

# Systems Biology: Discovering Biomarkers for Human Health and Disease



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# Risk of **breast cancer** incidence and disease progression in **Indian diabetic patients**

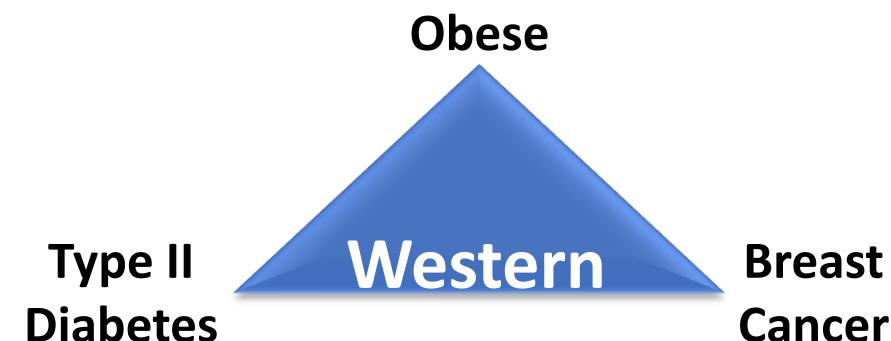
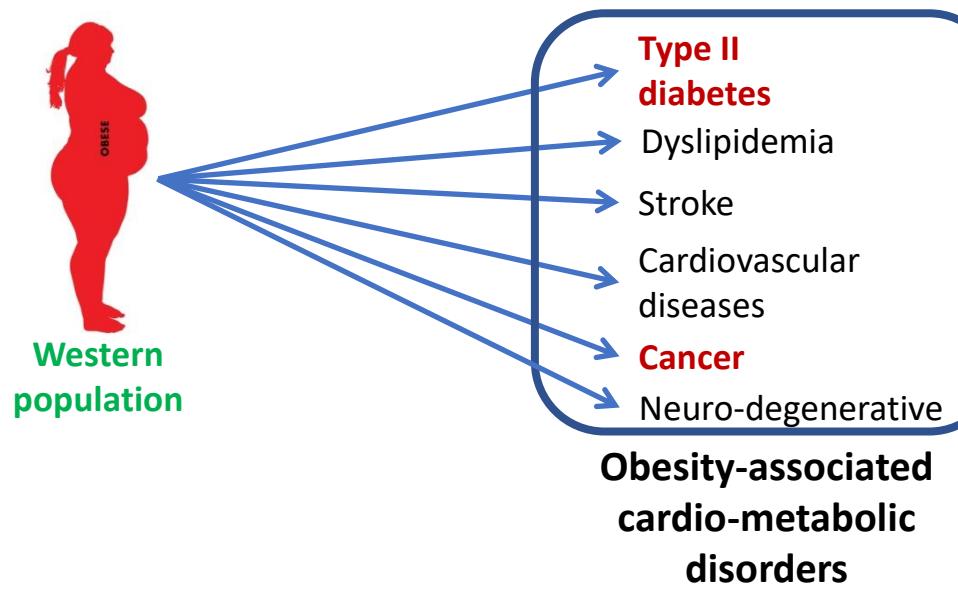
**Cancer** is a disease that results from genetic and/or epigenetic changes leading to abnormal growth and proliferation of cells, these cells then invade to surrounding tissues and spread to distant organs.

**Breast cancer** is a malignant tumor that starts in the breast cells. It can occur in both men and women, however, breast cancer in men is very rare.

“**Diabetes** is a chronic disease that occurs when the pancreas is no longer able to make insulin, or when the body cannot make good use of the insulin it produces”

-as defined by International diabetes federation (IDF)

**Obesity** is a condition when an individual accumulates excess body fat.



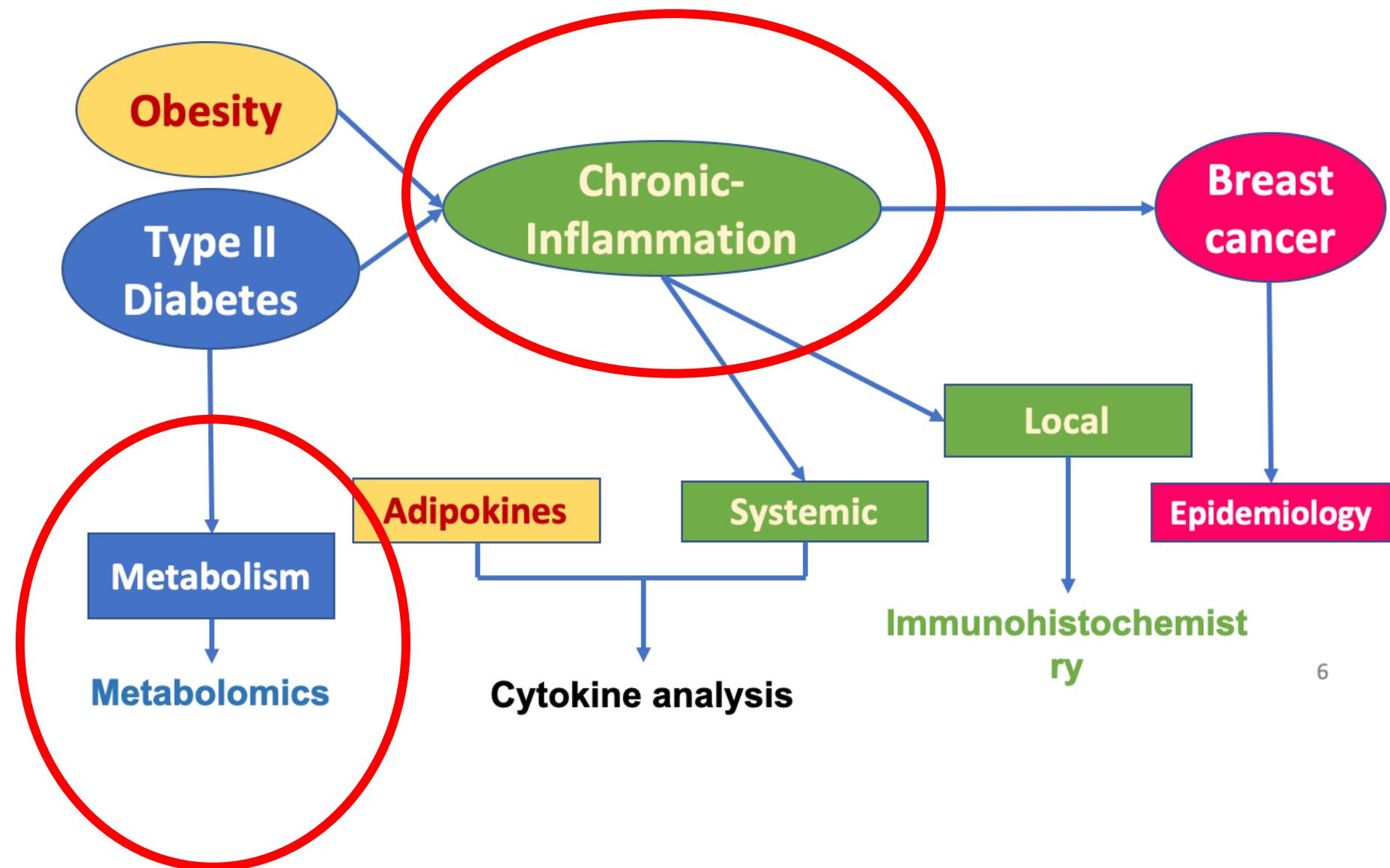
# Aim and objectives

**Aim: To understand the role of diabetes in breast cancer pathogenesis in Indian patients**

## Objectives:

1. To compare the status of **chronic inflammation** in Indian diabetic and non-diabetic breast cancer patients
2. To study the **metabolic profiles** of Indian diabetic and non-diabetic breast cancer patients
3. To understand the **role of diabetes in breast cancer incidence** in Indian patients
4. To develop **lean diabetic breast cancer mouse model** and validate the clinical results

# Methods



# Exploring the association between **breast cancer** and metabolic disorders and inflammatory conditions such as **diabetes**

- Identification of biomarkers for breast cancer
- Exploring the association between breast cancer and metabolic disorders and inflammatory conditions such as diabetes.
- The experimental data will be used to build networks or identify potential biomarkers useful for developing cancer treatment strategies. The information gained will be used to design additional biochemical experiments to validate the findings.

# Space explorations and metabolomics

This project will explore the effect of outer space-expanses that exists beyond the Earth and between celestial bodies-on human health and metabolism.

**Urine samples** from **astronauts** will be analyzed before, during and after their space missions to evaluate the effect of non-terrestrial conditions. This will be in collaboration with **Indian Space Research Organization**.

Study of effect of radiation on cells

The graduate student involved in the project will be required to:

- acquire, interpret and analyze biophysical data on metabolites
- to build mathematical models that provides biological insights into the system being studied.

State-of-art facilities for NMR and other biophysical experiments will be made available to student.