[Improving Personalized Medicine in Oncology Research with Biomarkers](http://www.conversantbio.com/blog/improving-personalized-medicine-in-oncology-research-with-biomarkers)

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Major investments in basic science have created an opportunity for significant progress in clinical medicine. Researchers have discovered hundreds of genes that harbor variations contributing to human illness, identified genetic variability in patients' responses to dozens of treatments, and begun to target the molecular causes of some diseases. In addition, scientists are developing and using diagnostic tests based on genetics or other molecular mechanisms to better predict patients' responses to targeted therapy.(1)

Personalized Medicine in Oncology

Molecularly targeted agents are the primary driver for personalized medicine in oncology. In the past, chemotherapy was the only systemic form of cancer therapy, often yielding unsatisfactory results with a “one size fits all” approach. Historically, specific targeting of cancer cells with anti-hormonal therapies to estrogen receptor (breast cancer) and testosterone receptor (prostate cancer) has been successful. However, the “Achilles heel” of cancer treatment has been failure of current treatments because of the emergence of genetic mechanisms of drug resistance.

Cancer is a heterogenous disease; no two cancers are exactly alike, and even the same type of cancer can act very differently in different individuals, making personalized medicine even more important. There are over 200 different types of cancers, and until recently, treatment was really a “trial and error” endeavor.

With [personalized medicine](http://www.conversantbio.com/blog/bid/284247/Using-Human-Tissues-for-Personalized-Medicine-Research), molecular biomarkers allow the physician to better predict how a patient will respond to a particular drug based on their genetic profile and test results. It is also possible to identify who needs and does NOT need aggressive treatment. Given the multiplicity of targets, it is vital to find the right solution and treatment.

The Benefits of Targeted Therapy

Each patient that is treated with targeted therapy, generates about 5000 points of data per month. (1) These data points are in the form of biomarkers, which indicate tumor response, toxicity, drug resistance and the like. Research needs to be conducted on every cell of every tumor to identify mutations and then choose the drug or multidrug approach to eradicate the cancer.

For patients with little hope for survival, personalized medicine research is the key. When no other drugs are working, it is through studying that persons biomarkers that new drugs can be offered. Over 500 drugs are in clinical trials today.

Whole blood samples and tumor tissue samples are critical to determining the basis for clinical trials. Biomarkers represent a dynamic paradigm shift, but it also means significantly more research needs to be done because drug development for these personalized cancers has become exponentially more complex. Designing targeted therapies to address the biomarkers associated with a particular patient’s cancer.

**The following key characteristics of targeted therapy must be evaluated in research:**

* Safety
* Effectiveness
* Dosing
* Half-life
* Contraindications
* Drug Resistance

The Future of Clinical Research for Targeted Therapy

Real progress will come when clinically beneficial new products and approaches are incorporated into clinical practice. As the field advances, there will be more efficient clinical trials based on a more thorough understanding of the genetic basis of disease. It is anticipated that, through research, some previously failed medications will be recognized as safe and effective and will be approved for subgroups of patients with specific genetic markers. (1)

How can Conversant Bio help you with your cancer biomarker research?

References

1. Hamburg M, Collins F. The path to personalized medicine. N Engl J Med 2010; 363:301-304