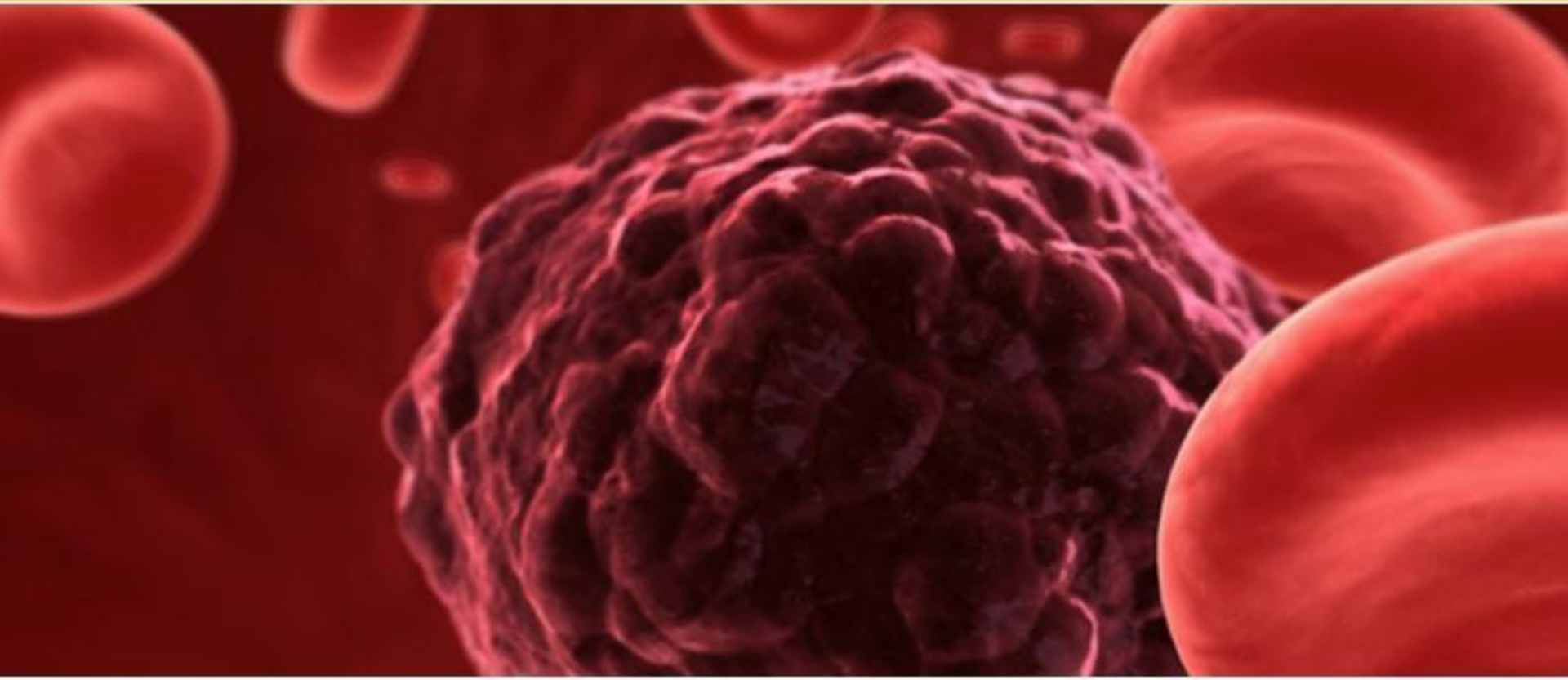


The Definitive Guide to

# ONCOLOGY BLOOD USES IN CANCER RESEARCH

conversant bio

Go Further. Faster.

**“Imagination has given us the steam engine, the telephone, the talking-machine and the automobile, for these things had to be dreamed of before they became realities. So I believe that dreams . . . are likely to lead to the betterment of the world.”**

- L. Frank Baum

# Accelerate Your Research with Conversant Bio

- **500+ Participating MDs**
- **50+ Partner sites for tissue procurement**
- **Continuous expansion of sourcing capabilities**
- **Closely monitored chain of custody**
- **Full regulatory IRB compliance**
- **Full-time Conversant Bio employed study coordinators**
- **Dedicated Project Managers for *every* account, *every* order**

**Experienced, customer-focused, trusted.**

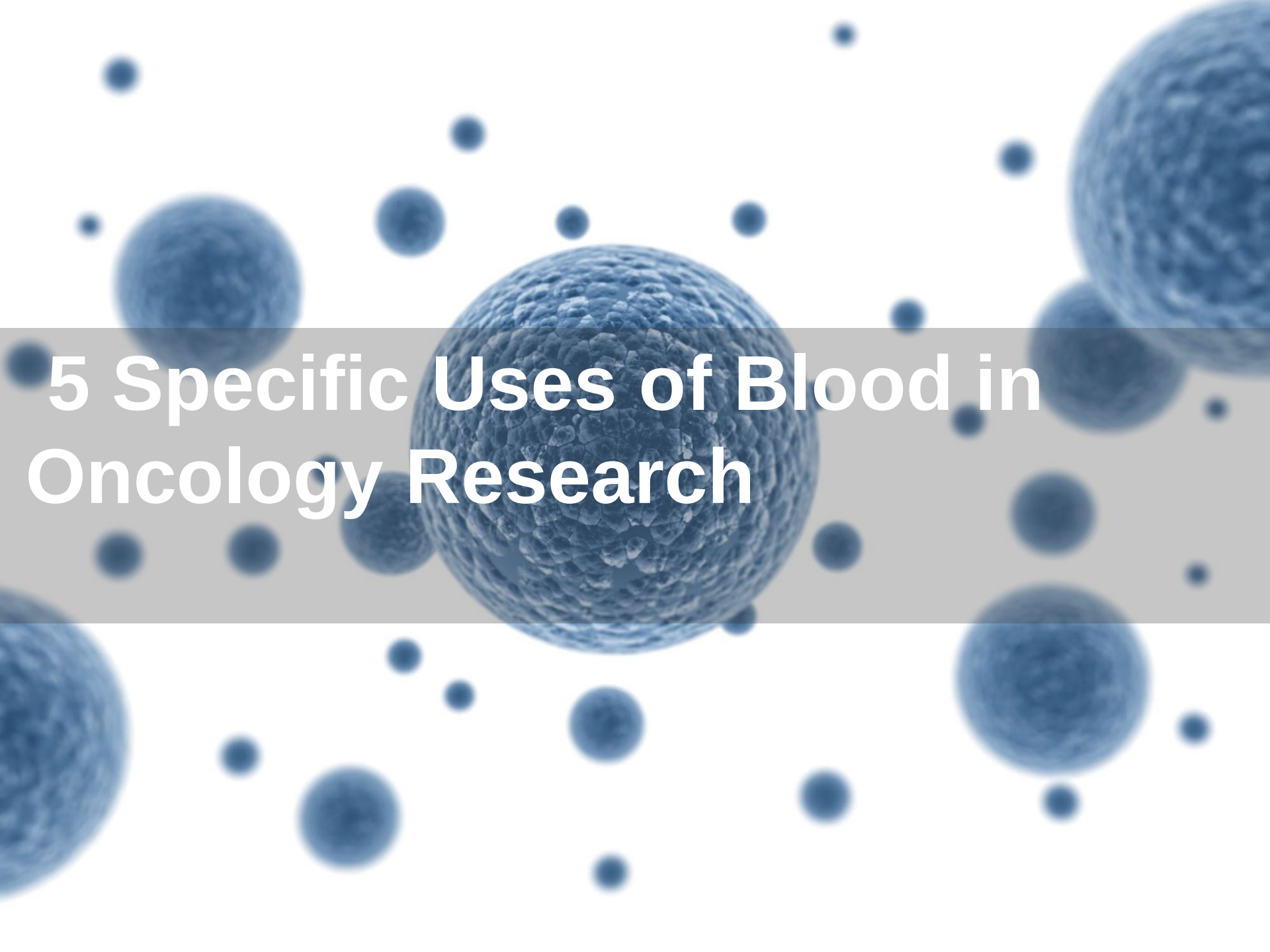
# Table of Contents

# Introduction

## Oncology Blood & Cancer Research

Most of cancer research revolves around identifying and understanding the molecular and cellular makeup of cancer cells and how they behave differently from normal cells. High quality human biospecimens are an important part of this work.

Advancing cancer research requires not only tissues, but also biofluids such as urine and blood.



# 5 Specific Uses of Blood in Oncology Research

1. **Identify and validate ways to deliver drugs or agents to specific cells**
2. Identify how diseases progress
3. Group patients as more or less likely to respond to specific drugs
4. Group patients to determine which treatment is appropriate
5. Develop screening tests to detect biomarkers that are associated with certain stages or subtypes of a disease

# Biomarker Use in Cancer Medicine

## Biomarker defined:

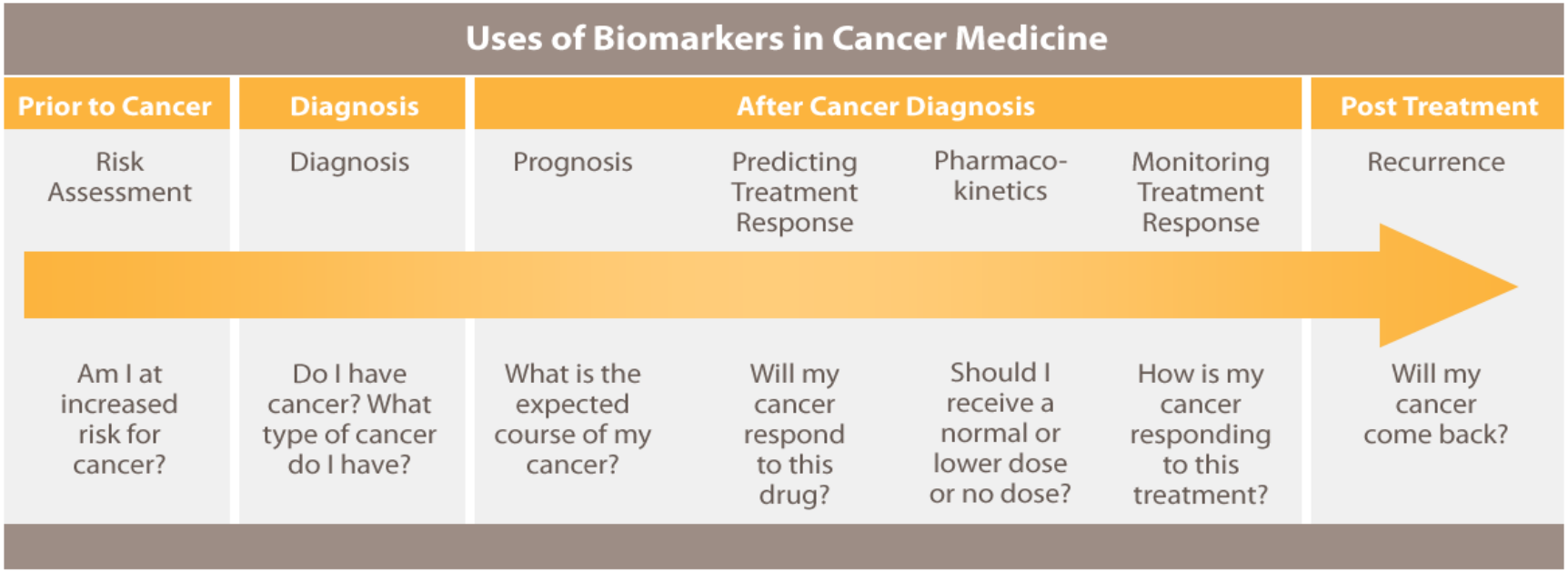
Oncology blood is primarily used to study biomarkers.  The National Cancer Institute defines a biomarker as “a biological molecule found in blood, other body fluids, or tissues that is a sign of a normal or abnormal process, or of a condition or disease.  A biomarker may be used to test how well the body responds to a treatment for a disease or condition.  Also called molecular marker and signature molecule.”

## Biomarkers in Action

Some examples of biomarkers that have garnered attention in the cancer research industry include KIT for gastrointestinal stromal tumors, CA 19.9 for pancreatic cancer, and CEA for colorectal cancer.

Additionally, the S100 protein family has been used as a biomarker for melanomas and about 50 percent of peripheral nerve sheath tumors. Also, alpha-fetoprotein (AFP) has been used to look for early-stage tumors in people with a high risk for liver cancer. These are just a few of the many biomarkers identified as potential tools in cancer research and treatment.

The Research Advocacy Group recently released a guide to biomarkers and their use in cancer research and drug discovery. The chart below describes the uses of biomarkers in all stages of cancer medicine from risk assessment to recurrence. In other words, biomarkers are used to answer questions such as "Do I have an increased risk for cancer?" or "Will my cancer come back?"



# Biomarker Use in Cancer Drug Development

Specific Drug Targets &
Surrogate Endpoints

## Specific Drug Targets - EGFR

Using biomarkers found in blood samples, researchers can identify specific targets for the drugs they are developing.  For example, Erlotinib, more commonly known as Tarceva, has been helping to make great strides in the fight against late stage non-small cell lung cancer (NSCLC) and pancreatic cancer. The drug targets and inhibits the epidermal growth factor receptor (EGFR).

According to Hal Barron of Roche, “10 to 30 percent of people worldwide with lung cancer have tumours that test positive for certain EGFR mutations.”  The FDA recently approved Tarceva and the cobas EGFR Mutation Test as a first line of treatment for patients with metastatic NSCLC.

## Specific Drug Targets - EGFR

Using the newly approved EGFR mutation test to assess the EGFR activating mutation positive levels, doctors can determine if patients would respond better to this treatment rather than receiving chemotherapy. In Europe, the European Randomised Trial of Tarceva versus Chemotherapy (EURTAC) study has observed tumor shrinkage in 65 percent of patients treated with Tarceva versus 16 percent of patients treated with platinum based chemotherapy. Tarceva has already been approved by the FDA for maintenance purposes in the United States.

Additionally, it is approved for patients whose tumors are not responding quickly enough to chemotherapy; however, Tarceva cannot be used with all chemotherapies that are used to treat advanced NSCLC.

## Specific Targets - ASCL1

Recently, Mayo Clinic researchers have discovered that the protein ASCL1 combined with a high level of RET can lead to an increased chance of smoking-related lung cancers.  Researchers were able to block the ASCL1 protein, causing the cancer tumor growth to slow.

Because of this research, they believe that this biomarker could be a target for drug discovery and a potential candidate for clinical trials.

## Surrogate Endpoints

Biomarkers are also being used to indicate whether or not disease progression is being slowed down by a particular drug. This can save companies the long and expensive process of beginning clinical trials if a drug fails to show that it will increase patients' chances of survival.

Circulating tumor cells (CTCs) and microRNA (miRNA) are currently being tested as surrogate endpoint biomarkers (SEB). Found in blood, they can serve as a predictor of disease onset or relapse. Some hurdles to these particular biomarkers' adoption are the difficulty in enriching, identifying, and measuring their levels in the blood.

# Ideal Characteristics of Surrogate Endpoint Biomarkers

- Biomarkers should be involved in the process that causes cancer
- Changes in biomarker should be highly related to changes in the disease
- Levels of biomarker should be high enough that they can be measured easily and reliably
- Effective treatment of the cancer should change level of the biomarker
- Level of the biomarker should not change spontaneously or in response to other factors not related to successful treatment of the cancer

# Benefits of Personalized Medicine in Cancer Treatment

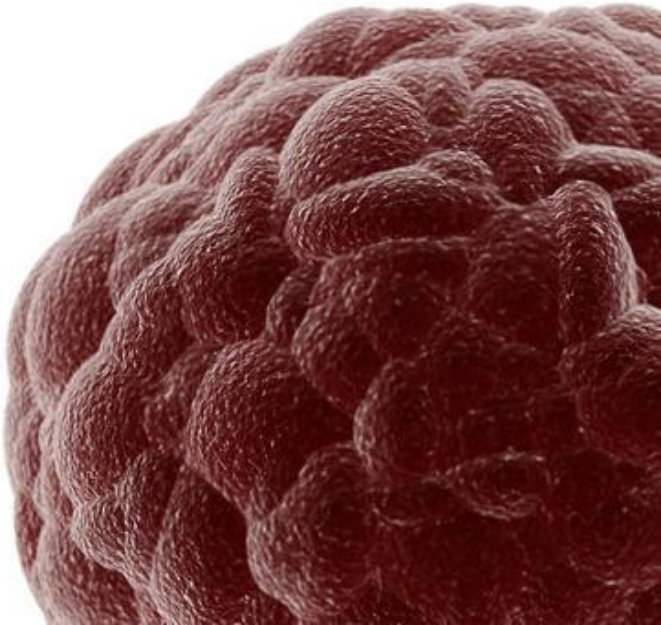
## Early Detection &
## More Accurate Diagnosis

Personalized medicine has the ability to affect the way patients are diagnosed and treated. Understanding particular biomarkers found in a patient's blood assists in early detection and a more accurate cancer diagnosis. For example, a patient with a mutation of the BRCA1 or BRCA2 gene has a higher probability of developing breast cancer in his or her lifetime. Knowledge of this mutation gives the patient preventative or treatment options.

Without personalized medicine, many doctors have to use a trial and error method to see how a patient will respond to different treatments. Often a doctor will have to try a combination of therapies, some of which will have no effect on the patient, delaying the progress of treatment or causing unnecessary side effects.

## HER2 For Instance . . .

There are many different types of drugs used in chemotherapy.  If a patient has HER2+ breast cancer, he or she will most likely be given Herceptin.  However, if a patient has HER2- breast cancer, his or her treatment is more likely to be Tykerb.  Because biomarkers play such an important role in the development of personalized medicine and successful treatment, it is essential that we continue to use oncology blood in drug development research.



# The Conversant Bio Advantage

# 1 Whole blood for assay development gives you room to discover.

- Knowing your assay will perform on clinical trial specimens is critical; working out the kinks before you begin receiving trial samples is essential. We can select patients using the the inclusion/exclusion criteria you expect for your trial.

- Optimize your existing assays and develop new ones before your clinical samples arrive.

# 2 Annotated data allows you to know more about your samples.

- Conversant Bio can collect specimens with your specific inclusion and exclusion criteria.

- A wide variety of data samples allows you to get specific with your research needs. Such data sets from patient records might include age, race, sex, smoking and alcohol history, treatment history, current treatment, and results of previously performed genetic testing.

# 3 Access to metastatic cancer patients allows you to tap into CTC research.

- Using our broad network of U.S. based sites, Conversant Bio sources peripheral blood from metastatic solid tumor cancer patients, including circulating tumor cells (CTC).

- Gain access to a variety of tissue samples such as breast, lung, colorectal, prostate, melanoma, ovarian, and other solid tumor cancers.

# 4 We allow you the flexibility you require.

- Whole Blood Tubes – collect blood in your specified tube (e.g., EDTA, Heparin, CellSave, and RNAlater) for any application.

- SOPs – We can process cells, proteins, DNA, or RNA samples for your downstream research. Just ask.

- Timeline – Projects can be initiated within 1 week and are often completed within 2-3 months. Conversant has experience running studies from 1-300 patients.

# 5 Untouched samples allow you to manipulate specimens as you wish.

- Receiving samples untouched and unprocessed allows you to process the blood for proteomic, genomic, and/or cell-based research . . . all from one blood tube.

- This improves your research by minimizing the variables.

Select Lab Capabilities

At Conversant Bio, we offer a wide variety of human peripheral blood samples from normal donors and from patients with oncologic diseases.

Some of the most popular peripheral blood products include our whole blood, peripheral blood mononuclear cells (PBMCs), plasma, and serum. Don’t hesitate to contact us with your specific requests.

**Request Pricing Today**

# Case Studies

Accelerate Your Research With Conversant Bio

Case Study No. 1

# Large Study, Fast Accrual

Conversant Bio provided 200 unique samples from Stage III and IV Non-Small Cell Lung Cancer (NSCLC) patients for an ongoing research project at a large biopharmaceutical company.  The blood was processed to plasma at the Conversant Bio lab.

After our impressive accrual of **160 unique patients in approximately 2 months**, the customer requested to extend the project by 85 patients.

Case Study No. 2

# Hard to Find Sample, Longitudinal Studies

Conversant Bio's access to patient schedules allows us to track patients longitudinally throughout a treatment cycle.

In a recent study, Conversant Bio started tracking 10 metastatic melanoma patients beginning treatment with Yervoy (ipilimumab). We will collect an active treatment blood sample as well as a post-treatment sample and process to peripheral blood mononuclear cells and serum at the Conversant Bio lab.

# Conversant Bio

## Because Patients Are Waiting . . .

The use of oncology blood in drug discovery and research is making large strides in the fight against cancer. At Conversant Bio, we are motivated by the knowledge that the products and services we provide are leading directly to advancements in treatments and cures to the world's most horrific diseases. We are driven to promote new and innovative solutions to these problems and are here to be your partner in research and development. We act with the belief and knowledge that patients are waiting . . . and our goal is to provide scientists and researchers with the highest quality specimens with which they can develop and create real advancements that will save human lives.

## Company Information

*Take Your Research Further. Faster.*

**Conversant Healthcare Systems, Inc. (Conversant Bio)**
601 Genome Way, Suite 1200
Huntsville, AL 35806
(866) 838-2798 phone
(256) 705-4103 fax
www.conversantbio.com

To find out how we can help with your research needs, email us at sales@conversantbio.com

# What Project Can We Help You With?

The Conversant Bio Advantage:

- **Quality Control System**
- **In-House Lab**
- **Fast Processing**
- **Diverse and Advanced Equipment**
- **Experienced Researchers and Staff**

**Request Pricing Today**