

Genetic Testing Dilemmas Activity

Provide students with background information about genetic testing and genetic counseling. Background information about this topic can be found at <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1200714/>. Provide each cooperative learning group with a different genetic testing scenario (shown below). Allow them to discuss and research the scenario and have the group to develop a response to each scenario. Then, groups should share their scenarios and responses to the whole group. (This sharing can be done in a variety of formats- *gallery walk*, *clock buddies*, etc.). Visit <http://www.pbs.org/wgbh/nova/body/genetic-testing-dilemmas-intro.html> for more background information about this activity.

Scenario 1: Testing Embryos

A couple is about to start a family. The male has a genetic mutation that greatly increases his chances, sometime in his life, of getting a rare form of colon cancer, a type that killed his mother and an uncle. Preimplantation genetic diagnosis, or PGD, makes it possible to test the female's embryos for the mutation and transfer only those that do not have it into your uterus to continue development. PGD involves removing one of eight cells in an embryo that, if deemed healthy, is transferred back into you for development—minus that one cell. However, even if the female doesn't do PGD and your baby were to inherit the mutation, there is no certainty that he or she would later get the disease.

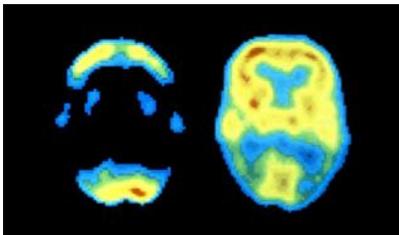


Embryo under a microscope

Given the above information, would you recommend that the female get tested?

Scenario 2: Alzheimer's Disease

Several members of your family have developed Alzheimer's disease late in life. You're thinking about getting tested for the genetic factors that scientists have identified as raising a person's chances of developing the disease later in life. There is currently no cure or treatment for Alzheimer's, nor is there convincing evidence that medication or diet will delay or prevent its onset in a susceptible individual.



PET scans of normal and Alzheimer's brains

Given the above information, would you get tested?

Scenario 3: Breast or Ovarian Cancer

You are a 25-year-old unmarried woman. Someday you plan to have children. You're worried because you have a family history of cancer: Your mother and aunt died of breast cancer, and one of your grandmothers of ovarian cancer. You've learned that women with a mutation in the *BRCA1* gene have a 60 to 80 percent greater chance than the average woman of getting breast cancer, and a 40 percent increased risk of developing ovarian cancer. Your doctor has advised you to get specialized genetic testing to see if you have such a *BRCA1* mutation—or one or more less common genetic glitches that also increase your likelihood of getting breast or ovarian cancer.



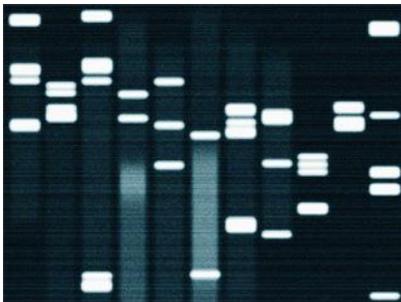
Young woman

Given the above information, would you get tested?

Scenario 4: Getting a Direct-to-Consumer Genetic Test

You feel fine, and you don't have a strong family history of any single disease, but you're curious about what your genes can tell you. You may want to know, for example, what your lifetime risk might be for developing certain common diseases or for passing defective genes onto your children—or perhaps more mundane things such as whether you have a gene that makes you sneeze in the sun. Instead of consulting with your doctor or a genetic counselor, you want to try testing on your own with a direct-to-consumer (DTC) genetic test from one of the companies now offering them.

You realize that DTC genetic testing is still in its early days, and such tests only look for the most common genetic markers—bits of DNA that vary from person to person and have been associated with an increased risk of a particular disease. If you have a strong family history of breast cancer or other serious disease, you would want to order a more comprehensive screening through your doctor, not rely on a far more limited DTC test. You also understand that DTC tests are all about probabilities, not guarantees, and that even if you have a mutation linked to heightened chances of getting a disease, you may never get the disease.



Close-up of DNA sequencing gel

Given the above information, would you get tested through a DTC genetic testing company?