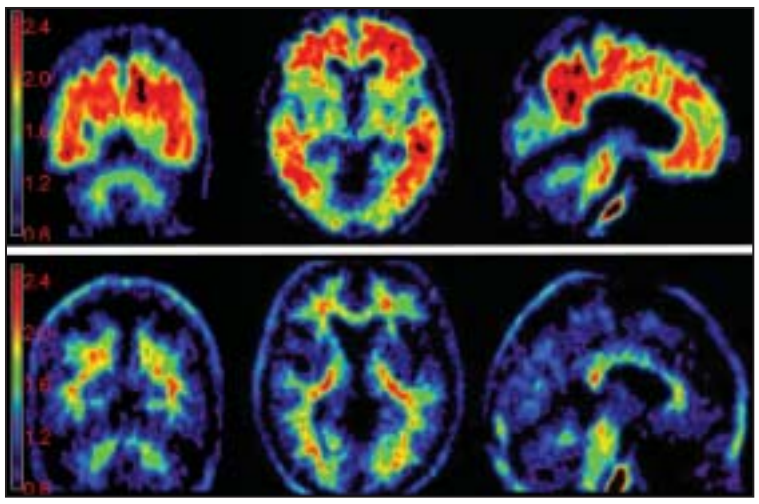
Image of the Month



Laboratory of Dr. Dean Wong/Avid Radiopharmaceuticals Inc.

PET imaging with F-18 AV-45 reveals greater amyloid deposition in the brain of an AD patient (top images). Less amyloid is seen in the healthy control (bottom images). The color gradient from blue to red indicates increasing amyloid.

The PET tracer Pittsburgh Compound B is labeled with C11, which has a half-life of only 20 minutes.

That means that researchers who wish to use the tracer to study Alzheimer's disease (AD) must have either an on-site cyclotron to generate the isotope, or have access to a cyclotron very nearby, said Dr. Dean F. Wong, a professor of radiology, psychiatry, neuroscience, and environmental health sciences at Johns Hopkins University, Baltimore. This need for a nearby cyclotron cuts down on the number of researchers who can use the tracer to investigate the role of amyloid in Alzheimer's.

Given this limitation, the search is on to find a more time-friendly radiotracer that also binds to amyloid plaques.

Several F18-labeled compounds are currently under investigation.

F18 compounds are especially attractive because the radioisotope has a half-life of 110 minutes.

Like Pittsburgh Compound B, which is derived from thioflavine—a dye that is currently used in autopsy tissue studies to highlight amyloid fibrils in the brain—F18-based tracers are based on stilbene dyes.

The AV-45 compound is now in phase II trials, and several companies are interested in using amyloid tracers as biomarkers in trials.

Dr. Wong and his colleagues presented data, obtained in part from research done at Johns Hopkins University, on one such tracer, AV-45—currently under development by Avid Radiopharmaceuticals Inc.—at the recent 2008 Society of Nuclear Medicine annual meeting.

Using AV-45, they were able to correctly identify individuals with possible or probable AD based on clinical criteria.

In addition, the investigators were able to use the technique to identify amyloid plaques in the brains of two healthy control participants.

The technique measures distribution volumes, which represent the amount of tracer collected in a brain area.

This is assumed to be proportional to the amount of amyloid load.

The researchers used mathematical models to better assess how much amyloid is actually binding to brain tissue as opposed to how much is simply collecting in the area.

Validation with postmortem tissue is still needed.

Once validated, the technique would be used to improve the models used to quantify amyloid binding.

The AV-45 compound is currently in phase II trials.

In addition, several companies are interested in using amyloid tracers as biomarkers in drug trials, reported Dr. Wong.

"What I'm excited about is its drug development potential because it might be [usable] as a biomarker for testing new drugs," he commented.

Once AV-45 is approved, "I can see increasing use of it to test a number of Alzheimer's drugs."

F18 tracers, like AV-45, could be produced in regional cyclotrons, bringing amyloid imaging to an even larger pool of researchers and even clinicians.

Dr. Wong reported receiving grant support for this study from the National Institutes of Health (NIH) as well as from several pharmaceutical companies.

—Kerri Wachter