Research Group in Bioinformatics

Introduction to Bioinformatics

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Overview

- Introduction
  - Objectives
  - Motivation
  - What is Bioinformatics?
- Research group
  - Pre-requisites
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Objectives

- Understand what is Bioinformatics, Computer Biology and Computation Molecular Biology.

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- Pre-requisites
- Research group's goals.

Motivation

What microorganism live in our armpits or in our mouths?

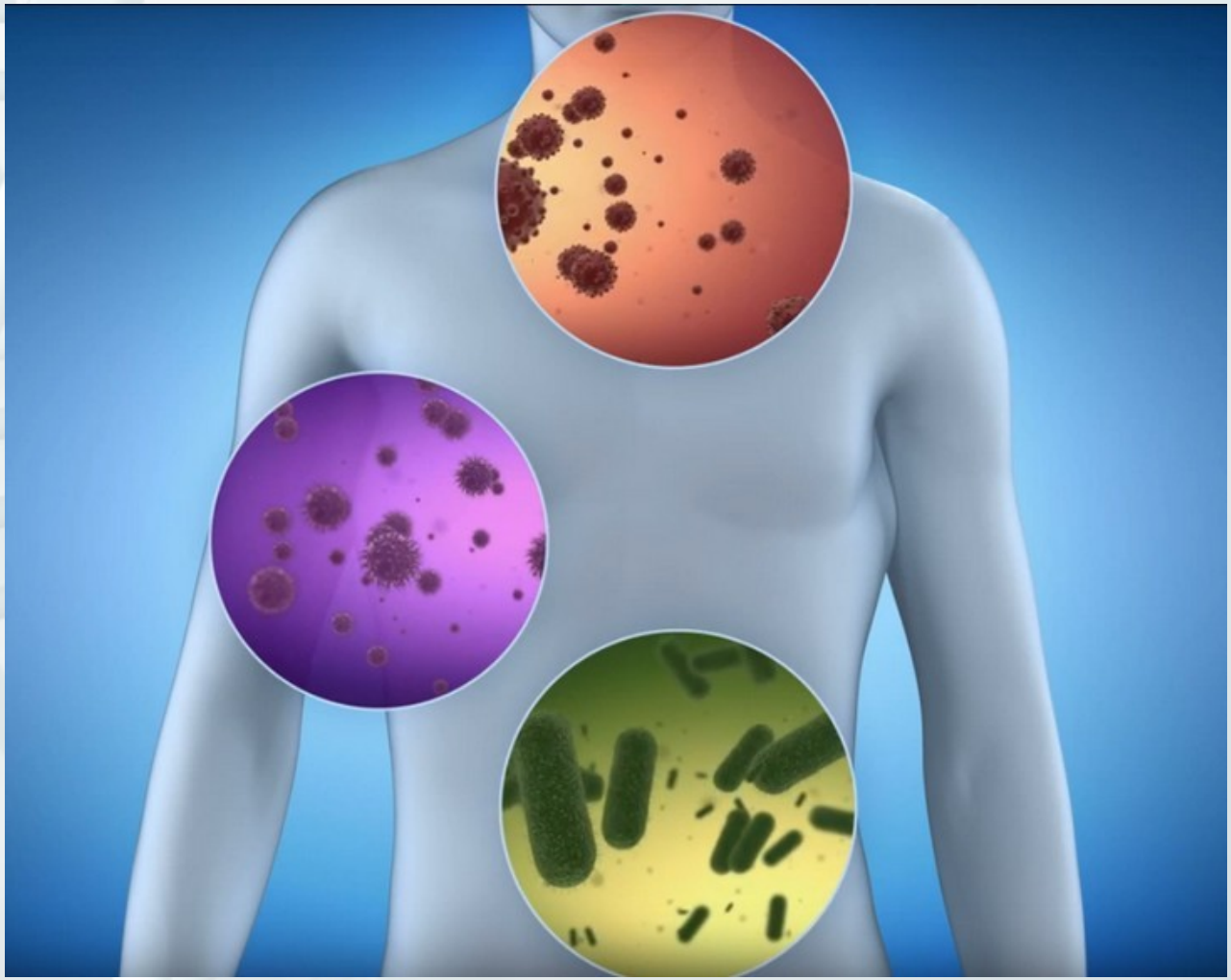

Figure: What microorganism live in our armpits or in our mouths?

Motivation
Is there a kindness gene?

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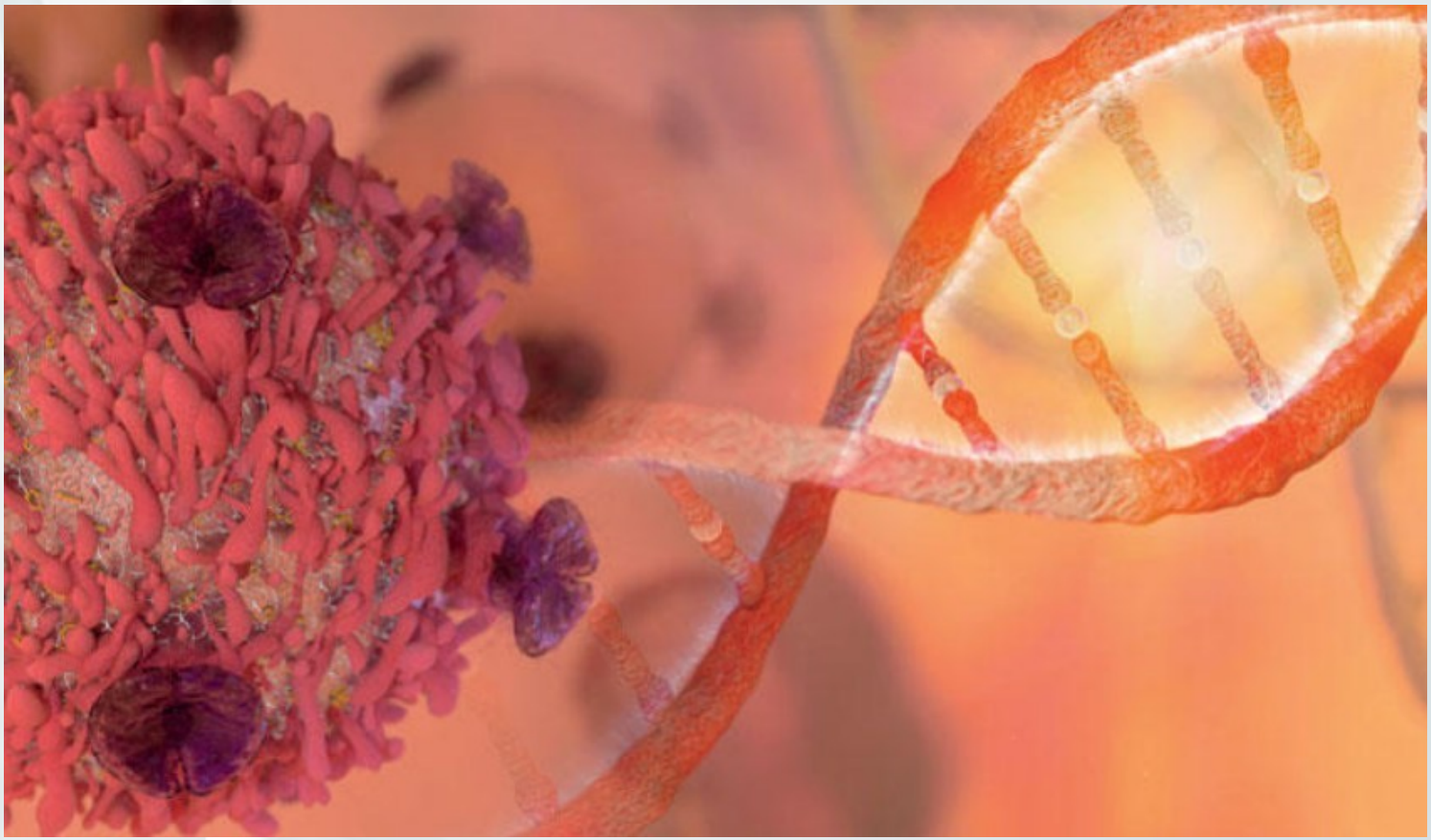
Motivation
Why a person has cancer?



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Motivation

Why some medicines no work in some persons?

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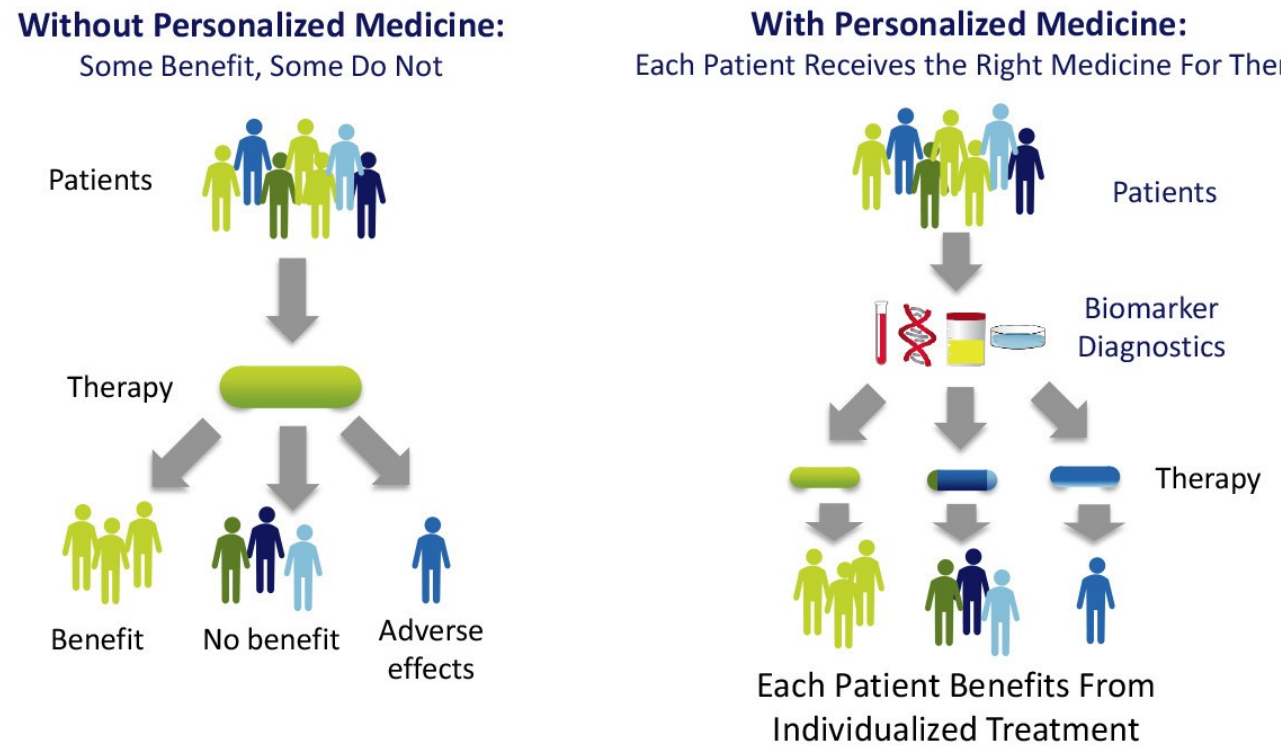


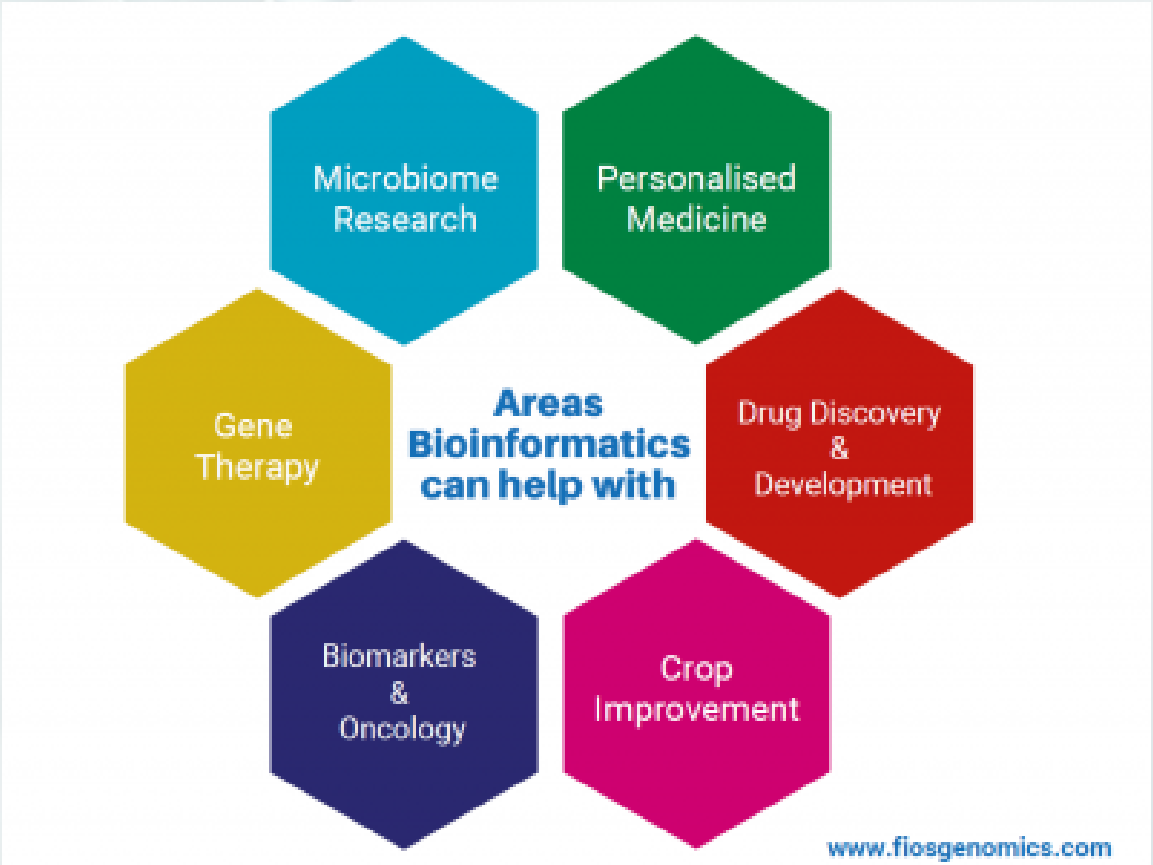
Figure: Personalized Medicine: New Approach to Treatment of Disease

According to Luscombe et al.: **Bioinformatics** involves the technology that uses computers for storage, retrieval, manipulation, and distribution of information related to biological macromolecules such as DNA, RNA, and proteins [1].

Bioinformatics is limited to sequence, structural, and functional analysis of genes and genomes and their corresponding products and is often considered **Computational molecular biology**. However, **Computational Biology** encompasses all biological areas that involve computation [2].

Motivation

Areas Bioinformaics can help with



Microbiome study the genetic material of microbes, bacteria, fungi, etc.

Figure: Areas Bioinformaics can help with.

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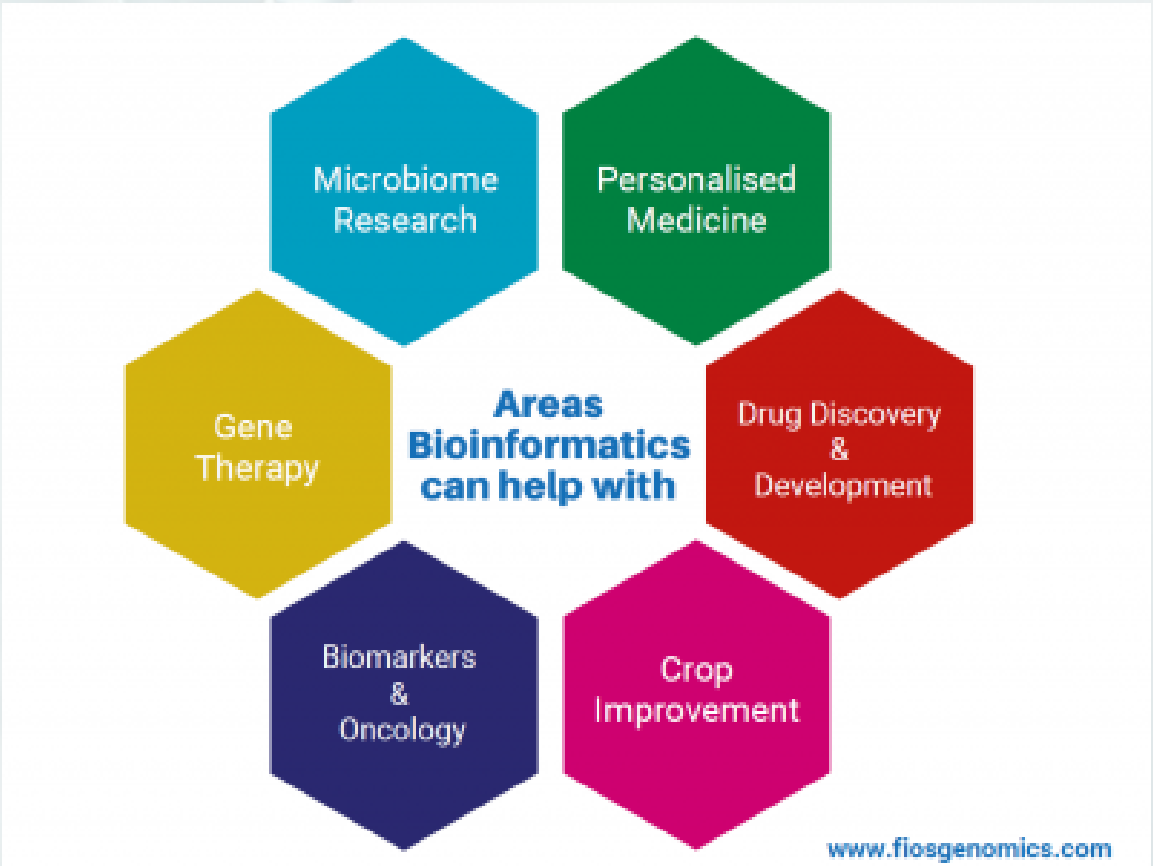

Personalized medicine has the potential to tailor therapy with the best response and highest safety margin to ensure better patient care.

Figure: Areas Bioinformaics can help with.

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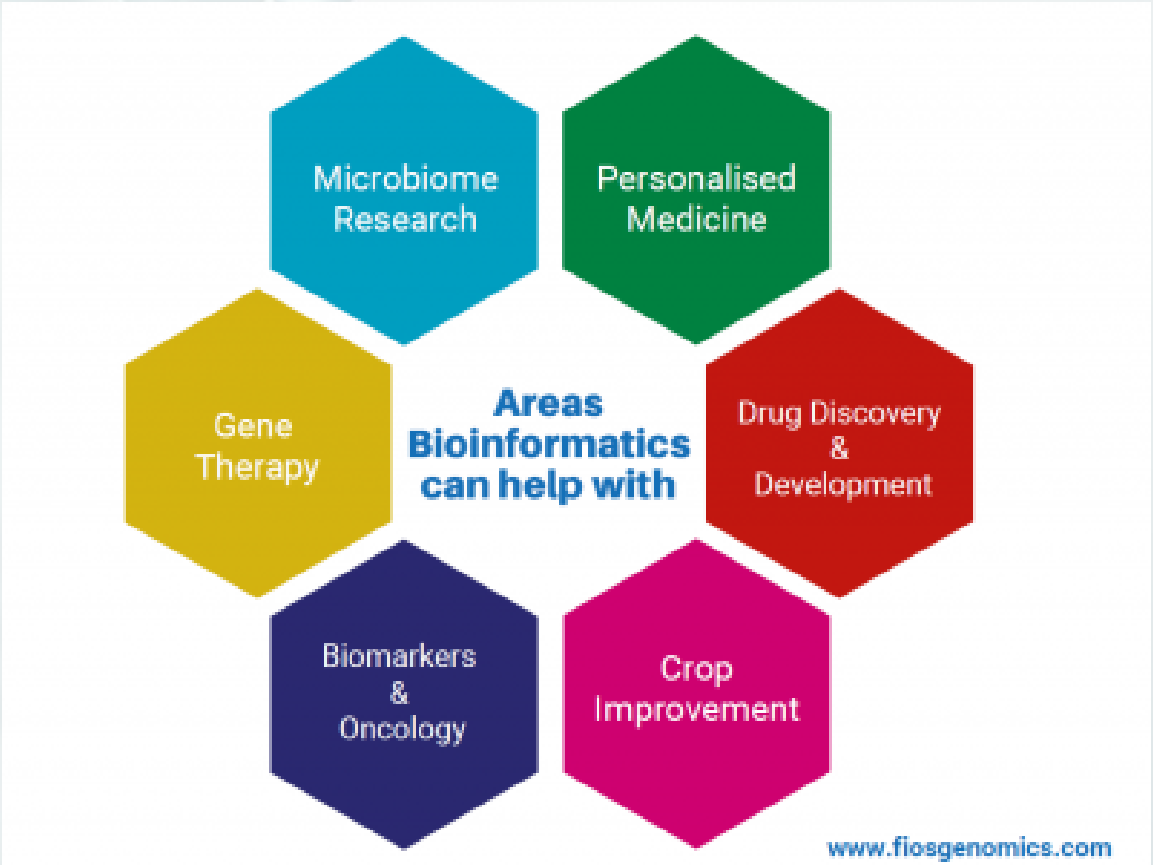

Drug descovery is the process through which potential new medicines are identified.

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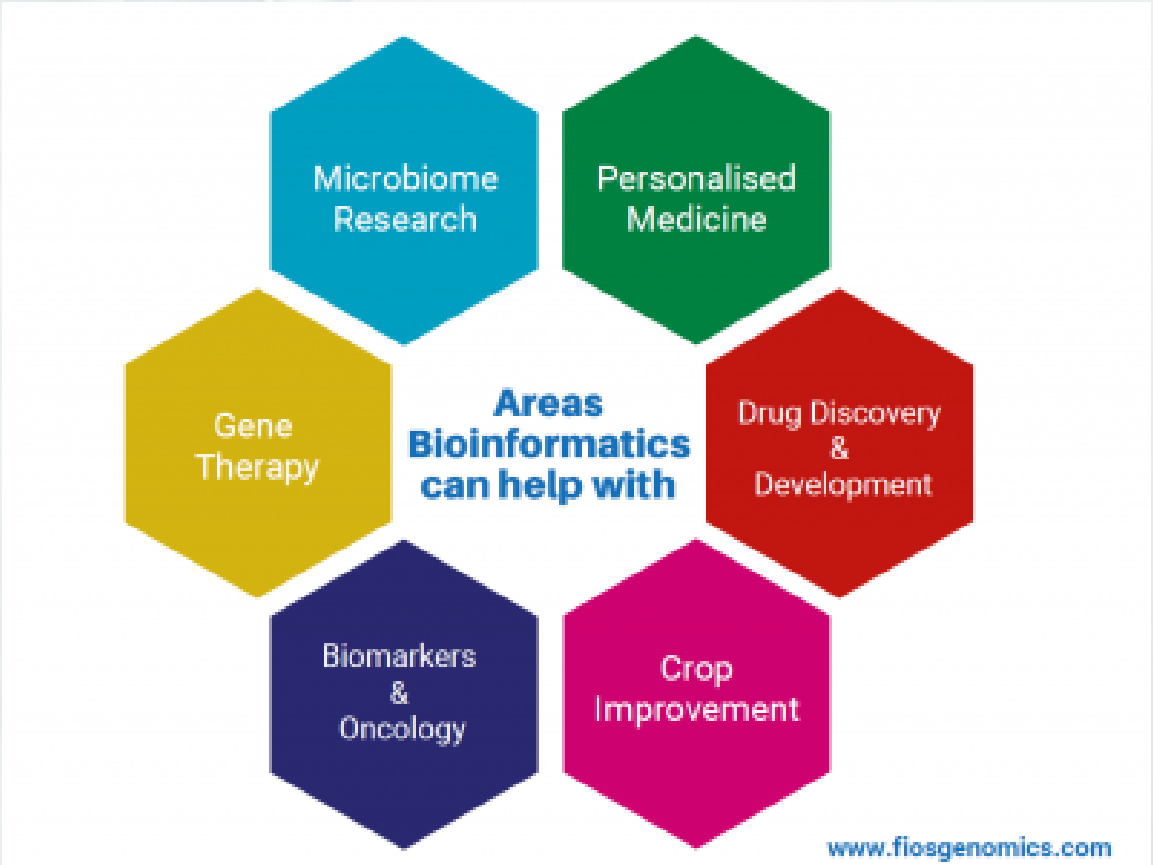

Crop improvement help to produce stronger, more drought, disease and insect resistant crops.

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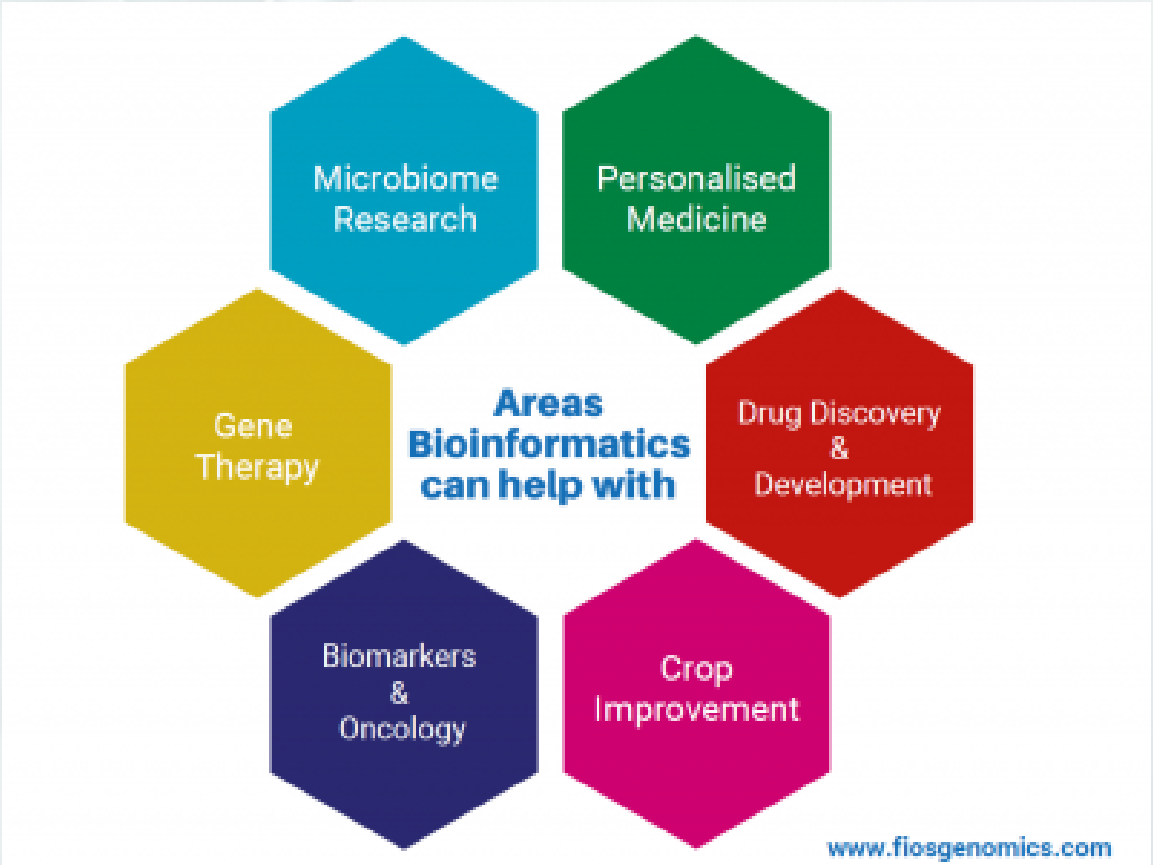

Biomarkers & oncology could be used as screening/early detection tool of cancer diagnostic and prognostic.

Figure: Areas Bioinformaics can help with.

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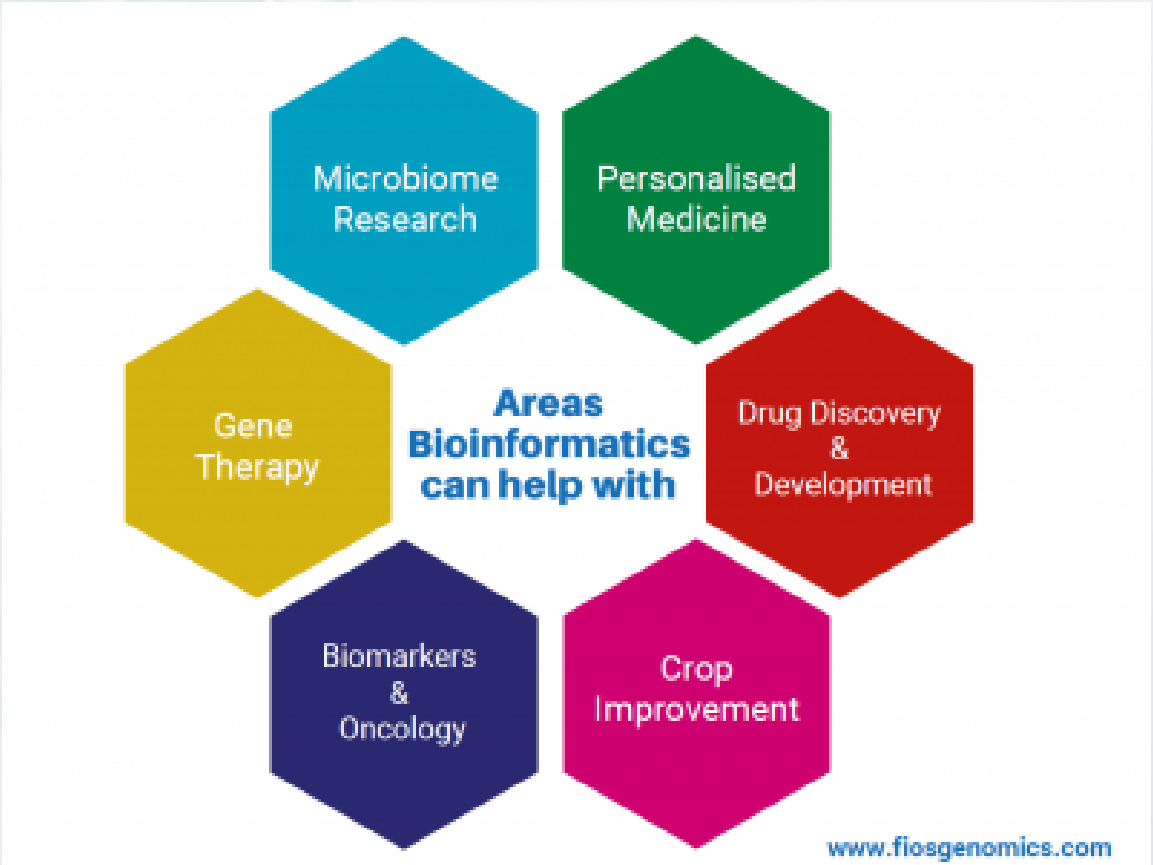

Gene therapy is an experimental technique that uses genes to treat or prevent disease. In the future, this technique could insert a gene into a patient's cells instead of using drugs or surgery.

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Pre-requisites

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- Molecular biology knowledge.

Goals

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Short-term

- Redact a poster.

Methodology

- Meetings each week **(Thursdays 8:45 pm).**

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- At the beginning, the professor will teach the key concepts.
- Make groups on different topics.

References I

[1] N. M. Luscombe, D. Greenbaum, and M. Gerstein, “What is bioinformatics? a proposed definition and overview of the field,” *Methods of information in medicine*, vol. 40, no. 04, pp. 346–358, 2001.

[2] J. Xiong, *Essential bioinformatics*. Cambridge University Press, 2006.

Thank you