

MEDICINE

432 Team

35 Common Solid Tumors



Done By:
Rawan AlQuaiz

Reviewed By:
Naif alajji

جامعة
الملك سعود
King Saud University

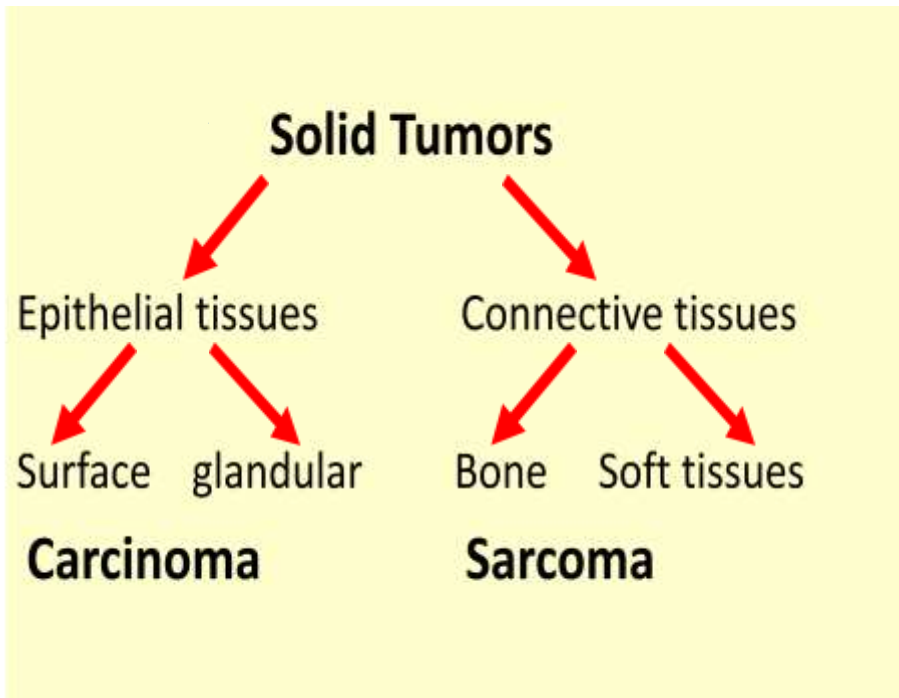


COLOR GUIDE: • Females' Notes • Males' Notes • Important • Additional

Objectives

1. Pathological classification and staging of solid tumors.
2. Common solid tumors worldwide and in Saudi Arabia.
3. Study of Two common solid tumors: breast cancer and colo-rectal cancer regarding:
 - *Risk factors*
 - *Clinical presentation*
 - *Early detection*
 - *Diagnostic tools*
 - *Broad lines of management*
 - *Prevention.*

Classification of common solid tumors:



Note(s):

- Surface epithelium tumors are classified according to the type of epithelium: transitional, squamous, columnar...etc

- Glandular epithelium:
*Malignant: adenocarcinoma
*Benign: adenoma

- Bone is a solid connective tissue.

Tumors are classified according to the presumed cell of origin. These types include:

- **Carcinoma:** Cancers derived from **epithelial cells**. This group includes many of the most common cancers, breast, prostate, lung, pancreas, and colon.
- **Sarcoma:** Cancers arising from **connective tissue** (i.e. bone, cartilage, fat, nerve), each of which develop from cells originating in mesenchymal cells outside the bone marrow.
- **Germ cell tumor:** Cancers derived from pluripotent cells, most often presenting in the testicle or the ovary (seminoma and dysgerminoma, respectively).
- **Blastoma:** Cancers derived from immature "precursor" cells or embryonic tissue. These are also **most common in children**. Blastoma as a suffix, with the Latin or Greek word for the organ or tissue of origin as the root. *Example: hepatoblastoma, neuroblastoma.*
- Some types of cancer are named for the size and shape of the cells under a microscope, such as giant cell carcinoma, spindle cell carcinoma, and small cell carcinoma.

General staging of solid malignancies:

- **Early stage:** *local ± Systemic treatment*
- **Locally advanced stage:** *both local and systemic treatment.*
- **Late stage (metastases):** *systemic ± local treatment.*

Note(s):

- *In the early stage, if micrometastasis is present we give local as well as systemic treatment (chemotherapy).*
- *Local treatment includes: radiotherapy and surgery.*
- *Systemic treatment: chemotherapy or others: biological, hormonal...etc.*

Common solid tumors in USA and KSA:

In the US, the three most common cancers are:

- **Males:**
 1. Prostate cancer
 2. Lung and bronchial cancer
 3. Colorectal carcinoma
- **Females:**
 1. Breast cancer
 2. Lung and bronchial cancer
 3. Colorectal carcinoma

In KSA, the three most common cancers are:

- **Males:**
 1. Colorectal carcinoma
 2. Non-Hodgkin's lymphoma
 3. Leukemia
- **Females:**
 1. Breast cancer
 2. Thyroid cancer
 3. Colorectal carcinoma

Note(s):

.....
 - Colorectal cancer is one of the most common types of cancer in KSA, because it is believed that the change in dietary habits (high fat & low fiber diet) → will lead to constipation and stasis of the waste → more time for the normal flora to work on the waste especially the fat & the fat remnants → carcinogenic materials are produced.

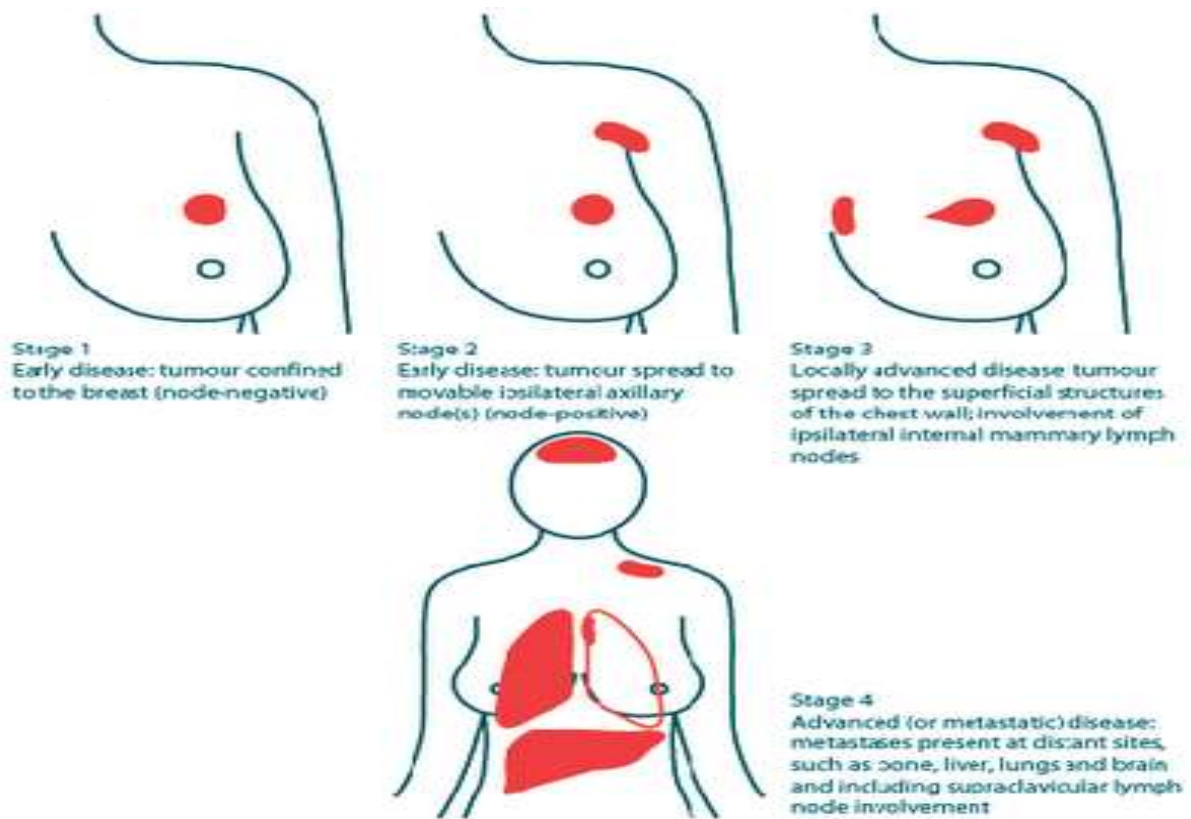
- Low fiber diet and other risk factors such as genetic predisposition (growth inhibitory factor deficiency) → high risk of colorectal cancer.

Breast cancer:

- *Breast cancer is a common malignancy but not a common disease.*
- *1st most common cancer in females.*
- *2nd most common cancer in general.*
- *2nd leading cause of death.*
- *Average age of incidence in western countries is mid 50's.*
- *Average age of incidence in Saudi Arabia is mid 40's.*
- *Wide age range 20 - +70y.*
- *Breast cancer can occur during pregnancy and during lactation.*
- *Breast cancer can occur in pre, peri and postmenopausal females.*

Risk factors of breast cancer:

- *History of breast cancer in one breast is a risk factor for cancer of the other breast.*
- *Family history of breast cancer, especially in first-degree relatives.*
- *Benign breast diseases / atypical hyperplasia.*
- *Radiation (Hodgkin's disease) "radiation of the mediastinal lymph nodes"*
- *Estrogen exposure: "The most imp. growth factor for breast tissue is estrogen, so an increase in estrogen exposure (endogenously/exogenously) is a risk factor for breast cancer"*
 1. *Early menarche, late menopause.*
 2. *Late first pregnancy/no pregnancy.*
 3. *Exogenous estrogen (hormonal replacement therapy).*
- *Genetic mutations:*
 1. *BRCA genes: are pro-oncogenes that function as DNA repair genes, but when they become mutated → turn into oncogenes. BRCA gene mutations → risk factor for both ovarian and breast cancer.*
 2. *p53: is a tumor suppressor gene → when it becomes mutated → inactivated.*

Breast cancer staging:**Note(s):**

- Breast cancer survival by stage:

- 1) Stage I: 5-year survival rate 90%.
- 2) Stage III: survival rate drops down to 50%.
- 3) Stage IV: survival is <10%.

Examples of general staging of cancer:

- Lung cancer:

- 1) Early stage → lesion in the lung
- 2) Locally advanced → big lesion in the lung and the draining lymph nodes.
- 3) Late stage (metastatic) → involvement of other organs and distant lymph nodes.

Each type of tumor has specific predilection to an area. For example:

- 1) Breast cancer usually metastasizes to the bone.
- 2) Colon cancer → liver.
- 3) Sarcoma → lung.

- Type of metastasis:

- 1) Sarcoma → mainly hematogenous spread.
- 2) Carcinoma → mainly lymphatic spread.

Screening for breast cancer:

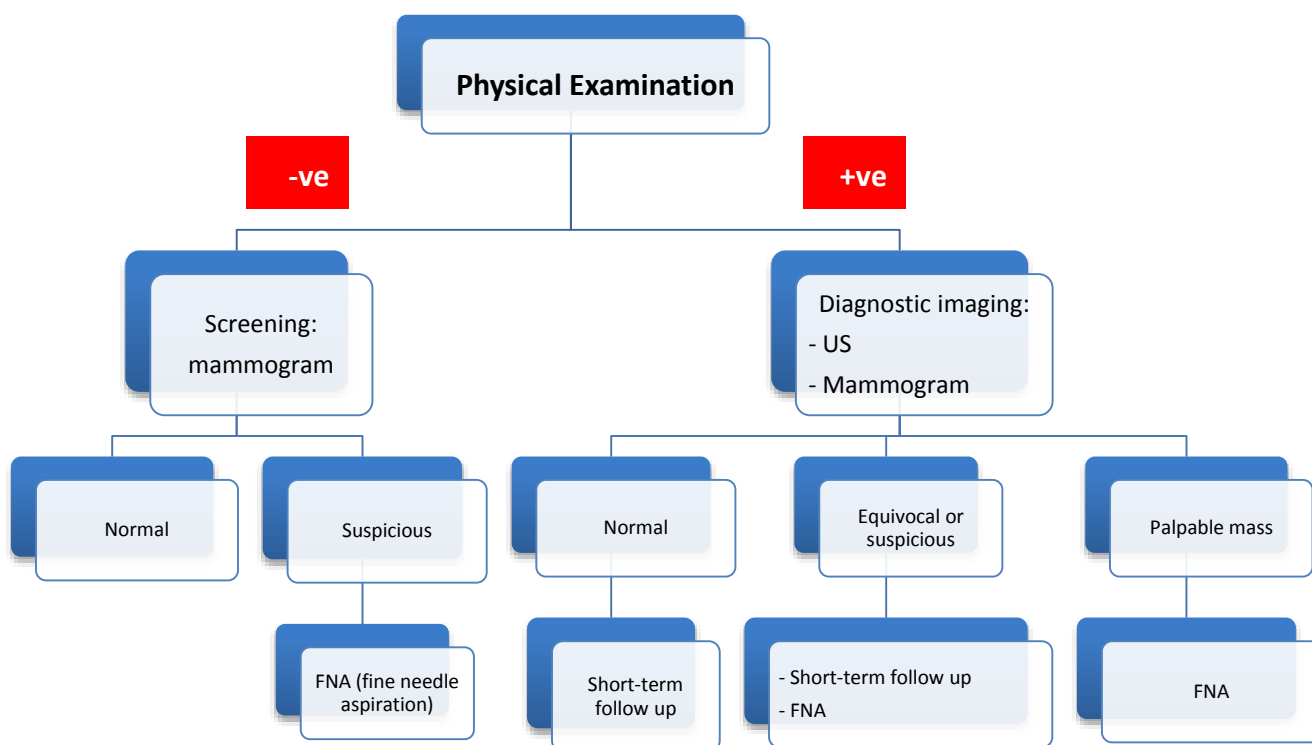
- Mammograms.
- Self-awareness (Monthly Self Exams) (BSE).

If you suspect breast cancer:

- Do not just reassure the patient.
- Do not give hormonal therapy.
- Do not give antibiotics.
- You should take careful history and physical examination.

Warning signs and symptoms:

- Painless lump or thickening (can be painful).
- Thickening or swelling that persists.
- Nipple pain or retraction.
- Nipple discharge.
- Breast skin irritation or dimpling.



Note(s):

.....
During physical examination of the breast:

- *Inspect both breasts: for any apparent masses, skin changes, nipple retraction or discharge...etc.*
- *When you palpate, always start with the normal side then the effected side and make sure to examine the axilla on both sides and the supraclavicular lymph nodes.*

Treatment:

- **Local therapy:**
 - 1) Surgery
 - 2) Radiotherapy
- **Systemic therapy:**
 - 1) Chemotherapy
 - 2) Hormonal therapy
 - 3) Biological therapy

Colon cancer:

- *The Colon is a long, coiled, tubular digestive tract.*
- *It basically acts as a waste processor.*
- *Takes digested food in the form of Solid waste pushing it out of the rectum and anus.*
- *The Colorectal tube is a prime location for the development and growth of small polyps or tumors.*
- *Colon cancer starts with a simple cell that mutates and grows into a polyp.*
- *If a polyp is allowed to remain in the colon it can grow into a cancerous tumor that can invade other organs.*
- *Colon cancer is the second leading cause of cancer deaths.*

Risk factors:

- **Older age:** *About 90 percent of people diagnosed with colon cancer are older than 50. Colon cancer can occur in younger people, but it occurs much less frequently.*
- **A personal history of colorectal cancer or polyps:** *If you've already had colon cancer or adenomatous polyps, you have a greater risk of colon cancer in the future.*

- **Inflammatory intestinal conditions:** *ulcerative colitis and Crohn's disease can increase your risk of colon cancer.*
- **Inherited syndromes that increase colon cancer risk:** *familial adenomatous polyposis and hereditary nonpolyposis colorectal cancer, which is also known as Lynch syndrome.*
- **Family history of colon cancer and colon polyps:** *You're more likely to develop colon cancer if you have a parent, sibling or child with the disease. If more than one family member has colon cancer or rectal cancer, your risk is even greater.*
- **Low-fiber, high-fat diet.**
- **Sedentary lifestyle.**
- **Diabetes:** *insulin resistance may have an increased risk of colon cancer.*
- **Obesity.**
- **Smoking:** *People who smoke cigarettes may have an increased risk of colon cancer.*
- **Alcohol:** *Heavy use of alcohol may increase your risk of colon cancer.*
- **Radiation therapy for cancer.**

Symptoms of colon cancer:

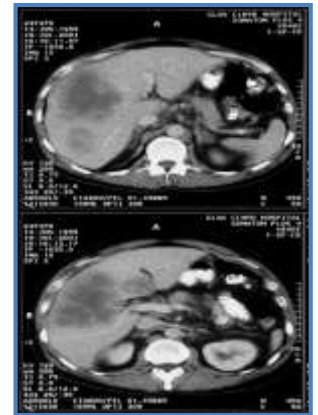
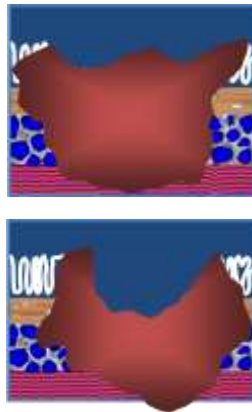
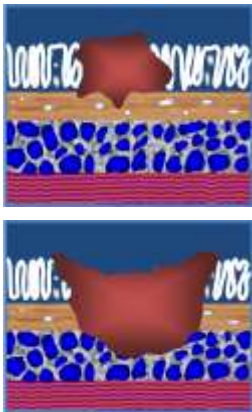
- *A change in bowel habits, including diarrhea or constipation or a change in the consistency of your stool.*
- *Rectal bleeding or blood in your stool.*
- *Persistent abdominal discomfort, such as cramps, gas or pain.*
- *A feeling that your bowel doesn't empty completely "tenesmus".*
- *Weakness or fatigue.*
- *Unexplained weight loss.*
- *Unexplained Fatigue*
- *Unexplained iron deficiency anemia*
- *Obstruction by the tumor → constipation → further obstruction.*

Note(s):

..... Case Scenarios:

- 1) *A male above the age of 55, presented with unexplained anemia → think of colon cancer.*
- 2) *A male above the age of 65 who was diagnosed recently with type 1 diabetes → think of pancreatic cancer.*
- 3) *A 60 year old female patient started to have menstrual bleeding again → endometrial cancer.*

Colon cancer staging:



Stage I

Tumor confined to the wall “glandular epithelium” with no invasion.

Stage II

Tumor goes beyond the wall.

Stage III

Nodal involvement.

Stage IV

*Metastasis
“To the liver”.*

5-year survival = 90%	60-80%	30-60%	< 5%
------------------------------	---------------	---------------	----------------

Early detection of colon cancer:

- 1) Colonoscopy
 - 2) Better imaging
 - 3) Better public and physician awareness.
- More cases are diagnosed at earlier stage of disease.

Different Strategies for Cancer Prevention:

1) Passive prevention:

Discover etiological factors → avoid these factors.

Examples:

- For lung cancer → avoid smoking and exposure to asbestos.
- For breast cancer → avoid obesity/weight gain as an adult, estrogen/progesterone use and alcohol use.
- General health maintenance → healthy diet and exercise, avoid smoking and drinking.

- However, primary prevention is not an easy task because social change is difficult and takes a long time. Also, sometimes it's not good enough in high-risk people.

2) Active prevention:

Discover pre-malignant lesions → get rid of them before developing invasive cancer.

Examples:

- In colon cancer → detect polyps and perform colectomy.
- In breast cancer → ductal carcinoma in-situ (DCIS).
- Eliminate or prevent pre-invasive disease before invasion develops using chemoprevention and surgery.

SUMMARY

- Solid tumors are classified according to the type of tissue:
 - 1) Malignancies arising from the parenchymal (epithelial) tissue → carcinomas.
 - 2) Malignancies arising from the mesenchymal (connective) tissue → sarcomas.
- Important genetic mutations in breast cancer include: BRCA and p53 genes.
- Suspecting breast cancer is one of the most important steps in diagnosing early breast cancer.
- If you suspect breast cancer → take careful history & examination, perform bilateral mammogram and breast US ± Fine needle aspiration
- In colon cancer → low fiber diet → constipation and stasis of the waste → more time for the normal flora to digest fat and fat remnants → carcinogenic material is produced.
- To improve patients prognosis:
 - 1) Early diagnosis.
 - 2) Early and proper intervention.
- There are two types of cancer prevention:
 - 1) Primary prevention.
 - 2) Secondary prevention.

Approach to Breast Cancer and Colorectal Cancer

Breast Cancer	Colorectal Cancer
DIFFERENTIAL DIAGNOSIS OF THE MASS	
<ul style="list-style-type: none"> • BENIGN: cysts (obstructed collecting ducts), fibroadenoma (overgrowth of periductal stromal connective tissue within the lobules), mammary duct ectasia, intraductal papilloma, mastitis, fat necrosis • ATYPICAL HYPERPLASIA: 3-5x increased risk of breast cancer • CARCINOMA IN SITU: ductal (DCIS), lobular (LCIS) • MALIGNANT: breast cancer (see below for details) 	<ul style="list-style-type: none"> • ADENOCARCINOMA: mucinous subtype, signet ring cells, adenosquamous, medullary. • CARCINOID: mostly involving appendix and rectum, less malignant. • RARE: squamous cell, small cell, undifferentiated. • ADENOMATOUS POLYP: pre malignant.
CLINICAL FEATURES	
<p>RATIONAL CLINICAL EXAMINATION SERIES: DOES THIS PATIENT HAVE BREAST CANCER? PHYSICAL: the value of inspection is unproved. Palpation with clinical breast examination (CBE) includes proper positioning of the patient, use of a vertical strip pattern, proper position and movement of the fingers (pads of 2nd to 4th fingers rolling motion), thoroughness of search, and spending at least 3 min per breast (sens 54%, spc 94%, LR+ 10.6, LR 0.47)</p> <p>APPROACH: “screening by both clinical breast examination and mammography is associated with decreased breast cancer mortality. Clinical breast examination alone detected between 3 45% of breast cancers that were missed by screening mammography. While clinical breast examination alone cannot rule out disease, the high specificity of certain abnormal findings significantly increases the probability of breast cancer”</p> <p>LOCOREGIONAL: breast lump (with or without pain), nipple discharge, eczema or retraction, skin erosion, erythema or edema, change in breast size, axillary adenopathy</p> <p>METASTATIC: bone pain, seizure, headache, dyspnea, jaundice</p> <p>CONSTITUTIONAL: fatigue, weight loss, anorexia</p>	<p>LOCAL: dysphagia (74%), odynophagia (17%), upper GI bleed, epigastric pain</p> <p>REGIONAL: dyspnea, cough, hoarseness, pain (ret rosternal, back, RUQ)</p> <p>METASTATIC: Virchow’s node, hepatomegaly, pleural effusion</p> <p>CONSTITUTIONAL: anorexia, fatigue, weight loss</p>

STAGING

STAGE GROUPINGS			STAGE GROUPINGS			
Stage	TNM @=any	5 Year survival	Stage	TNM (@=any)	Frequency	5 year survival
I	T1N0M0	100%	I	T1N0M0	15%	90%
IIA	T0 1N1M0, T2N0M0	90%	IIA	T3N0M0	} 20%	85%
IIB	T2N1M0, T3N0M0	80%	IIB	T4N0M0		70%
IIIA	T0 2N2M0, T3N1 2M0	70%	IIA	T1 2N1M0	} 40%	80%
IIIB	T4N0 2M0	50%	IIIB	T3 4N1M0		60%
IIIC	T@N3M0	40%	IIIC	T@N2M0		45%
IV	T@N@M1	20%	IV	T@N@M1	25%	5%

I made the approach simple because it is so long, so if you are not satisfied you could read *Approach to Internal Medicine*

Questions

- 1) A 55-year-old male is being evaluated for constipation. There is no history of prior gastrectomy or of upper GI symptoms. Hemoglobin is 10 g/dL, mean corpuscular volume (MCV) is 72 fL, serum iron is 4 µg/dL (normal is 50-150 µg/dL), iron-binding capacity is 450 µg/dL (normal is 250-370 µg/dL), saturation is 1% (normal is 20%-45%), and ferritin is 10 µg/L (normal is 15-400 µg/L). Which of the following is the best next step in the evaluation of this patient's anemia?
 - a. Red blood cell folate
 - b. Serum lead level
 - c. Colonoscopy
 - d. Bone marrow examination
 - e. Hemoglobin electrophoresis with A2 and F levels

- 2) A 47-year-old premenopausal woman of Mediterranean descent presents with a painless breast mass. Her mother underwent a mastectomy at age 74 because of breast cancer. Her sister has had ovarian cysts but no cancer. There is no other cancer in the family. Biopsy of the mass reveals infiltrating ductal carcinoma. The patient has two daughters and asks about genetic testing. What is the most likely cause of her malignancy?
- A germline mutation in the p53 suppressor gene
 - A germline mutation in the BRCA1 gene
 - A somatic mutation in the BRCA1 gene
 - Exposure to a carcinogen such as diethylstilbestrol in utero
 - Unknown



432 Medicine Team Leaders

Raghad Al Mutlaq & Abdulrahman Al Zahrani

For mistakes or feedback: medicine341@gmail.com

Answers

1) C

2) E