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Facts About Personalized Cancer Medicine

Personalized medicine can be used to learn about a person's genetic makeup and to unravel the biology of their tumor. Using this information, doctors hope to identify prevention, screening, and treatment strategies that may be more effective and cause fewer side effects than would be expected with standard treatments. By performing more genetic tests and analysis, doctors may customize treatment to each patient's needs.

Creating a personalized cancer screening and treatment plan includes:

- Determining the chances that a person will develop cancer and selecting screening strategies to lower the risk
- Matching patients with treatments that are more likely to be effective and cause fewer side effects
- Predicting the risk of recurrence (return of cancer)

How personalized medicine is different

Before personalized medicine, most patients with a specific type and stage of cancer received the same treatment. However, it became clear to doctors and patients that some treatments worked well for some patients and not as well for others. With the growth in the knowledge of genetics, researchers found that the genetic differences in people and their tumors explained many of these different responses to treatment. Although a person with cancer now may receive a standard treatment plan (such as surgery to remove a tumor), the doctor may also be able to recommend some type of personalized cancer treatment. Personalized cancer treatments may be offered as an active part of the treatment plan or as part of a clinical trial [1] (research studies in people).

Examples of personalized medicine

Some examples of personalized medicine strategies for cancer include the following:

Targeted treatments [2]**.** A targeted treatment targets a cancer's specific genes, proteins, or the tissue environment that contributes to cancer growth and survival. Researchers are identifying new targets each year and developing and testing new drugs for these targets. Breast cancer, colorectal cancer, gastrointestinal stromal tumor, kidney cancer, lung cancer, melanoma, multiple myeloma, some types of leukemia and lymphoma, and some types of childhood cancers are just a few cancers where targeted treatments are available. Of course, treatment with a targeted therapy depends on finding out whether the tumor has the specific target. This is usually done by testing a sample of the tumor obtained through a biopsy (the removal of a small amount of tissue) or during surgery.

Pharmacogenomics [3]. Instead of testing the tumor for a specific gene or protein, pharmacogenomics looks at how a person's genes affect the way the body processes and responds to drugs. The differences influence how effective and safe a drug is for a person. For example, some people's bodies may process a medication more quickly than others, so that person would require a higher dose of that drug for it to be effective. However, if someone's body does not process a medication as quickly, the medication will stay in the bloodstream for a longer time and may cause more severe side effects.

How can pharmacogenomics be put into practice for cancer treatments? Here is an example: People with colorectal cancer that have a specific gene variation may have life-threatening side effects when treated with irinotecan (Camptosar). This altered gene makes it harder for the body to break down irinotecan. In these patients, doctors prescribe lower amounts of irinotecan so patients will have fewer side effects.

Future directions in personalized medicine

Despite the promises of personalized cancer treatments, not all types of cancer have personalized treatment options. Some of these are only available through a clinical trial and are not yet standard treatment options. Genetic testing [4] of both the patient and the tumor sample may be costly and time-consuming, and many insurance plans may not cover the costs of these tests. Some personalized treatments, such as targeted treatments, can also be expensive. Finally, not enough is known yet for doctors to be able to make personalized recommendations for cancer screening and prevention.

Although personalized medicine is a new and exciting approach to cancer treatment, doctors still don't know everything about the genetic changes that occur in a cancer cell and how some of these new cancer treatments work. Sometimes a targeted therapy stops working and a promising treatment is no longer effective. Talk with your doctor to learn more about personalized cancer treatments and whether they may be a part of your treatment plan.

Questions to ask the doctor

To learn more about personalized cancer care, consider asking your doctor the following questions:

- What are my treatment options?
- What clinical trials are open to me?
- Are there tests available that can help guide treatment choices?
- Is this treatment considered an example of personalized medicine? If so, how?
- What are the benefits of this treatment?
- What are the potential side effects of this treatment?
- What is my prognosis (chance of recovery?)

More Information

ASCO Annual Meetings; Cancer News for Patients: Personalized Medicine [5]

Explaining Cancer Genome Research [6]

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Links:
[1] http://www.cancer.net/all-about-cancer/clinical-trials
[2] http://www.cancer.net/node/24729
[3] http://www.cancer.net/node/24727
[4] http://www.cancer.net/node/24895
[5] http://www.cancer.net/cancer-news-and-meetings/asco-annual-meetings/research-summaries?field_page_topic_tid=286&date_filter%5Bvalue%5D%5Byear%5D=
[6] http://www.cancer.net/node/24519