

Oncology 725, Spring 2024

Course Description: A review and discussion of the current literature on topics related to cancer biology. The emphasis is on the development of skills in data analysis, critical interpretation, and clear writing.

Textbook and Reading Materials: Reading materials will be posted on the Canvas site for students to access electronically or to print their own copy.

Assessment and Grading: Students will participate in weekly discussions of the selected papers. Grades will be assessed formally through a written take-home midterm and final.

Use of Artificial Intelligence: For the purpose of ONC-725, artificial intelligence models, ChatGPT in particular, can be used as tools. The information you receive from these tools should always be checked via other methods to confirm that the output is correct. You are not permitted to claim the output of ChatGPT or other AI as your own. This is to encourage and hone your own writing and critical thinking skills. The following is a paraphrase from Bill's son Arthur on his AI policy for his students, "Generative artificial intelligence models, and ChatGPT in particular, are new tools. They are trained to solve exactly one problem: produce the most probable next syllable. With enough training data, this leads Generative AI to appear "magical," describing subjects about which we may be ignorant in seemingly perfect English. However, these tools can easily make mistakes and "hallucinate" citations, experiments, or inaccuracies as facts. As such, you may use it as a tool to explore a subject. However, you must check its output via other methods to confirm that it is correct, and you must never use its output as your own (either verbatim or reworded). First, it writes like a ninth grader and you're better than that. Second, you will not learn, and as such will have a harder time with the rest of your PhD. Third, these tools cannot synthesize information as well as a Ph.D. student, and are not designed to; they will make your thinking appear simplistic."

Introduction: (1/25/24)

"Doll and Peto's Quantitative Estimates of Cancer Risks: Holding Generally True for 35 Years" by William J. Blot and Robert E. Tarone, JNCI J Natl Cancer Inst, 2015, Vol. 107, No. 4.

"Differences between germline and somatic rates in humans and mice" by Brandon Milholland, Xiao Dong, Lei Zhang, Xiaoxiao Hao, Yousin Suh & Jan Vijg, NATURE COMMUNICATIONS | 8:15183 | DOI: 10.1038/ncomms15183.

Infectious agents causing cancers: (2/1/24)

"Helicobacter pylori, Homologous-Recombination Genes, and Gastric Cancer" by Yoshiaki Usui et al. N Engl J Med. 2023 Mar 30;388(13):1181-1190. doi: 10.1056/NEJMoa2211807.

"Helicobacter pylori pathogen regulates p14ARF tumor suppressor and autophagy in gastric epithelial cells" by Horvat et al. *Oncogene*. 2018 Sep;37(37):5054-5065. doi: 10.1038/s41388-018-0343-8. Epub 2018 May 30.

"Estimating the Global Burden of Epstein-Barr Virus–Associated Gastric Cancer: A Systematic Review and Meta-Analysis", *Clinical Gastroenterology and Hepatology* 2023;21:922–930, Hirabayashi et al. *Carcinogens, Mutations, and Cancer*

Carcinogens, Mutations, and Cancer: (2/8/24)

"High burden and pervasive positive selection of somatic mutations in normal human skin" by Martincorena, Roshan, et al. *Science*. 2015, 348: 880-886 .

"Clonal dynamics of hematopoiesis across the human lifespan" by Emily Mitchell et al. *Nature*. 2022 Jun;606(7913):343-350

"Pervasive chromosomal instability and karyotype order in tumor evolution" by Watkins et al. *Nature* | Vol 587 | 5 November 2020/16/23:

Inherited Predispositions to Cancer: (2/15/24)

"A Dominant Mutation That Predisposes to Multiple Intestinal Neoplasia in the Mouse" by Moser and Dove et al., *Science*. 1990, Jan 19; 247(4940): 322-4.

"Autosomal recessive colorectal adenomatous polyposis due to inherited mutations of MYH" by Julian R Sampson, et al., *Lancet*. 2003 Jul 5;362(9377):39-41.

"Activation of beta-catenin-Tcf signaling in colon cancer by mutations in beta-catenin or APC" by P J Morin, et al., *Science*. 1997 Mar 21;275(5307):1787-90.

Mutations that "Drive" Cancer: (2/22/24)

"EGFR Blockade Reverts Resistance to KRAS G12C Inhibition in Colorectal Cancer" by Amodio et al. 2020, *Cancer Discov* 2020;10:1129–39.

"Super-enhancer hypermutation alters oncogene expression in B cell lymphoma" by Bal et al. *Nature* | Vol 607 | 28 July 2022

BRCA1 and BRCA2: (2/29/24)

"Population-Based Screening for BRCA1 and BRCA2" by King et al. *JAMA*. 2014. 312: 1091-1092

"Cell-lineage heterogeneity and driver mutation recurrence in pre-invasive breast neoplasia" by Weng et al. *Genome Medicine* (2015) 7:28

"Association of Family Cancer History with Pathogenic Variants in Specific Breast Cancer Susceptibility Genes" by Kurian et al. *JCO Precis Oncol* 5:1853-1859. © 2021.

Telomerase and cancer: (3/7/23)

"Extension of life-span by introduction of telomerase into normal human cells" by Bodnar et al. Science. 1998 Jan 16;279(5349):349-52. doi: 10.1126/science.279.5349.349.

"Systematic analysis of noncoding somatic mutations and gene expression alterations across 14 tumor types" by Fredriksson et al. Nat Genet. 2014 Dec;46(12):1258-63. doi: 10.1038/ng.3141. Epub 2014 Nov 10.

Cancer-associated TERT promoter mutations abrogate telomerase silencing by Chiba et al. Elife. 2015 Jul 21;4:e07918. doi: 10.7554/eLife.07918.

Epigenetics and Cancer: (3/14/24)

"Genomic Imprinting in Mammals" by Denise P. Barlow and Marisa S. Bartolomei in Cold Spring Harb Perspect Biol. 2014 Feb 1;6(2):a018382.

"The Association between TIF1 Family Members and Cancer Stemness in Solid Tumors" by Czerwinska et al. Cancers 2021, 13, 1528.

Tumor Heterogeneity: (3/21/24)

"AICDA drives epigenetic heterogeneity and accelerates germinal center-derived lymphomagenesis" by Teater et al. Nat Commun. 2018 Jan 15;9(1):222.

"Tracking the Evolution of Non-Small-Cell Lung Cancer" by Jamal-Hanjani et al., N Engl J Med. 2017 Jun 1;376(22):2109-2121.

"Tracing cancer evolution and heterogeneity using Hi-C" by Erdmann-Pham et al. Nature Communications | (2023) 14:7111

Spring Break (3/23 – 3/31/24)

Metastasis: (4/4/24)

"A distinct role for Lgr5+ stem cells in primary and metastatic colon cancer" by De Sousa e Milo et al. Nature. 2017, 543: 676-672.

"Chromosomal instability drives metastasis through a cytosolic DNA response" by Bakhoun et al. Nature. 2018 Jan 25; 553(7689): 467–472.

"Pan-cancer whole-genome analyses of metastatic solid tumours" by Priestley and Baber et al. Nature. 2019, 575: 210-216:

Immune Responses to Cancer: (4/11/24)

"A guide to cancer immunotherapy: from T cell basic science to clinical practice" by Waldman et al. Nat Rev Immunol. 2020 Nov;20(11):651-668

"Elucidating the heterogeneity of immunotherapy response and immune-related toxicities by longitudinal ctDNA and immune cell compartment tracking in lung cancer" by Murray et al. Clin Cancer Res. 2023 Nov 8. doi: 10.1158/1078-0432.CCR-23-1469

Cancer Prevention and Screening: (4/18/24)

"Efficacy of Larotrectinib in TRK Fusion–Positive Cancers in Adults and Children" by Drilon et al., N Engl J Med. 2018 Feb 22;378(8):731-739. doi: 10.1056/NEJMoa1714448.

"Direct detection of early-stage cancers using circulating tumor DNA" by Phallen et al. Sci Transl Med. 2017 Aug 16;9(403):eaan2415.

"Circulating Tumor DNA in Stage III Colorectal Cancer, beyond Minimal Residual Disease Detection, toward Assessment of Adjuvant Therapy Efficacy and Clinical Behavior of Recurrences" by Henriksen et al. Clin Cancer Res. 2021 Oct 8. doi: 10.1158/1078-0432.

Vaccines for prevention and treatment of cancer: (4/25/24)

"Full eradication of pre-clinical human papilloma virus-induced tumors by a lentiviral vaccine" by Douguet et al. EMBO Mol Med . 2023 Oct 11;15(10):e17723. doi: 10.15252/emmm.202317723. Epub 2023 Sep 7.

"Advances in vaccine development for cancer prevention and treatment in Lynch Syndrome" by Bolivar et al. Mol Aspects Med. 2023 Oct;93:101204. doi: 10.1016/j.mam.2023.101204. Epub 2023 Jul 19.

"mRNA Vaccine Slows Melanoma Recurrence", Cancer Discov (2023) 13 (6): 1278. <https://doi-org.ezproxy.library.wisc.edu/10.1158/2159-8290.CD-NB2023-0028>