Cancer Imaging

The goal of the Cancer Imaging Program at the University of Arizona Cancer Center is to use the tremendous power of imaging technologies, methods and applications to increase patient survival and prevent and cure cancer. The Cancer Imaging Program works to improve imaging tools in the study of cancer biology, increase sensitivity and specificity of early cancer detection methods and develop and implement more effective cancer therapies using imaging biomarkers and image-guidance.

The Cancer Imaging Program has outstanding research projects exploring all of the major types of imaging—nuclear and x-ray imaging, magnetic resonance imaging, optical imaging and ultrasound imaging—as well as the development of advanced imaging contrast agents.

A key component to the Imaging Program is its translational aspects. An interdisciplinary team of researchers works together to take new imaging techniques and discoveries into the clinic. Projects include development of new instruments for optical imaging of ovarian cancer, new ways to measure tumor response to therapy by CT, MRI and ultrasound, and the development of new diagnostic imaging agents.

HIGHLIGHTS

NEW IMAGING TECHNOLOGIES

Jennifer Barton, PhD; Arthur Gmitro, PhD; and Raymond Kostuk, PhD, are all developing new optical imaging instruments to detect early stage ovarian cancer. Ranging from optical coherence tomography to confocal microendoscopy to high-resolution holographic endoscopy, the new instruments are designed to provide the gynecologic oncologist with an assortment of new tools to visualize abnormal cells on the surface of the ovary and fallopian tubes. The goal is provide women at high risk for development of ovarian cancer with a sensitive and accurate way of assessing ovarian health.

FINDING THE RIGHT TREATMENT

Marty Pagel, PhD, is advancing imaging techniques to allow early assessment of treatments in individual patients. By being able to evaluate therapeutic response within a few days of starting treatment ineffective therapy can be stopped and an alternative treatment applied. This will save patients from the side effects of ineffective therapies and allow them to receive an effective therapy for their disease.

MICROBUBBLE TECHNOLOGY

Radiologist Evan Unger, MD, is testing therapies for hypoxia, or low oxygen, in tumors. Oxygen is vital in tumor treatment and hypoxic tumors are often resistant to traditional radiation treatments. Dr. Unger's focus is finding ways to infuse these tumors with oxygen while reducing potential side effects. In related research, Dr. Unger is developing microbubble technology, a procedure which injects millions of tiny bubbles in a patient's bloodstream that would act as mirrors for ultrasound or as delivery systems for drugs or oxygen. The goal is to allow patients to undergo fewer treatments and recover faster from radiation therapy.