

Proteins could help women avoid thyroid surgery

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Dr. Paul Weinberger is working to identify blood-based biomarkers for thyroid cancer. Credit: Phil Jones/GHSU Photographer

Dr. Paul Weinberger wants to make thyroid cancer diagnosis as simple and accurate as checking for high cholesterol.

About 30 percent of women have a thyroid growth in their lifetime, the vast majority of which is not cancer, said Weinberger, [otolaryngologist](#) at Georgia Health Sciences University. In about 80 percent of cases, physicians can rule out cancer based on the shape of biopsied thyroid cells.

It's the remaining 20 percent that are problematic: 75 percent are benign but there is no way to be sure without surgery.

"The vast majority of patients who get this indeterminate answer end up having at least part of their [thyroid gland](#) removed," Weinberger said.

"And we end up saying afterward: 'Oh, good news, this was not cancer.'"

Weinberger wants to help women avoid unnecessary surgery with the help of a Young Investigator Combined Award from the American Head and Neck Society/American Academy Otolaryngology-Head and Neck Surgery Foundation.

"That is the Holy Grail everybody is looking for: blood-based biomarkers of cancer," Weinberger said.

He's looking at two proteins, Galectin-3 and HBME-1, about which little is known other than they are found at elevated levels in [thyroid cancer](#). While still a resident at GHSU, Weinberger was honored by the Head and Neck Society for his role in linking Galectin-3 to thyroid cancer. Three years ago GHSU and other centers started checking Galectin-3 levels as part a definitive [cancer diagnosis](#) in surgically removed thyroid tissue. More recently, HBME-1 testing also was added.

But Weinberger believes those proteins could tell the tale much earlier as biomarkers in the few cells removed during a [needle biopsy](#). Using super-sensitive mass spectrometry technology developed to detect trace amounts of drugs and other substances in [forensic pathology](#) and now used in major research centers, he'll examine the biopsied cells collected over three years from 50 patients to look at levels of both proteins. He can then correlate those with pathology findings from the surgically removed thyroid. He's tested the concept in purified proteins and some cell lines. If the relationship holds that elevated protein levels equal cancer in the patient samples, the next step would be a prospective study

in current patients before seeking Food and Drug Administration approval.

He's stored the existing samples at room temperature to make sure the proteins are stable enough to be functional [biomarkers](#) so that referring physicians, for example, could one day send tissue samples to centers such as GHSU with mass spectrometry capabilities.

Weinberger noted that even benign thyroid growths sometimes necessitate surgery because of airway and/or swallowing problems. An ultrasound of the growth determines whether a biopsy is needed.

While the cause of thyroid disease is essentially unknown, the thyroid is one of the most metabolically active areas of the body; it receives as much blood flow as the brain and constantly produces hormones essential to regulating the metabolism, Weinberger said.

Provided by Georgia Health Sciences University

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