EUGENE KOAY

TALK TITLE

"Combining quantitative imaging and mechanistic mathematical models to predict outcomes to cytotoxic and immune-oncology therapies"

ABSTRACT

The field of oncology has rapidly transformed with new combination therapies, targeted therapies, and immune-oncology-based treatments. While these innovations have led to improved outcomes in general, many individual patients still do not benefit from these treatments, and methods to identify these non-responders early in treatment are not available, leading to prolonged treatment with potential for significant side effects and no clinical benefit. We have investigated the use of quantitative imaging to inform mechanistic mathematical models, with applications to conventional cytotoxic therapies and to immunotherapy. In this talk, we will highlight our recent work in pancreatic cancer for predictions of response to chemotherapy and radiation, and in dozens of solid tumors for early predictions of response to immune checkpoint blockade. We will point to ongoing efforts to incorporate molecular imaging into these studies that aim to improve our ability to properly select patients for novel oncologic treatments.

BIO

Dr. Eugene Koay is a physician scientist at The University of Texas MD Anderson Cancer Center, who specializes in radiation therapy for patients with hepatobiliary and pancreatic cancers, and develops applications of the physical sciences to cancer for the purposes of early detection, biomarker development, and therapeutic management. He received a Bachelor of Science in Chemical Engineering from Rice University in 2001. He completed the MD/PhD Program at Baylor College of Medicine/Rice University in 2009, with a PhD in Bioengineering. His residency training was in Radiation Oncology at The University of Texas MD Anderson Cancer Center (2009-2014). He then joined faculty at MD Anderson where he established his clinical and research foci. He leads the Cancer Physics and Engineering Laboratory at MD Anderson.

This lab studies how the physical properties of tumors relate to the biological underpinnings of the disease. Recent work from the lab has shown how radiomics and artificial intelligence-based approaches may lead to clinically-relevant methods to stratify and manage hepatobiliary and pancreatic cancers (Koay et al, JCI, 2014; Amer et al , Cancer, 2018; Koay et al, Clin Cancer Res 2018). Dr. Koay's lab also collaborates with mathematical modelers to apply physical models of therapeutic delivery (Pascal et al, Proc Nat Acad Sci, 2013; Butner et al, Sci Advances 2020) and tumor growth (Koay et al, Clin Cancer Res 2018). These studies describe how patient-specific parameters may be used to detect cancer earlier, predict treatment response, and improve cancer outcomes.

The website for the Cancer Physics and Engineering lab is:
https://www.mdanderson.org/research/departments-labs-institutes/labs/koay-laboratory.html
For a list of publications, please see:
http://www.ncbi.nlm.nih.gov/sites/myncbi/1tlQnqz8QOkkk/bibliography/47177581/public/?sort=date&direction=ascending