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IFTM University, Moradabad, Uttar Pradesh

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PERSONALIZED MEDICINE

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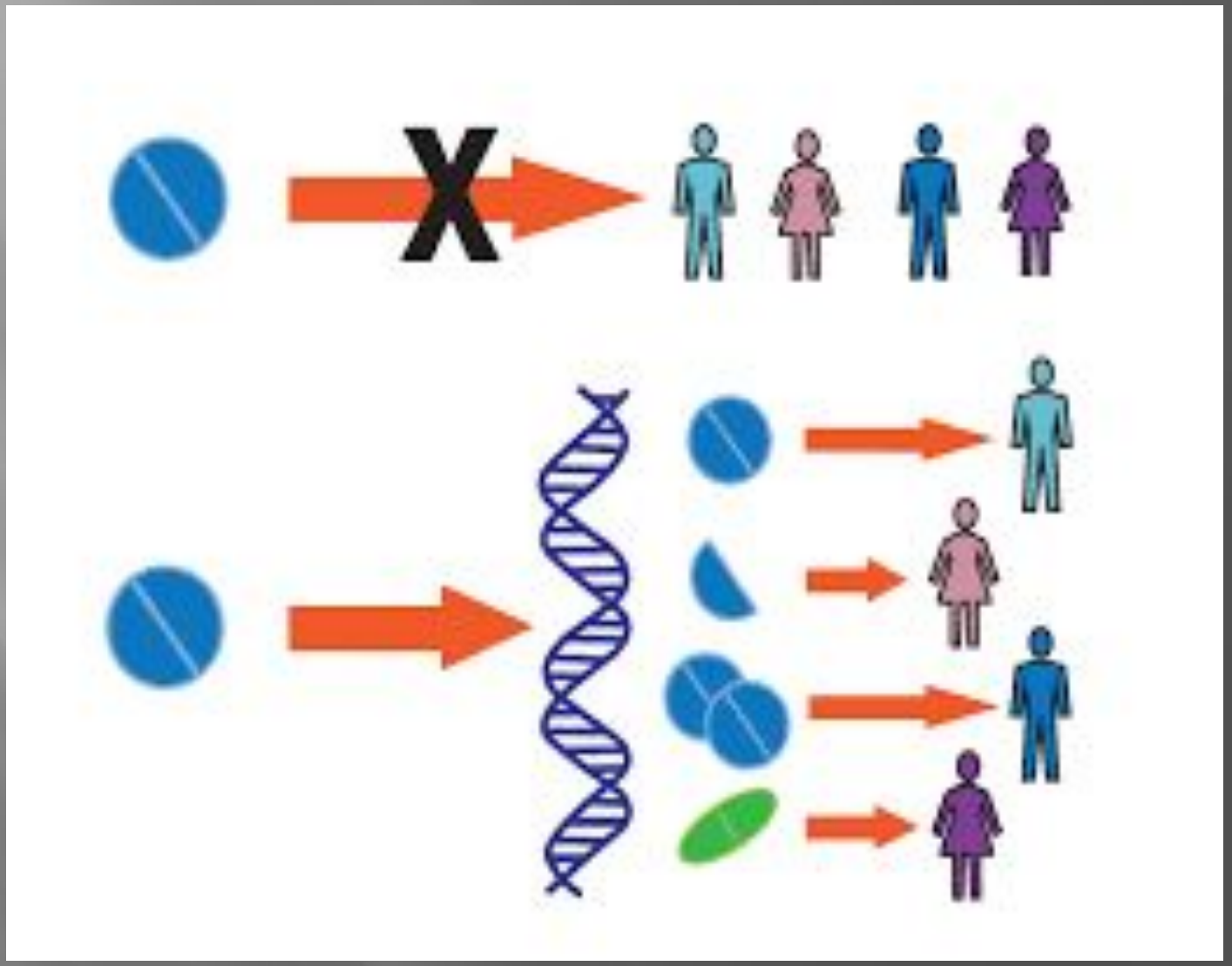
Introduction

- The concept of personalized medicines date back hundred of years .
- Development in chemistry ,histochemistry ,and microscopy allowed scientist to begin to understand the underlying causes of disease.
- Personalized medicine (PM) has the potential to tailor therapy with the best response and highest safety margin to ensure better patient care. By enabling each patient to receive earlier diagnoses, risk assessments, and optimal treatments, PM holds promise for improving health care while also lowering costs.



Definition

- The term “personalized medicine” is often described as providing “the right patient with the right drug at the right dose at the right time”.

- More broadly “personalized medicine” may be thought of as the tailoring medical treatment to the individual characteristics, needs and preferences of a patient during all stages of care ,including prevention ,diagnosis, treatments.

Need for personalized medicine

- Similar symptoms but different illness
- Medical interventions may work in some people but not in others
- Advances in genomics helps to treat a patient precisely and effectively
- To avoid any allergic and adverse effect

Pharmacogenetics

- Pharmacogenetics involves the search for genetic variations that lead to inter individual difference in drug response.

- The goals of pharmacogenetics are to optimize drug therapy and limit drug toxicity based on an individual's genetic profile. Thus, pharmacogenetics aims to use genetic information to choose a drug, drug dose, and treatment duration that will have the greatest likelihood for achieving therapeutic outcomes with the least potential for harm in a given patient.

Personalized medicine for cancer

- Personalized medicine for breast cancer is an approach to diagnosis, treatment and prevention that takes into account the genes you're born with (your genetic makeup) and the genes or others markers present within the cancer cells.

- With this approach, your blood or tumour tissue is collected for analysis, often genetic. The information may help predict or diagnose disease and guide treatment decisions.

- For example, cells from a breast tumor may be tested to determine whether they produce too much of a protein called HER2. Someone with HER2-positive breast cancer is likely to respond to the drugs that target that protein.

- Some genetic tests will reveal whether your body will turn on (activate) certain medications thus helping to determine which treatment may be best for you.

- Personalized medicine for breast cancer may involve analyzing the genetic makeup of your cells or, if you have cancer, the makeup of your cancer cells. Tests might include

Drug–gene testing

Genes may influence the way your body processes medications, including those used to treat breast cancer. doctor may use information from a genetic test of your cells to determine which medications and dosages are most appropriate for you. The field of drug-gene interactions is called pharmacogenomics.

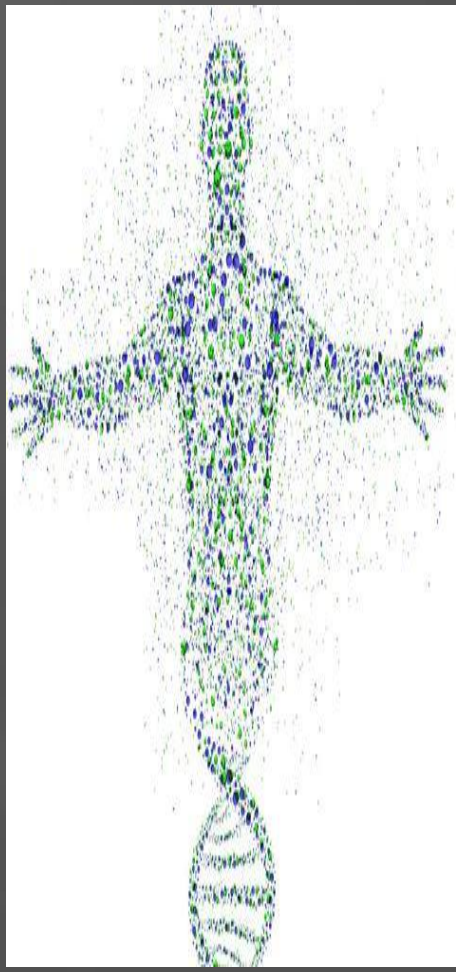
Advance cancer

- If cancer progresses despite treatment, doctor might recommend testing the genetic makeup of cancer cells.

- This test, called tumor sequencing, is used to look for changes or alterations in the cancer so that doctor can choose the best drug for type of tumor.

Family history

- Genetic testing for inherited gene mutations that increase your risk of breast cancer, such as the BRCA (breast cancer)gene, is offered to people with a strong family history of the disease. Women who have these genes have an increased risk of developing breast cancer compared with the general population. This same test can also be used to determine if you would respond to a specific drug for the treatment of metastatic breast cancer (Parp inhibitor). Other, newer genetic tests may be available, too, depending on a person's family cancer history.



Personalized cancer vaccines

- Personalized cancer vaccines can be patient specific or antigen specific examples are given below:

- **Patient specific cancer vaccines**

  This approach may generate an antigen specific response even when the tumor antigens are not known . A cell therapy product is created using a technique that fuses the patients own tumor cells with powerful, immune-stimulating dendritic cells (DC). The fusion product is then injected back into the patient

the goal of sparking a specific immune response against with the cancer

Antigen –specific vaccine

- If genes are identified in the majority of all cancers ,a more universal approach to cancer vaccines are considered. success with these strategies will greatly depend on whether it is possible to induce robust immunity against antigens identified .

- To create this vaccine ,the antigen bearing tumor cells are fused to antibody –producing mouse cells that act as small factories .

churning out large quantities of the protein antigens which are then given back to the patients with an immune system booster . The vaccine induces an immune response against the cancerous cells.

Thank you