Tumor markers

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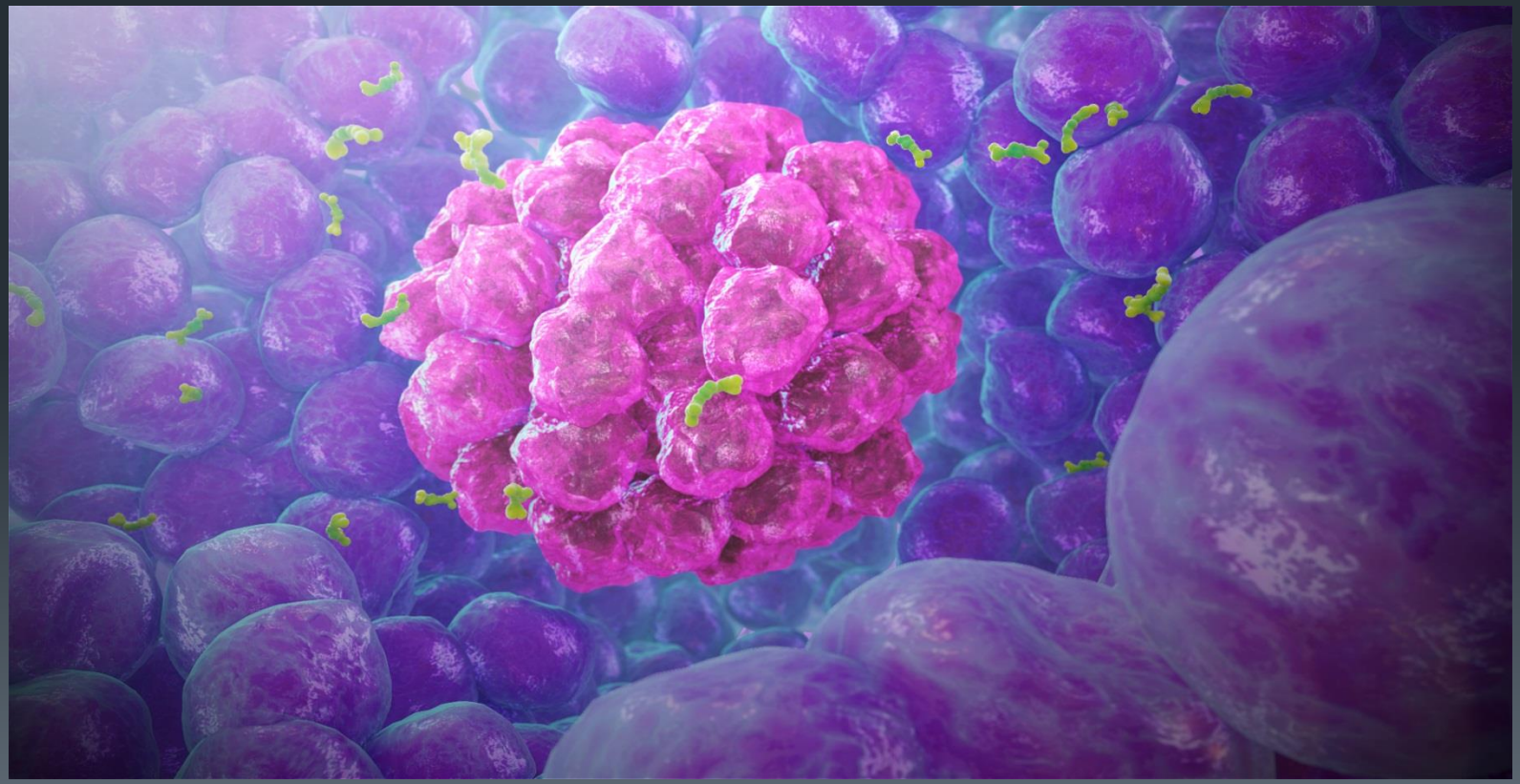


Tumor Markers

- Tumor : a swelling of a part of the body, generally without inflammation, caused by an abnormal growth of tissue, whether benign or malignant.
- **Benign tumor**

Limited in their growth .

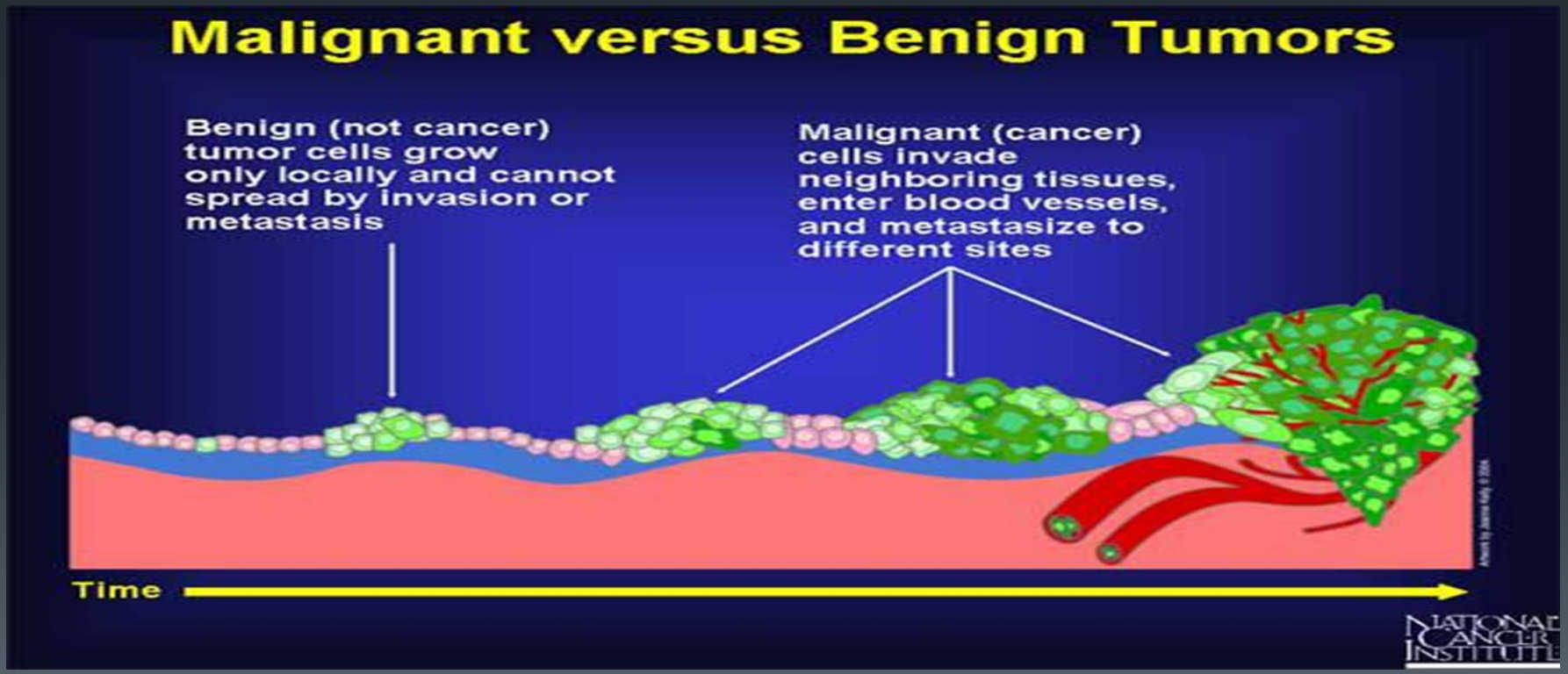
Do not invade or metastasis .

- **Malignant tumor (Cancer)**

Spread from the original site and cause secondary tumor

Tumor Markers

- Difference between benign and Malignant tumor :



charachteristics

Benign vs. Malignant Tumors

Benign	Malignant
Grow slowly	Grow rapidly
Well-defined capsule	Not encapsulated
Not invasive	Invasive
Well differentiated	Poorly differentiated
Low mitotic index	High mitotic index
Do not metastasize	Can spread distantly (metastasis)

Tumor Markers

- Tumor markers are substances, usually proteins, that are produced by the body in response to cancer growth or by the cancer tissue itself and that may be detected in blood, urine, or tissue samples .
- Some tumor markers are specific for a particular type of cancer, while others are seen in several cancer types. Most of the well-known markers may also be elevated in non-cancerous conditions. Consequently, tumor markers alone are not diagnostic for cancer

Types of tumor markers

- **Enzymes**

Enzymes	Type of cancer
Alkaline phosphatase	Bone, leukemia
Amylase	Pancreas
γ-Glutamyltransferase	Liver
Lactate dehydrogenase	Liver, lymphomas, leukemia
Prostatic acid phosphatase	Prostate
Neuron specific enolase (NSE)	neuroblastoma

Types of tumor marker

- Hormones

Hormone	Type of cancer
Calcitonin	Medullary thyroid
Human chorionic gonadotropin (hCG)	Choriocarcinoma, testicular cancer
Prolactin	Pituitary adenoma

Types of tumor marker

- **Oncofetal Antigen**

Some of oncofetal proteins used as tumor marker:

Name	Type of cancer
α-Fetoprotein	Hepatocellular carcinoma
carcinoembryonic antigen	colon cancer

Note: In healthy adults, the serum AFP level is less than 10 μg /L. In addition to pregnancy,

Types of tumor marker

- **Carbohydrate Antigen**

Some of Carbohydrates antigens used as tumor marker.

Name	Type of cancer
• CA 15.3	Breast, ovarian, pancreatic, lung, colorectal
• CA 19.9	pancreas
• CA 125	Ovarian

Types of tumor marker

- **Proteins**

Proteins

several proteins have been proposed to be used as tumor markers as in the following table.

Name	Type of cancer
C-peptide	Insulinoma
Ferritin	Liver, lung, breast, leukemia
Bence jonse protein	Multiple myeloma,
B2M (Beta-2 microglobulin)	Multiple myeloma, and lymphomas
PSA (Prostate specific antigen)	Prostatic cancer

Genetic markers

- Oncogenes.
- Tumor suppressor genes.

oncogenes

- Oncogenes are involved in growth factor signaling pathways, thus amplification of the oncogene leads to abnormal cell growth

Oncogenes

Oncogenes are activated by dominant mutations, and associated with hematological malignancies such as leukemia.

Oncogenes are involved in growth factor signaling pathways, thus amplification of the oncogene leads to abnormal cell growth.

The level of expression in tissue appears to correlate with the stage or grade of the tumor.

Oncogene markers:

Oncogene	Function	Type of cancer
N-ras-mutation	Signal transduction	Acute myeloid leukemia, neuroblastoma
c-myc translocation	Transcription regulation	B and T cell lymphoma, lung cells
c-abl/bcr	Signal transduction	Chronic myelocytic leukemia
translocation N-myc	Transcription regulation	neuroendocrine

Tumor supressor genes

- The oncogenicity of suppressor genes is derived from loss rather than activation.
- Any mutation either deletion in suppressor genes or alterations in chromosomes (monosomy) lead to to high uncontrolled cell activity.
- Mutations in p53 apparently allow cells to move through the cell cycle and contribute to the autonomous growth of cancer.

Tumor suppressor genes

The suppressor genes have only been isolated from solid tumors.

The oncogenicity of suppressor genes is derived from loss rather than activation.

Any mutation either deletion in suppressor genes or alterations in chromosomes (monosomy) lead to high uncontrolled cell activity.

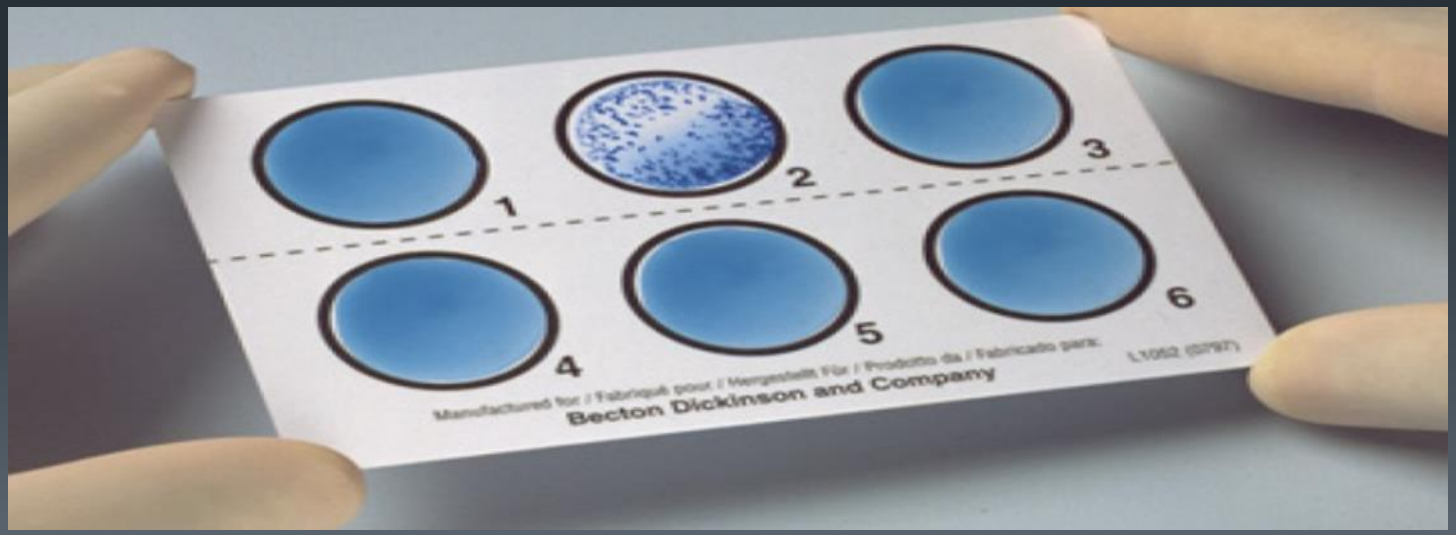
Suppressor gene markers.

Suppressor gene	Chromos	Type of
DCC (deleted colon carcinoma) RB (retinoblastoma) p53	18q 13q 17q	Colon, adenoma Eye Various

Note: Mutations in p53 apparently allow cells to move through the cell cycle and contribute to the autonomous growth of cancer.

Serology

- Scientific study of blood serum to diagnose the presence of antibodies in the serum which are typically formed in response to an infection or to one own proteins (in instances of autoimmune disease)



Antigen&Antibody

- Antigen :foreign substance such as bacteria and viruses ,they stimulate B Lymphocytes to produce Ab.
- Antibody :is protein made by B Lymphocytes .

Inflammatory disease disorders

1- Rheumatic fever

- ASOT(Anti- streptolysin o- test)
- CRP (C-Reactive protein)

2- Rheumatoid arthritis

- R F
- Anti-ccp

ASOT

- Anti-streptolysin O (ASO or ASLO) is the antibody made against streptolysin O.
- Anti-streptolysin O (ASO) is an antibody often found in the blood of people who have suffered a streptococcus infection. A blood test, known as the anti-streptolysin O titre, is sometimes used to test for the presence of this antibody in the blood. This test is considered useful because certain health conditions, such as rheumatic fever, usually only occur in people who have recently suffered or are suffering a streptococcus infection. While testing for anti-streptolysin O is not considered effective for diagnosing a specific illness, it can help doctors determine if a patient is suffering from a streptococci-related disease

ASOT

CRP(c- reactive protein)

- C-reactive protein is produced by the liver. The level of CRP rises when there is inflammation throughout the body. This article discusses the blood test done to measure the amount of CRP in your blood.

Rapid test (Ag Ab reaction)