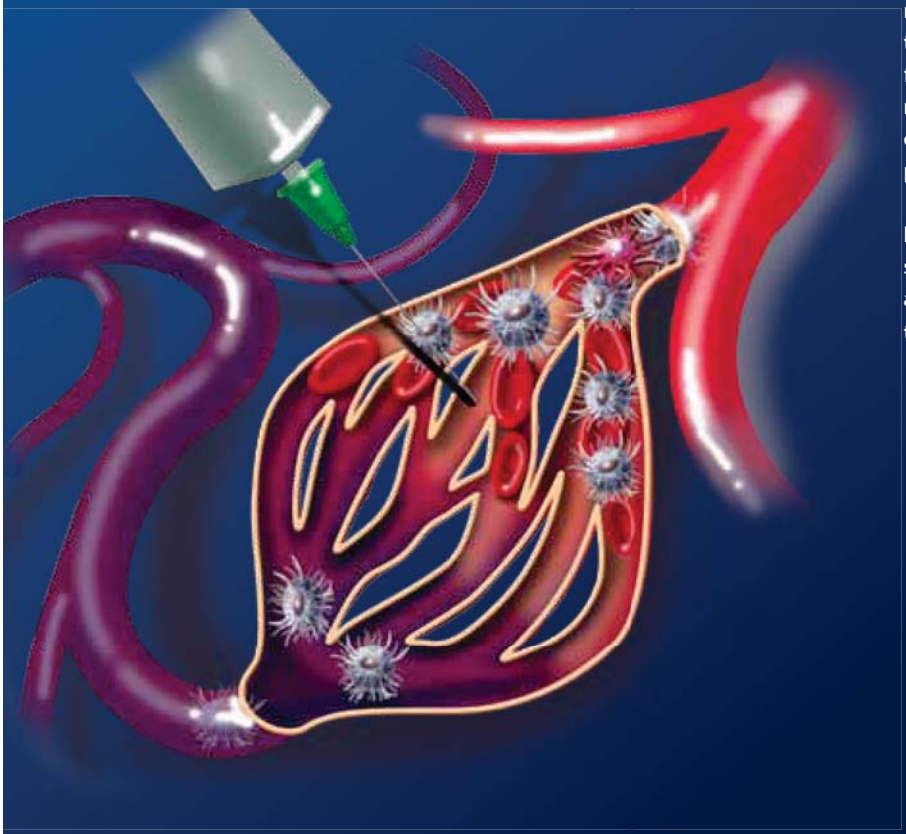
Arteries Are Better Than Veins for Liquid Biopsy

As the field of liquid biopsies for tracking disease progression and therapeutic response heats up, physicians are seeking ways to apply this approach to patients. Currently, assays for circulating tumor cells (CTCs)—one type of liquid biopsy—have been approved for diagnostic purposes in metastatic breast, colorectal or prostate cancer. In these diseases, the presence of CTCs in the peripheral blood is associated with decreased progression-free and overall survival. The major challenge for this technology is that CTCs are not always found in the blood of patients with aggressive disease, who would be expected to have high numbers.

Now, Jefferson researchers investigating uveal melanoma, which originates in the eye, have shown that the low numbers could be explained by where the blood is drawn—from a vein or an artery.

In breast cancer, a high number of CTCs (more than five cells in 7.5 ml of blood collected from the veins) indicates aggressive metastatic disease. "If we can validate this approach for uveal melanoma, we hope to be able to catch cancer before it develops into metastatic disease," says Takami Sato, MD, PhD, the K. Hasumi Professor of Medical Oncology and lead investigator. "The work by Dr. Mizue Terai and others at Jefferson gives us hope that CTCs might be useful for uveal melanoma patients as well. On the other hand, our research raised a concern that venous blood specimens, which are tested as the standard practice for CTC measurement, might not be the best source for CTC detection."



CTCs are larger than other blood cells and have different characteristics, making them detectable in samples. Most commonly, blood is obtained from a patient's vein, having already passed through an intricate sieve of narrow capillaries throughout the body. When Terai, PhD, and colleagues compared blood samples taken from uveal melanoma patients' veins to those collected from arteries, they saw a much higher number of CTCs in the latter. In fact, all of the uveal melanoma patients with multiple liver metastases had CTCs present in their arterial blood, while only 53 percent of blood from the veins of those same patients had CTCs.

Although it is more technically difficult to collect blood from an artery than a vein, this and other research suggests that checking arterial blood may be a more accurate way of assessing the number of CTCs—and therefore metastatic disease.