

ASK THE **Expert** THE

Clifford Saper, M.D., Ph.D. is James Jackson Putnam Professor of Neurology and Neuroscience, Harvard Medical School and Chairman, Department of Neurology Beth Israel Deaconess Medical Center in Boston, MA.



Why are post-mortem brains needed for research when there are high-tech brain scanning technologies available now?

Although modern scanning methods do show us a great deal about the overall structure of the brain, they do not allow us to identify changes at the level of single cells, or complex biochemical changes in the brain. These analyses can be done only by examining actual brain tissue from individuals posthumously. This is the case for many other neurological conditions. For example, disorders such as Parkinson's disease exhibit no specific changes in the brain that can be identified with clinical scanning methods. For TS where we still do not understand the primary cause of the condition, we know that some imaging methods are inadequate if we want to push the frontier forward. Only examination of actual brain tissue holds the promise of a breakthrough that will allow us to understand and more effectively treat TS.

Why are brains from people who didn't have TS important to retrieve?

From our current knowledge, it is clear that the underlying basis for TS is likely to turn out to be a subtle difference in the brain. This slight difference can be detected only by comparing tissue from people with TS with samples from individuals who did not have TS. In other words, for each new analysis we do, it is important to have a set of tissue standards from unaffected individuals for the purposes of comparison.

Exactly what can scientists learn from brain tissue research?

Typically, an autopsy brain is studied in one of two ways. First, some of the tissue may be removed for biochemical analysis. Second, the remaining tissue is put into a preservative such as formaldehyde, and can then be dissected into very thin slices so that they can be examined microscopically. Currently we have very sophisticated meth-

ods available to us for examining the exact chemicals present in individual nerve cells. This technique helps us detect very subtle, but important changes in the brain. While we have yet to uncover the underlying cause of TS, the chances are quite good that we will be able to do so only by studying brains at this microscopic and biochemical level of detection.

If I agree to donate my brain when I die, will my relatives be informed about what is learned from my donation?

In a routine autopsy, the brain is examined by standard neuropathological methods, and a report is generated on the abnormalities found in that brain. This information can then be shared with the family. However, for TS, we know that the underlying problem is not one that shows up on a standard neuropathological examination. Therefore, to make the very best use of this precious resource, we need to prepare the tissue in different ways. Thus, depending on the particular study we are doing, the success of these research efforts often means that the remaining amount of tissue is insufficient to carry out a standard neuropathological examination and report. In other words, to advance the field, the best possible use of a tissue donation from a person who had TS is to preserve its usefulness and not provide the standard neuropathology report.

Generally when tissue samples are used in a research study, they are often combined with samples from other brains that have been harvested. Such studies may extend over periods of five to ten years. Moreover, because of the extreme rarity of TS brains, samples are now being shared among several interested TS investigators. Portions are being used in nearly all of the studies currently in progress.

It should be emphasized that the researchers who obtain tissue are provided with only a case number; confidentiality is strictly observed, and names of individual donors are never disclosed to the scientists.

While this protects donor privacy, it makes it nearly impossible for the researchers, years later, to identify specific donors and notify their families when the study is completed. The good news, however, is that each time a new finding is made using TS autopsy material, the finding is published in the medical literature. These studies are publicized by TSA and donor families do have the opportunity to read about these advances. In that way, families can learn of the importance of their loved one's contributions. Even though families cannot be notified about which specific study included tissue from their donor members, they will know that it is very likely that each TSA-sponsored project has benefited from their donations.

In sum, we can all feel good about the progress made, and feel even better when, as a result of this work, we have discovered new and improved ways to treat TS.

Editor's Note: TSA is very grateful to Dr. Saper who continues to give of his time and highly valuable expertise in the preparation of brain tissue to accommodate the specific needs of scientists working in the field of TS neuropathology research.

PLEASE CONSIDER TAKING ACTION TODAY!

As part of our ongoing efforts to obtain sufficient brain tissue for TS researchers, TSA is planning a second in our series of Brain Bank Program recruitment requests. Once again, TSA members will be asked to register their intent to become brain donors.

Better yet, you can take action today! To learn more and get answers to any questions you might have about the program, please refer to the Research Section on the TSA website, <http://tsa-usa.org>, or call Heather at 718-224-2999 ext. 247.

