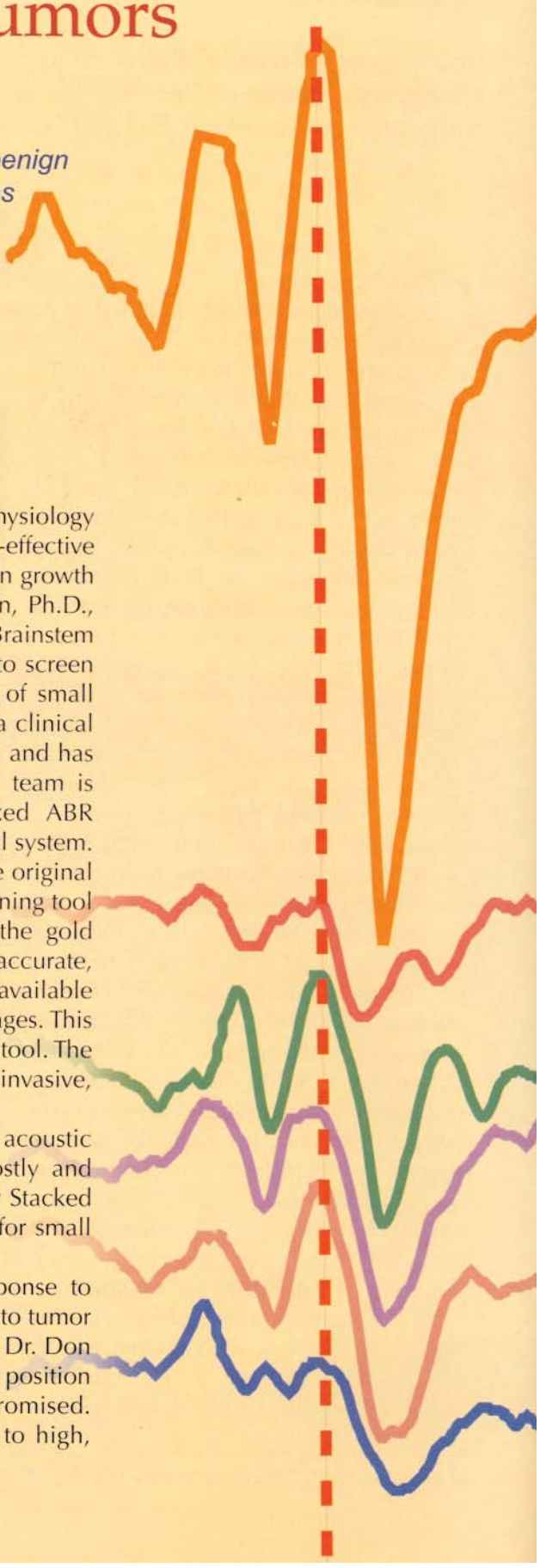
More Effective, Affordable Screening for Small Acoustic Tumors

An acoustic tumor (vestibular schwannoma) is a benign growth originating from the vestibular nerve that lies adjacent to the acoustic and facial nerves and may affect hearing and cause facial paralysis.

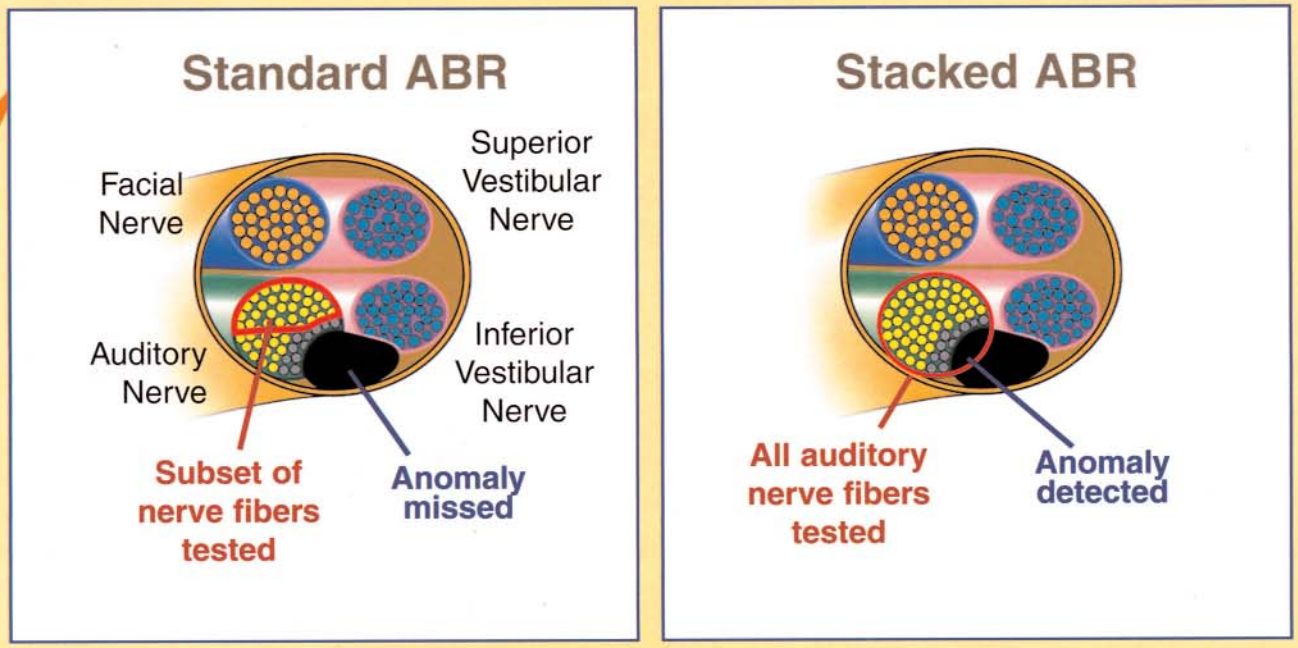


A team of scientists in the House Ear Institute's Electrophysiology Department has met the challenge of finding a cost-effective method to screen for small acoustic tumors, (a benign growth on the hearing nerve) less than 1 cm in size. Manuel Don, Ph.D., recently refined and modified the standard Auditory Brainstem Response (ABR) test that was previously used successfully to screen for medium and large tumors, but detected only 30-50% of small tumors. This new test, the Stacked ABR, was developed as a clinical system in collaboration with Bio-logic Systems Corporation and has been FDA-approved for commercial application. The HEI team is currently providing instructional courses on the Stacked ABR methodology and training clinicians in the use of the clinical system.

Due to its inability to consistently find small tumors, the original standard ABR test has been supplanted as a diagnostic screening tool in recent years by Magnetic Resonance Imaging (MRI), the gold standard for tumor detection. MRI technology is extremely accurate, but it requires large and costly equipment, isn't universally available and requires the injection of dyes to create high contrast images. This makes it invasive as well as expensive as an initial screening tool. The need for an accurate, less expensive, widely-available, non-invasive, and portable screening method was apparent.

"Doctors certainly need to be thorough. However, acoustic tumors are very rare, so most of the patients sent for costly and invasive MRIs do not have tumors," said Dr. Don. "The new Stacked ABR provides an effective and cost-efficient way to screen for small tumors."

ABR tests measure neural activity that occurs in response to sound. The failure of the old standard ABR tests was not due to tumor size alone because they did detect 30-50% of small tumors. Dr. Don hypothesized that small tumors were missed because of the position of the tumor and the auditory nerve fibers that were compromised. Fibers in different regions of the auditory nerve respond to high,



middle, or low frequencies. The old standard ABR measures relied primarily on responses from a subset of high frequency nerve fibers. Thus a tumor that did not compromise this subset of fibers would be missed by the old standard ABR tests. The new Stacked ABR test uses clicks and special masking noises to stimulate hearing while external sensors placed on the patient's scalp record the brain's response. This method allows audiologists to assess the neural activity from across the entire auditory nerve, not just a subset of fibers.

"The Stacked ABR test allows us to assess the neural activity from five octave-wide bands across the auditory nerve," explains research audiologist Betty Kwong. "By aligning the peak activity for each region and stacking (summing) it, we can see whether a tumor has caused a reduction in overall neural activity, no matter what fibers the tumor affects."

Compared to the old standard ABR tests, the new Stacked ABR is both more sensitive and specific for acoustic tumors. In one study to detect 95% of the small tumors, the Stacked ABR had only 17% false positives while the old standard ABR tests had 95% false positives. If the Stacked ABR screening test indicates the presence of a small tumor, then the patient can be sent for further evaluation.

The Stacked ABR will be widely available through clinics and audiology centers soon and, because it is an extension of a previously covered procedure, should be covered by most insurance plans. ❖

Stacked ABR aligns peak responses from each region tested.