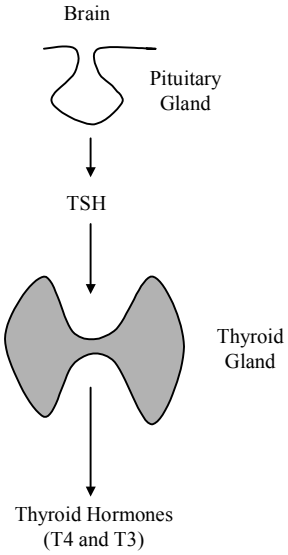
# THYROID NODULES – PATIENT INFORMATION

## WHAT IS THE THYROID GLAND AND WHAT DOES IT DO?

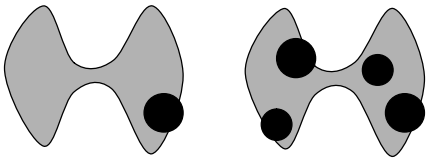
- The thyroid is a butterfly-shaped gland that straddles the trachea (windpipe) in the neck.
- The thyroid makes two hormones that are released into the blood to control many of the body's systems and functions. The thyroid hormones are called T3 and T4.
- The thyroid is controlled by the pituitary gland. This gland is located underneath the front part of the brain, behind the eyes, and it controls the body's production of several hormones. It controls the thyroid by releasing a hormone called TSH (thyroid stimulating hormone). TSH causes the thyroid to release T3 and T4 which then act on the body. The pituitary can sense how much thyroid hormone is in the blood, and can adjust the signal to the pituitary gland to keep the hormone levels normal (very similar to how the thermostat can sense how much heat is in your home, and can adjust the signal to the furnace to keep your home at the right temperature).




- Problems with the thyroid gland affect either the function of the thyroid, the structure of the thyroid, or both. Problems with the function include *hyperthyroidism* (overactive thyroid) and *hypothyroidism* (underactive thyroid). Problems with structure include *goiter* (enlarged thyroid) and *nodules* (abnormal lumps in the thyroid).

## WHAT IS A THYROID NODULE?

- A thyroid nodule is structural problem where there is a lump in the thyroid gland. Sometimes several nodules can develop within the thyroid, a condition called multinodular goiter.




## WHAT ARE THE SYMPTOMS OF THYROID NODULES?

- Thyroid nodules frequently cause no symptoms, and are often discovered during a physical examination or during a CT scan, MRI scan, or ultrasound that is performed for another reason.
- Thyroid nodules may occasionally be associated with symptoms of neck pain, pressure, choking, or difficulty swallowing.
- Some people with thyroid nodules may also have an underactive thyroid (hypothyroidism) or overactive thyroid (hyperthyroidism). These symptoms are "non-specific," meaning many other conditions can cause similar symptoms. Therefore, blood testing is needed to diagnose abnormal thyroid function.
    - Hyperthyroidism – fatigue, weight loss (or rarely weight gain), poor sleep, palpitations (sense of heart racing or beating strongly), tremor or shakiness, excessive sweating, intolerance of hot temperatures, difficulty concentrating, restlessness, nervousness, weakness, light menstrual periods or missed menstrual periods, and excessive number of bowel movements or diarrhea.
    - Hypothyroidism – fatigue, weakness, weight gain, muscle aches, constipation, depressed mood, dry skin, intolerance of cold temperatures, and heavy menstrual periods

## WHAT CAUSES THYROID NODULES?

- Thyroid nodules are common, especially in women, and may be detectable in as many as 20-30% of people. For most people in the United States who develop thyroid nodules, there is no clear explanation for why the nodule formed.
- Nodules are more common in people who have had previous radiation therapy involving the neck, and in people from areas where iodine intake is low (uncommon in the United States). Sometimes thyroid nodules run in families.

# THYROID NODULES – PATIENT INFORMATION

## HOW ARE THYROID NODULES EVALUATED?

- Your doctor will ask whether thyroid cancer or other thyroid problems run in your family, will ask if you have had radiation therapy involving your neck, will perform a physical examination, and may use the ultrasound machine to evaluate the structure of the thyroid in more detail (this machine uses sound waves to non-invasively and painlessly "take a picture" of the thyroid gland).
- Evaluation of thyroid nodules typically tries to answer 2 questions;
    - *Is the nodule malignant (cancerous)?* Fortunately, only about 5% of all nodules are caused by thyroid cancer, and when thyroid cancer is present it is almost always curable (it is uncommon for people with thyroid cancer to die because of their thyroid cancer).
    - *Is the nodule causing symptoms?* Larger nodules may push on surrounding tissues to create difficulty swallowing, difficulty breathing, or choking sensations. Some people may be bothered by the appearance created by the nodule. Surgical removal is an option if the nodule is creating symptoms.
- Two tests are most commonly used to evaluate thyroid nodules
    - TSH – a blood test used to evaluate the thyroid function. If the TSH is low, suggesting overactive thyroid function (hyperthyroidism), the nodule may be evaluated differently than if the TSH is normal or high.
    - FNA biopsy – fine needle aspiration biopsy involves inserting a small needle into the thyroid gland to obtain tissue. A pathologist will examine this tissue under the microscope to try and determine if the nodule is benign or cancerous. Your doctor will tell you more about this procedure if it is required to evaluate your nodule.

## WHAT ARE POSSIBLE RESULTS AFTER FNA BIOPSY?

- There are 4 possible results after FNA biopsy. Additional evaluation and treatment depends on the result:
    - *Benign.* This is the most common result. If the thyroid function is normal, generally no treatment is required, and the nodule simply needs to be monitored over time (see below).
    - *Malignant.* If cancer is suspected after FNA, the thyroid gland needs to be removed surgically. Evaluation will be performed to evaluate what tissues are involved by cancer, and whether additional treatment, such as radioactive iodine, is required after surgery. See www.thyca.org for more detailed information about thyroid cancer treatment.
    - *Indeterminate.* In this setting, the pathologist is unable to determine if the nodule is benign or cancerous based on the FNA result, which is typically called a "cellular follicular lesion" or "follicular neoplasm." These nodules need to be removed surgically to determine if they are cancerous. Approximately 80% of these nodules will turn out to be benign, and 20% cancerous.
    - *Non-diagnostic*. About 10-15% of the time, there will be no evidence of cancer on the biopsy, but there will not be enough normal thyroid cells for the pathologist to be confident the nodule is benign. Usually the biopsy should be repeated 3-6 months later, and a sufficient diagnosis can be obtained 50% of the time. Depending on circumstances, your doctor may also consider simply watching the nodule, or may recommend that it be surgically removed.

## HOW WILL I BE MONITORED?

- For benign nodules, periodic examination of the neck and/or thyroid ultrasound is performed to ensure the nodule is not changing over time.
- Thyroid nodules may grow over time. For thyroid nodules that have significant enlargement, it may be necessary to repeat the FNA biopsy or remove the nodule surgically.
- In a few circumstances, thyroid hormone is used to minimize the chance that a nodule will grow. There is controversy among thyroid specialists as to which patients benefit from thyroid hormone for nodule treatment. Your doctor may discuss with you whether you are a good candidate for thyroid hormone treatment of your nodule.