

# NEOPLASTIC DISEASES

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## OBJECTIVE/RATIONAL

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Cancer is one of the most feared and dreaded of all diseases. The student will differentiate between normal and neoplastic tissues and know the terms associated with neoplastic diseases.

TEKS 121.15 4C, 4D, 6D

TAKS ELA 1, 4  
Science 1, 2, 3

National Science Education Standards A9-12; C9-12; F9-12; G9-12  
National Health Care Skills Standards .01, .07

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## KEY POINTS

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- I. Neoplasia - Literally means new cell growth
  - A. Non-Neoplastic cell growth - may appear tumor like but may be reversible if the cause is removed
    - 1. Hyperplasia –an abnormal increase in cell number without a significant alteration of structure or function
    - 2. Metaplasia –an abnormal increase in cells where one type of mature or differentiated cell is substituted for another type of mature cell.
    - 3. Dysplasia –cell growth in which cell uniformity is lost and polymorphism is exhibited. Normal orientation may also be lost. (Referred to as atypical cells.) May be a precancerous condition.
  - B. Neoplasm/Cancer
    - 1. the mass of cells that makes up the new growth
    - 2. may be referred to as a tumor.
    - 3. considered a parasitic abnormal mass of cells that grows progressively unless it is removed or controlled
- II. Types of neoplasms
  - A. Malignant
    - 1. Characterized by anaplastic cells
    - 2. Anaplasia is cell growth with more pleomorphism than in dysplasia and may exhibit a complete loss of cellular differentiation with an increase in the number of mitotic figures.
    - 3. Does not resemble the tissue of origin histologically
    - 4. Cells are poorly differentiated and the nuclei are pleomorphic.
    - 5. Mitosis is very irregular
    - 6. Fast-growing and invades the surrounding tissues
    - 7. Metastatic
    - 8. The external surface is usually irregular and unencapsulated.
    - 9. Not reversible
  - B. Benign
    - 1. No anaplastic cells are seen histologically

2. Cells are well differentiated with nuclei of normal size and shape
  3. Histologically resembles the tissue of origin
  4. Slow-growing and does not infiltrate the surrounding tissue (expansive).
  5. External surface is usually smooth and encapsulated.
  6. Not metastatic
  7. Not reversible
- III. Classification of neoplasma - Done on the basis of the tissue of origin
1. A. Carcinoma
    1. Most common
    2. tumors of epithelial origin of internal and external body surfaces
  - B. Sarcoma - tumors that arise from mesenchymial or connective tissues
  - C. Leukemias - neoplasms of blood and lymph
  - D. Others - Glioma, Melanoma
- IV. Staging and grading of cancer
- A. Staging is based on the size of the primary tumor, whether or not regional lymph nodes are involved, and if metastasis has occurred. TNM System
    1. T1, T2, T3, T4 – based on the size of the primary tumor
    2. N0, N1, N2, N3 indicates nodal progression
    3. M0 or M1 indicates metastasis
  - B. Grading is based on the degree of anaplasia and used to estimate the aggressiveness or degree of malignancy.
    1. Grade I – Cells are well differentiated and resemble the original tissue.
    2. Grade II & III – Cells are moderately or poorly differentiated
    3. Grade IV – Recognition of the original tissue is difficult because the tumor is so anaplastic.
- V. Effects
- A. local
    1. obstruction
    2. pain
    3. necrosis
  - B. systemic
    1. weight loss
    2. cachexia – tissue wasting
    3. anemia
    4. secondary infections
- VI. Etiology
- A. Life style
  - B. Carcinogens
  - C. Radiation
  - D. Random genetic alteration
  - E. Viral infections
- VII. Diagnosis
- A. Signs and symptoms
  - B. Radiographic studies
  - C. Biopsy and histological examination

- VIII. Treatment – curative or palliative
  - A. surgery
  - B. radiation
  - C. Chemotherapy
- IX. Prognosis
  - A. Type of tumor
  - B. Grade and stage
  - C. Initiation of treatment
  - D. Early detection

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**ACTIVITY**

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- I. Complete the **Neoplasm Laboratory Investigation**.

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**MATERIALS**

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Tamparo, Carol D. and Lewis Marcia A. *Diseases of the Human Body* 2<sup>nd</sup> Edition F.A. Davis Company 1995 ISBN # 0803690568

Damjanov, Ivan. *Pathology for the Health-Related Professions* 2000 W.B. Saunders Co. ISBN # 07216-8118-2

<http://edcenter.med.cornell.edu/Courseware/courseware.html>

Microscope

Prepared histology slides; hyperplasia, metaplasia, dysplasia and anaplasia

Prepared histology slides of normal tissues and organs. (Note: these slides should correspond to the abnormal slides.)

Prepared cytology slides; various structures showing cancerous tissues.(Provide at least two. One benign and one malignant)

Gloves

Laboratory coat or apron

Goggles

Biohazard containers

Surface disinfectant

Paper towels

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**ASSESSMENT**

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**Laboratory Investigation Rubric**

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**ACCOMODATIONS**

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For reinforcement, the student will review and repeat the laboratory investigation.

For enrichment, the student will contact the American Cancer Society, Texas Department of Health, and the Center for Disease Control to do an epidemiological study of the prevalence of cancer in their community.

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### **REFLECTIONS**

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## NEOPLASTIC LABORATORY INVESTIGATION

### **Purpose**

In this laboratory investigation, the student will differentiate between normal and neoplastic tissues and know the terms associated with neoplastic diseases.

### **Background Information:**

### **Materials:**

Microscope

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### **Procedure:**

1. Wash hands and put on gloves and goggles.
2. Assemble equipment and materials.
3. Prepare work area.
4. View the normal and abnormal slides.
5. Clean work area with surface disinfectant. Remove goggles and gloves and wash hands.

**Data:**

Draw and label observations

a. Non-neoplastic

b. Neoplastic

**Conclusion:**

1. Compare and contrast the normal tissue from the non-neoplastic tissue slides.

2. Compare and contrast the normal tissue from the neoplastic tissues.

