalk between the Tumor and the Microbiome (Ronny)

Yi et al. "**Multimodal Immune Phenotyping Reveals Microbial-T cell Interactions That Shape Pancreatic Cancer**", *Cell Reports Medicine* (2024).

*"***Targeting PD-L2-RGMb overcomes microbiome-related immunotherapy resistance", ***Nature* (2023).

(2/20/25) Class 6: Immune Surveillance (Ahmed)

Herrera et al. **"Low dose radiotherapy reverses tumor immune desertification and resistance to immunotherapy",** *Cancer Discovery* (2021).

Li et al., "**IGSF8 is an Innate Immune Checkpoint and Cancer Immunotherapy Target**". *Cell* (2024).

(2/27/25) Class 7: Systemic Factors and Tumor Progression (Guilherme)

Argiles et al. "**Cancer-associated cachexia — understanding the tumour macroenvironment and microenvironment to improve management",** *Nature Review Clinical Oncology* (2023).

Queiroz et al. "**Blocking ActRIIB signaling and restoring appetite reverses cachexia and improves survival in mice with lung cancer",** *Nature Communications* (2022).

(3/06/25) Class 8: Tumor Angiogenesis, Lymphangiogensis (Ahmed)

Garcia Silva et al. **"Melanoma-derived small extracellular vesicles induce lymphangiogenesis and metastasis through an NGFR-dependent mechanism",** *Nature Cancer* (2021).

Stella Stasso "**Lymphangiogenesis-inducing vaccines elicit potent and long-lasting T cell immunity against melanomas**", *Science Advances* (2021).

--- Spring Break: March 8-16, 2025 ---

(3/20/25) Class 9: Stressful Tumor Microenvironments (Hypoxia and Nutrient Scarcity) (Ahmed)

Lien et al. **"Low glycaemic diets alter lipid metabolism to influence tumour growth",** *Nature* (2021).

Ubellacker et al. **"Lymph protects metastasizing melanoma cells from ferroptosis",** *Nature* (2020).

(3/27/25) Class 10: Tumor-Nervous System Interactions (Ronny)

Balood et al. **"Nociceptor neurons affect cancer immunosurveillance",** *Nature* 2022

Banh et al. "**Neurons release serine to support mRNA translation in pancreatic cancer",** *Cell* (2020).

(4/03/25) Class 11: The Influence of Age on Tumor Growth (Ronny)

Rossetti et al., "**In Vivo DNA Replication Dynamics Unveil Aging-Dependent Replication Stress**". *Cell* (2024).

Marino-Bravante et al. "**Age-dependent Loss of HAPLN1 Erodes Vascular Integrity via Indirect Upregulation of Endothelial ICAM1 in Melanoma**". *Nature Aging* (2024).

(4/10/25) Class 12: Tumor Metabolism (Ahmed)

Xiao et al. **"Emerging therapies in cancer metabolism",** *Cell Metabolism* (2023).

Tang et al. "**Immunogenic coevolution defines unique microenvirnmental niches in ccRCC**", *Cell Metabolism* (2023).

(4/17/25) Class 13: Tumor Dormancy (Guilherme)

Albrengues et al. **"Neutrophil extracellular traps produced during inflammation awaken dormant cancer cells in mice",** *Science* (2018).

Montagner et al., "**Crosstalk with lung epithelial cells regulates Sfrp2-mediated latency in breast cancer dissemination**", *Nature Cell Biology* (2020).

(4/24/25) Class 14: Cancer Heterogeneity, Plasticity, and Tumor Evolution (Guilherme)

Chia-Kuei Mo et al, "**Tumour evolution and microenvironment interactions in 2D and 3D space**", *Nature* (2024).

Concepcion et al. "**SMARCA4 inactivation promotes lineage-specific transformation and early metastatic features in the lung,"** *Cancer Discovery* (2021).

(5/01/25) Class 15: Sex as a Biological Variable in Tumor Progression (Ahmed)

Vellano et al. **"Androgen receptor blockade promotes response to BRAF/MEK-targeted therapy",** *Nature* (2022).

Presentation Schedule:

Date	Background Presenter	Paper Presenter
1/23/25	Shirley Sun	Owen Koucky
1/30/25	Hira Khattak	Beatrice Goncalves
2/06/25	Grace Hinds	Madison Wahlsten
2/13/25	Jinfan Zhang	Shirley Sun
2/20/25	Mehrnaz Zakershahrak	Megan Costa
2/27/25	Bhargavi Subramanian	Jinfan Zhang
3/06/25	Owen Koucky	Grace Hinds
3/13/25	*NO CLASS*	*NO CLASS*
3/20/25	Beatrice Goncalves	Hira Khattak
3/27/25	Madison Wahlsten	Kim Manning
4/03/25	Megan Costa	Bhargavi Subramanian
4/10/25	Kim Manning	Mehrnaz Zakershahrak
4/17/25	*Grace Hinds*	*Beatrice Goncalves*
4/24/25	*Kim Manning*	*Bhargavi Subramanian*
5/01/25	*Hira Khattak*	*Owen Koucky*