Addressing the Need for Research In Early Cancer Detection Through Imaging presented by Dr. Jung W. Choi

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Cancer hits close to home for all of us. Sadly, it has hit me even closer due to a dear friend and colleague's untimely loss of her daughter after complications following a bone marrow transplant this week after a year long struggle.

At Moffitt's Corporate Partner's and Foundation meeting in October, Dr. Jung W. Choi, MD, PhD, addressed the need for research in early cancer detection through imaging. Dr. Choi holds a Bachelor's degree in Biochemistry from Columbia University in New York City. Under the NIH Medical Scientist Training Program (MSTP) grant, he then entered into a combined MD-PhD program at New York University School of Medicine, where he received his PhD from the Department of Molecular Oncology and Immunology. After completing an internship in internal medicine at the UCLA Medical Center, he was a post-doctoral research fellow at the UCLA Crump Institute of Molecular Imaging and at the Division of Medical Imaging Informatics in the UCLA Radiology Department. He then completed his radiology residency at the UCLA Medical Center, followed by a clinical body imaging fellowship at Stanford University Medical Center.

> Cancer screening examinations for early cancer detection are only readily available for certain cancers such as breast, colon, liver, prostate and skin cancer. I was surprised to learn how few screening studies are available and the limitations and risks inherent with these types of screenings. For example, colonoscopy for colon cancer screening carries the risk of bowel perforation and bleeding, especially after biopsies. Small or flat lesions in the bowel may be missed on colonoscopy; and did you know that the endoscope sometimes only go so far into the colon? Cancers that are not seen on endoscopy can go undetected until it metastasizes. Lung cancer screening is performed either with a chest x-ray or a chest CT scan. A lung nodule seen on an x-ray often leads to a diagnostic dilemma as it can represent either infection or cancer. A biopsy is sometimes the only way to tell the difference, but that carries certain risks such as a collapsed lung, which may require hospitalization. If an open surgical biopsy is needed, the recovery time can be up to weeks for a benign lesion. With regards to prostate cancer, transrectal ultrasound imaging is usually performed, but that does not always tell the doctor where the cancer is in the prostate. Ultrasound guided prostate biopsies are thus typically required and use an average of 10-20 needle biopsies per procedure. If the cancer is small, the needles may still not find it. Even, non-invasive screening exams such as CT scans require a certain amount of radiation exposure, which carry a small, but real, risk of developing a malignancy later in life. No wonder we as patients are reluctant to comply with screening recommendations.

Early detection remains key for treating most types of cancer, as the chance for a cure is greatest when it is caught at an early stage. We are aware of the consequences when cancer is not discovered until the

latter stages. Cancer screening examinations that are safe, accurate, and non-invasive are still desperately needed

Molecular imaging of cancer is a relatively new and exciting area of research that can identify new tumor biomarkers for both imaging and treatment. It also may provide a more detailed characterization of the malignancy based on the imaging profile, which may help guide and expedite targeted therapeutics.

Dr. Choi's research interest is in molecular imaging with regards to cancer detection. He is currently collaborating with the Gillies research group in identifying cancer specific markers for imaging in the preclinical and clinical stage, including detecting tumor activity with MR spectroscopy.

Prostate cancer is the most common cancer in men and an under- funded area of research: 30,000 men will die this year and 200,000 new cases are recorded annually. The current screening tests for prostate cancer are the digital rectal examination and a blood test for Prostate Specific Antigen, both of which have certain limitations. From an imaging perspective, there are no definitive non-invasive imaging methods to reliably diagnose prostate cancer.

Dr. Choi's research goal is to identify and localize prostate cancer in patients using MR spectroscopy. In particular, a prostate cancer tumor marker known as Prostate-specific Membrane Antigen (PSMA) would be detected in prostate cancer cells with MR spectroscopy, by utilizing a substrate specific for PSMA. This approach may be able to localize tumor cells in both the prostate gland and adjacent lymph nodes in patients, as well as identify early tumor recurrence in patients who have already had prostate resection and initial treatment.

I am anxiously awaiting preliminary data from Dr. Choi's research in the next few months and will post an update.