

Acute Myeloid Leukemia (AML) is a complex and aggressive form of blood cancer that affects both children and adults. It arises from abnormal growth of immature white blood cells in the bone marrow, disrupting the body's ability to produce healthy blood cells. AML occurs when genetic mutations cause bone marrow cells to malfunction and rapidly multiply. As the unhealthy cells accumulate, they crowd out the normal blood cells, leading to life-threatening complications. Common symptoms include fatigue, frequent infections, bleeding, and unexplained weight loss. However, these symptoms can vary, making AML difficult to diagnose in its early stages. While advancements in treatment have improved outcomes, AML remains a significant medical challenge.

Diagnosis typically involves blood tests, bone marrow biopsies, and genetic analysis to identify specific mutations. Once diagnosed, treatment options depend on factors such as age, overall health, and genetic markers. Traditional approaches include chemotherapy, radiation, and stem cell transplantation. While these treatments can be effective, they also come with significant side effects and may not work for everyone.

Currently, ongoing research focuses on deciphering the intricate genetic and molecular processes that underlie the progression of AML. The primary objective is to uncover new therapeutic targets that can be exploited for effective treatment. Promising treatment approaches on the horizon include targeted therapies that aim to disrupt specific molecular pathways implicated in AML development, immunotherapies that harness the body's own immune system to combat cancer cells, and innovative drug combinations designed to minimize toxicity while maximizing efficacy.

One of the most promising areas of research is precision medicine, which involves tailoring treatment based on an individual's unique genetic profile. By understanding the specific genetic alterations in a patient's leukemia cells, doctors can select therapies that are more likely to be effective while minimizing side effects. This personalized approach holds great potential for improving outcomes and reducing treatment-related complications.

Proteins are the workhorses of our cells, carrying out vital functions that keep our bodies functioning properly. In cancer, such as AML, certain proteins become aberrantly modified with sugar molecules in a process called glycosylation. These sugar modifications can alter protein structure, stability, and function, contributing to the development and progression of cancer.

Glycoproteomics involves the study of the glycoproteome, which encompasses all the sugar-decorated proteins in a cell or tissue. By analyzing the glycoproteome, we gain valuable insights into the intricate molecular changes that occur in cancer cells. They can identify specific glycoproteins that are dysregulated in cancer, paving the way for new diagnostic markers and potential therapeutic targets.

One of the most exciting aspects of glycoproteomics in cancer research is its potential for personalized medicine. Every individual's cancer is unique, and glycoproteomics provides a way to analyze the specific glycosylation patterns of a patient's cancer cells. By understanding these individualized glycoprotein profiles, doctors can tailor treatments to target the vulnerabilities specific to each patient, leading to more effective therapies and improved outcomes.

Aim of this project is to obtain glycoproteomic data of potential therapeutic targets for more effective and personalized treatments, ultimately improving the chances of survival and enhancing the quality of life for AML patients, and monitor treatment outcomes.