Information on Blood Test for Alzheimer's disease (AD)
Credit: Hyun-Sik Yang, MD

How do these tests work?

In Alzheimer's disease, which is caused by abnormal accumulation of amyloid-β (Aβ) and tau proteins in the brain, these changes can be detected in the spinal fluid as well as in blood samples. We do not fully understand the exact mechanisms, but it is well known that Aβ proteins go down and certain forms of tau ("phospho-tau" or pTau) go up in the spinal fluid and blood. Now, with the technology to detect very low concentrations of these proteins from bodily fluid, we can detect Aβ and pTau from blood. However, the important thing to remember is that there is significant variability in accuracy between the companies, and both plasma and PET biomarkers seem to be "stage-dependent," likely more meaningful/useful at some AD stages and not others. As this is a very early day in blood AD diagnosis, tests have not been thoroughly vetted by the FDA.

Are they more accurate than the brain scans? How do they differ?

First, it is important to know which brain scans we are talking about. If it is brain MRI, it is measuring brain shape, but not directly measuring Aβ or tau of AD. So, brain MRI measures different aspects of the disease, and we cannot really compare that with the blood tests for AD. On the other hand, if we are talking about Aβ PET, that would be a more appropriate comparison. The short answer is that "reliable" or "good" blood tests perform almost as well as the Aβ PET and as good as the CSF tests. Still, given the technical variability, many doctors would still like to confirm the blood test results with the CSF or PET scan, especially if the results are close to the borderline.

Should I request the test from the doctor?

The short answer is "not yet." At BWH, we are primarily using spinal fluid or PET scans to confirm Alzheimer's diagnosis. First, there is a significant variability among the blood tests out there and some tests are not very reliable (even though they might advertise and sell their products already). Also, while there have been very exciting technical developments in blood markers in recent years, we still need additional studies to determine the best ways to implement them in real-world practices (e.g., exact cut-off, how to interpret borderline values, etc.). Another practical issue is the cost. None of the tests are covered by insurance yet, and there are other means to test for Alzheimer's disease markers (e.g., lumbar puncture [spinal fluid], PET) covered by insurance. Finally, I would advise against getting the testing in cognitively unimpaired individuals at this point (unless in the setting of clinical trials or research studies), as the clinical utility of these tests without cognitive symptoms remains unclear. That said, I think we will soon be able to use blood diagnostics in certain cases within the next few years, so stay tuned! (And, if you want to see that coming sooner, please participate in clinical research studies investigating the blood Alzheimer's markers—we need your help!)

Notes:
In short, the blood tests are not at their prime time yet, and there is significant technical variability depending on the company, but we expect this to come to the clinics within the next few years. We recommend careful discussion with your neurologist.

The consensus at the Alzheimer's Association International Conference seemed that plasma biomarkers are very good, and the technology is almost ready, but we will need to figure out how to actually use them in the clinic. There remain some uncertainties on how to use them—e.g., exact cut-off, how to deal with borderline values, etc.