Elena had had a sore throat for months. At first, she thought it was just one of those colds that went on and on, but over time it just seemed to get worse, and some days it felt like she had something stuck in her throat. Dr. Tran first looked down her throat with an otolaryngoscope, and then used her hand to feel the outside of her neck. “Did you know that you have an enlarged thyroid?” asked Dr. Tran. Elena didn’t know that, but wondered if it could be related to that feeling of having something in her throat.

“Do you feel tired a lot? Do you have a tendency to gain weight?” Dr. Tran asked. Elena laughed. “Doesn’t everybody?” she said. Of course she felt tired a lot, she worked full-time and had two young children at home! She was still struggling to get back to her pre-baby weight, but that was true of most of her friends who were moms. “I’m going to order some labs for you” said her doctor. “Sometimes thyroids just get enlarged, but everything else is normal. But usually it means that there is a problem.” Elena went down to the lab and had a vial of blood drawn for the tests. A few days later, she got an e-mail that her test results were available. She logged on to her medical provider’s website and was able to see the results:

|  |  |  |
| --- | --- | --- |
| **Component** | **Your Result** | **Standard Range** |
| TSH | 8.90 mIU/mL | 0.10–5.50 mIU/mL |
| Free T4 | 0.9 ng/dL | 0.8–1.7 ng/dL |

Later that day, Dr. Tran called Elena to tell her that her results did indeed indicate some abnormalities with her thyroid. She told Elena that she had a medical condition for which she would have to take medication every day for the rest of her life. However, it was a very manageable condition that would not be expected to shorten her life or impact her quality of life as long as she took her medication regularly. Dr. Tran also directed Elena to the website of the [American Thyroid Association](http://thyroid.org/what-is-hypothyroidism/" \t "_blank), which she said could provide more information.

**Questions**

1. What type of thyroid disease does Elena have? hypothyroidism

2. Why are Elena’s TSH levels elevated, but free T4 levels in the normal range?

3. Given Elena’s lab results, what would you expect her levels of TRH to be?

4. Why do you think TSH is measured instead of TRH?

5. Will the medication Elena takes for her disorder mimic the effects of TSH, or T4? Why is this?