

# An explanation of incomplete proteins

By **BARBARA INTERMILL**  
Monterey Herald

Reader Ann F. writes: “I remember learning a bit about incomplete proteins a long time ago, and that if you combined, say, beans with corn, you had a complete protein, much as if you’d eaten eggs, or meat, or cottage cheese.

I always assumed that you should eat them at the same meal.

But I’m wondering, suppose you had one incomplete for breakfast, and the other for lunch — or for dinner — or maybe even the next day? I looked online, but didn’t learn anything about timing.

So I’d be interested in your take on this, and also on amounts — should the servings be of equal size, or, for an example, would a spoonful of corn with a big serving of beans, or vice versa, work just fine?

And I wonder if some combinations are better

than others. Is a peanut butter sandwich (whole wheat bread), for example, any better or worse than beans and corn? Or is it just a good idea to eat a big variety of foods?”

Great questions, Ann, because guidance on this issue has changed over the years. According to the most recent position paper on vegetarian diets by the Academy of Nutrition and Dietetics (eatright.org), protein from a variety of plant foods eaten during the course of the day supplies enough essential amino acids to meet your protein needs. (Amino acids are required to “build” more than 100,000 different proteins in the human body.)

Experts say the best balance of plant-based proteins comes from eating grain foods (which are limited in the essential amino acid lysine, but have a good amount of methionine and cysteine) as well as legumes (which have enough lysine,

but are lower in methionine and cysteine).

Thus, a diet that includes grains such as wheat, oats, rice and corn (corn is considered a grain as well as a vegetable) in addition to legumes like beans and peas can provide all the building blocks your body needs to make complete proteins.

Soybeans are also legumes, and here’s their claim to fame: Because they contain all the essential amino acids we need, they are considered a complete plant protein.

To use your examples, then, corn and beans in normal portions would fill each other’s protein “gaps” whether you ate them at the same time ... or not. Likewise, peanut butter (peanuts are legumes) and bread (grain) are also complementary.

And yes, the more variety of foods one eats on a vegetarian diet, the better, say experts. Besides



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legumes and grain combinations such as bean burritos or lentils and rice, don’t forget that most vegetables also contain small amounts of protein to contribute.

Choose these foods throughout the day to assure your body gets all the ingredients it needs to build a strong you!

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tionist and syndicated columnist. She is the author of “*Quinn-Essential Nutrition: The Uncomplicated Science of Eating.*” Email her at [barbara@quinnessential-nutrition.com](mailto:barbara@quinnessential-nutrition.com).

# Common questions about genetic testing for cancer risk

By **JOEL STREED**  
Mayo Clinic News Network

Your genes play a role in nearly all areas of your health. A gene is like an instruction manual for your body that tells your body how to function, develop and stay healthy. People have about 20,000 genes in their bodies.

Many health conditions have a genetic link. Genetic testing can help you and your health care team understand if you have an increased risk for developing certain conditions that are present in your family.

If you’re at risk, you may be able to take preventive measures to decrease your risk or undergo genetic testing to clarify your risk.

Here are nine common questions about genetic testing:

## Do all types of cancers have a genetic component?

Most cancers are considered sporadic, meaning the cancer happens randomly or has environmental influences, such as smoking and lung cancer. About 25% of cancers are considered familial. This is when multiple members of a family are affected by cancer.

These family members have some shared genetic factors in combination with shared environmental factors that lead to the development of these cancers.

About 10% of cancers are considered hereditary or have a single specific genetic component that can be tested and increase a person’s risk for developing cancer. Genetic counseling

and genetic testing can help determine which category a person’s individual or family cancer falls into.

It also can help estimate your risk for developing cancer.

## What types of genes are examined during genetic testing?

You may have an increased risk for some health conditions, including some types of cancer, based on your genes. A genetic test looks for specific harmful gene changes, called mutations or pathogenic variants, that can cause you to develop a genetic condition.

Gene changes are like spelling errors within your body’s instruction manual.

Most genetic tests look for changes in group of genes called a panel. However, testing may look for changes in a single gene when there is a known genetic mutation in your family. The most common genes typical thought of related to cancer risk are BRCA1 and BRCA2. These genes are associated with breast and ovarian cancer. It’s known that changes in other genes can increase risk for these cancers, as well.

There also are gene panels that assess risk for other cancers, such as colorectal, pancreatic, prostate, liver, uterine and endometrial cancers.

## Am I guaranteed to get cancer if I have a known gene?

No. Inheriting a harmful gene change means that you have an increased risk for cancer, but it does not guar-

antee that you will develop a cancer in your lifetime.

If testing shows that you have an increased risk for cancer, you may need to be screened earlier or more often.

For example, if you have a change in the BRCA gene that increases your risk for breast cancer, your care team will recommend that you have mammogram or MRI breast screenings beginning at a younger age or more frequently. The genetic counselor will explain your associated cancer risks and screening recommendations based on your genetic test results.

## What criteria do I need to meet to have genetic testing completed?

Your health care team may recommend genetic testing based on guidelines established by the National Comprehensive Cancer Network (NCCN). These guidelines use factors such as your personal cancer history, family cancer history, ancestry or the presence of abnormal cells to determine if you qualify for genetic testing.

If you do not meet the NCCN guidelines, you can still pursue testing. Your health insurance may not cover any or all of the testing costs, so more out-of-pocket expenses to be tested are possible.

## Can genetic testing help during cancer treatment?

If you are battling cancer, genetic testing can help your care team make recommendations for treatments and surgical procedures. For example, some

cancers associated with genetic mutations respond better to certain types of chemotherapy treatments. Similarly, genetic testing can help you determine between a lumpectomy or a mastectomy when making surgical decisions about breast cancer.

It also can affect the management of cancer risk over time.

The results also can help other family members. Potentially, your children, siblings, nieces and nephews could have inherited the same gene mutation. Knowing this information can help them establish early screening schedules and make healthy decisions about their lives.

## How can I prepare for a genetic testing consultation?

Gathering a detailed family health history is the most important thing to prepare for a genetic counseling appointment. Try to gather information about relatives, including types of cancer diagnosed, age of diagnosis, current age or age at death. Also find out if any relatives have previously had genetic testing completed.

If no previous genetic testing has been performed, often the best person to be tested is the family member with cancer.

That person is most likely to have a genetic change, if there is one. If an affected family member is unavailable for testing due to death or lack of interest, an unaffected person can still be tested.

Something else to think

about before your consultation is the purpose of your test. Younger patients usually want to know their personal risk so they can do extra screening. Older patients who are cancer survivors may wish to gather information and share it with downstream family members so they are aware of harmful genetic changes they could have potentially inherited.

## Am I only able to get cancer if I have the BRCA gene or one of these other genes?

A common misconception is that you have one of these genes or you don’t. Everyone has the BRCA genes and these other genes associated with cancer risk. The role these genes play in the body is to prevent cancer from occurring.

It’s when a harmful change occurs in one of these genes that causes it not to work like it should. This leads to the increased risk for cancer to develop.

People without these harmful changes can still develop cancer, but the risk is not as high as someone who has a hereditary predisposition.

## Am I more likely to inherit something from a parent of the same sex as me? Or the parent that I most resemble?

No. Every person has two copies of every gene — one copy inherited from each parent. If a parent has a harmful genetic change in one copy of a gene, it is random which copy they will pass on to children.

Every child has a 50-50 chance of inheriting the typical copy or the changed copy, regardless of you or your parent’s biological sex, or whether you more closely resemble one side of the family.

## There is breast cancer on my dad’s side of the family, I’m not at risk because my dad can’t pass that on, right?

People often think that a heritable risk for some cancers, such as breast and ovarian cancer, can’t be passed on from males. This is not true.

All people, regardless of biological sex, can carry a heritable risk factor for any type of cancer and can pass it on to any of their children.

While you can’t change your genes, you can control some aspects of your environment, such as diet and physical activity level, as well as alcohol and tobacco use. That’s why it’s still so important to live a healthy life, regardless of your personal and family genetic history.

## RECIPE

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### ZUCCHINI LASAGNA ROLL-UPS

For marinara

- 1 28-ounce can whole peeled plum tomatoes
- 1 medium yellow onion, peeled and halved
- 2 large cloves garlic, peeled
- 2 tablespoons extra-virgin olive oil
- Pinch of dried oregano
- Salt and pepper

For lasagna

- 4-5 large zucchini
- Salt and pepper
- 16-ounce container ricotta
- 1 1/2 cup shredded mozzarella, divided
- 3/4 cup freshly grated Parmesan, divided, plus more for passing

- 1 large egg
- Handful fresh basil, sliced very thin
- Pinch red pepper flakes, or more to taste

1. Make marinara sauce: In a medium saucepan or Dutch oven, combine the tomatoes (with their juices), onion, whole garlic cloves, olive oil and oregano. Bring the sauce to a simmer over medium-high heat, then reduce heat to low. Simmer sauce for about 45 minutes, stirring occasionally with a wooden spoon, until it is thick and fragrant. Remove onion and then smooch the cooked garlic with a fork and then stir into the sauce. Season to taste with salt and pepper. Keep slightly chunky or puree with an immersion blender if you like your sauce smooth. (Sauce can be made a day or two ahead of time and refrigerated.)

2. Preheat oven to 375 degrees Fahrenheit.

3. Using a mandoline or very sharp knife, slice zucchini lengthwise into 1/8-inch-thick strips, sprinkle with a little salt, then place strips in a colander or on a paper towel-lined baking sheet to drain for at least 15 minutes. (This will draw out any excess water.)

4. In a small bowl, stir together ricotta, 3/4 cup shredded mozzarella, 1/2 cup Parmesan, egg, basil and pepper flakes. Taste, then season with salt and pepper.

5. Rinse zucchini under cold water then spread out on paper towels and pat dry. Depending on the length of the strips, you may want to cut each in half. (I used 6-inch strips of zucchini for the roll-ups.)

6. Spread enough marinara to cover the bottom of a 9-by-13-inch baking dish (about 1/3 cup). Spoon about 1 tablespoon of ricotta mixture on top of a

zucchini slice, then roll up until tightly closed. Place in baking dish. Repeat with remaining zucchini slices, making sure the roll-ups are packed together closely. When dish is full, cover roll-ups with 1 cup marinara sauce, or more if you like a saucy lasagna.

7. Sprinkle the zucchini rolls with remaining 3/4 cup mozzarella and 1/4 cup Parmesan. Bake until zucchini is tender and cheese has melted and turned golden in spots, about 20 minutes. Serve with crusty bread and a green salad, and more grated Parmesan for passing.

Serves 6-8.

— Gretchen McKay



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