

Fecal Occult Blood Test – Activity 2: Articles

Instructions: In this text the articles (a, an, the) have been removed and replaced with blanks. Read the text and try to put the articles in their proper location. After you have finished, you can (1) listen to a reading of the article to check your answers while practicing your listening skills or you can (2) check the answer page.

Key Vocabulary: Non-technical words that you may find useful in medicine have been put in bold blue print.

The **previous** activity was about the FOBT, or more specifically G-FOBT, which uses guaiac as the reagent. This particular test is called a **qualitative** test because it produces either positive or negative results. It does not measure the amount of blood in the **stools**. A test that can measure the amount is called a **quantitative** test. The G-FOBT also has some **limitations** which reduce its usefulness. The first is that guaiac reacts with the heme part of hemoglobin. Heme can move through the entire digestive tract without being seriously **degraded** by enzymes or bacteria. Therefore, any blood from any part of the digestive tract can reach the stools and be **detected** by guaiac. Because the FOBT is particularly interested in blood from the large intestines, this ability to react with blood from more proximal areas can lead to false positive tests. Second, guaiac is not human specific, that is, it will produce a positive test if blood from other animals is in the digestive tract. This may sound strange, but whenever a person eats red muscle tissue from cows, pigs, cats, dogs, etc., they **ingest** a small amount of hemoglobin found in the tissues of the animal. White muscle tissue contains less blood and is less likely to produce a false positive. Lastly, as mentioned in the previous article, guaiac can react with certain chemicals in various vegetables as well as with certain drugs and vitamins. These factors taken together create a real potential for false positive tests. The risk of a false positive test can be reduced by having the patient **restrict** their diet prior to testing. However, diet restrictions do not affect the problem of blood from proximal bleeding being detected in the stools.

To overcome these problems there is a second type of FOBT that can be used. The test is based on immuno-chemistry and not an enzymatic reaction. The test is called an I-FOBT with the “I” standing for immunochemical. The test is also sometimes called the FIT (Fecal Immunochemical Test). These tests can be either positive/negative or quantitative and, like the G-FOBT, are easy for the patient to use. Of interest here is the quantitative test, which is called the qI-FOBT. Since the test is quantitative it can measure the amount of blood in the stools which gives the test diagnostic power. Different amounts of blood are **indicative** of various conditions which can cause blood in the stools. Because of its greater **sensitivity** (i.e. its ability to detect very small amounts of blood) and **specificity** (i.e. no reactions with meats or other foods and chemicals) the test can reduce the number of false positive tests (specificity) and the number of false negative tests (sensitivity).

The test is based on a reaction between specially prepared antibodies and the globin (or protein) part of hemoglobin. Antigen-antibody reactions are very specific, therefore few other compounds can react with the antibodies designed to react with human globin. This **feature** dramatically reduces the number of false positives associated with meats, vegetables, drugs and vitamins. Unlike heme, which is a fairly **robust** molecule and can move the length of the digestive tract without destruction, the globin part of hemoglobin is much more **delicate** and much more easily degraded by enzymes and bacterial action. As a result, if human globin is detected in the stools, the source of the bleeding must be much more distal. The globin part of hemoglobin, from bleeding proximal to the large intestines, would be destroyed before it reached the rectum and exited in the stools.

As you can see, the qI-FOBT solves all the major issues associated with the standard G-FOBT. Its quantitative nature, ease of use, and reduction in both false positives and false negatives all make this test a desirable screening test. The **drawbacks** of the test include the increased cost of the test and the need for special equipment to analyze the results. However, the benefits of better detection rates, earlier detection and increased reliability provide **compelling** reasons for its use.