

The Promise of Personalized medicine

Kristina D'Amico

Personalized medicine is a growing field in medicine, as a way to analyze a person's unique clinical and genetic factors. These factors are different for every person, including their onset, their course, and how they might respond to drugs or other interventions. Personalized medicine is about putting together a treatment specific to the individual. In order for personalized medicine to be used effectively by healthcare providers and their patients, these findings must be translated into precise diagnostic tests and targeted therapies.

Personalized medicine aims to tackle more complex diseases, such as cancer, heart disease, and diabetes, for years believed to be influenced primarily by environmental factors and their interaction with the human genome. These diseases have strong multi-gene components—and in some cases might be caused by errors in the DNA therefore they can be better understood using a whole-genome approach.

Personalized medicine is already being used in treating breast cancer. The genes BRCA1 and BRCA2 are associated strongly with breast cancer patients. People with these genes are more likely to develop breast cancer in their lifetime. If we are able to sequence a woman's genome and find these genes we are at an advantage and can then treat the patient to try to avoid breast cancer all together.

Another form of breast cancer can be distinguished by the over-expression of the HER2 protein which is a growth factor protein. The knowledge of the role of this protein in breast cancer has led to the drug development of Herceptin. Herceptin, specifically targets aggressive HER2-positive breast cancer. Importantly, before this medication was developed, women with HER2-expressing breast cancer were less responsive to standard treatments. Now, however, treatment with Herceptin in combination with chemotherapy has amazingly been shown to reduce the recurrence rate of this type of cancer by 52 percent.

The cost of sequencing a genome may be expensive. But it is important to also consider the cost of treatment if a woman is faced with breast cancer. The cost of treating breast cancer can be upwards of \$20,000. Personalized medicine can be used as a form of preventative measures. The costs have gone from \$300,000,000 in 2001 to \$5,000 cost of sequencing a human genome in 2011. The cost of people not doing this is much greater than 5,000 dollars it is their lifetime. In order to make this more affordable new research has been done to find innovative ways of reading a genome.

The advantages of personalized medicine cannot be ignored. The knowledge of the genomic code in each person can allow for better treatment and diagnosis of diseases. The treatment would be able to individualize each person and allow for the most effective treatment. This type of diagnosing and treating should not be a luxury but should be taken advantage of by everyone.