

# Pathology of Ovary & Fallopian tube

## Ovarian tumors

I

### Incidence

- ★ Ovarian cancer accounts for 3% of all cancers in females.
- ★ **Benign tumors** occur mostly in **young** women between (20-25 years old).
- ★ **Borderline tumors** occur at **slightly older ages**.
- ★ **Malignant tumors** are more common in **older women** (45-65 years old)

II

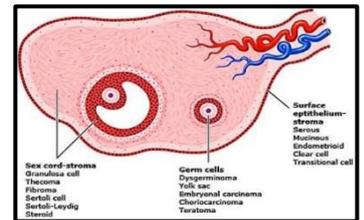
### Risk factors

- ★ Nulliparity
- ★ family history
- ★ Germline mutations in certain tumor suppressor genes (as BRCA 1 & 2)

III

### Origin

- ★ Tumors of the ovary are remarkably varied as they may arise from any of the three cell types in the normal ovary:



## Surface epithelial tumors

I

### Incidence

**Most common**, accounting for >90% of ovarian tumors.

II

### Origin

- ★ The most widely accepted theory for the origin of surface epithelial tumors is the transformation of coelomic epithelium.
- ★ This view is based on the embryologic pathway by which the müllerian ducts are formed from the coelomic epithelium, **and evolve into:**
  - ⊗ Serous (tubal) epithelium
  - ⊗ Endometrioid (endometrial) epithelium
  - ⊗ Mucinous (cervical) epithelium
- ★ These epithelial types are present in the normal female genital tract.

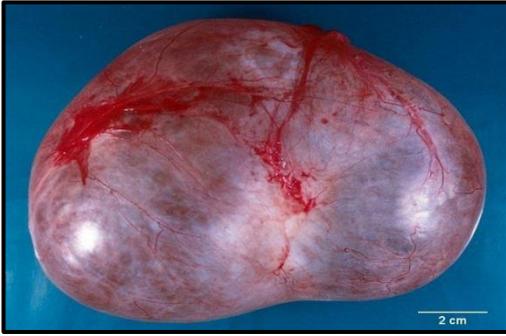
III

### Types

- A. Serous tumors
- B. Mucinous tumors
- C. Endometrioid tumors
- D. Others



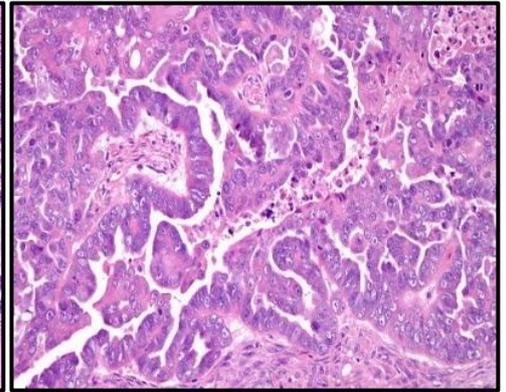
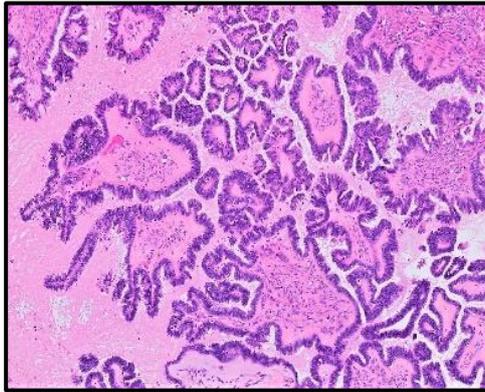
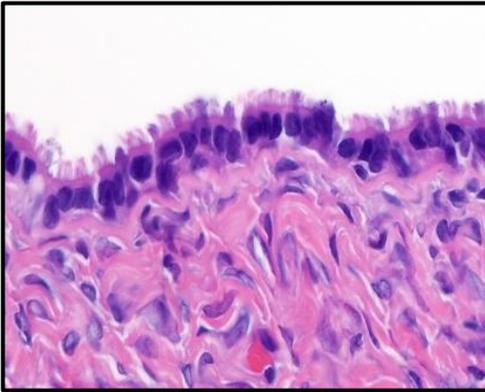
		A) Serous tumors	B) Mucinous tumors
<b>Incidence</b>		<ul style="list-style-type: none"> <li>★ <b>Prevalence:</b> Account for 30% of all ovarian tumors.</li> <li>★ <b>Age:</b> <ul style="list-style-type: none"> <li>⊗ Benign lesions are usually 30-40 years of age.</li> <li>⊗ malignant serous tumors more commonly seen 45-65 years of age.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>★ <b>Prevalence:</b> Account for 25% of all ovarian neoplasms.</li> <li>★ <b>Classification:</b> Only 10% are malignant; 10% are borderline, and 80% are benign.</li> <li>★ <b>Age:</b> Wide range with a mean age at diagnosis of 50 years.</li> <li>★ <b>Symptoms:</b> abdominal pain, distension, pelvic mass.</li> </ul>
<b>Pathogenesis</b>		<ul style="list-style-type: none"> <li>★ <b>The low-grade tumors</b> arise in serous borderline tumors with only rare mutations in p53 (tumor suppressor gene).</li> <li>★ <b>In contrast, the high-grade tumors have a high frequency of mutations in the p53.</b></li> </ul>	---
<b>N/E</b>	<b>Shape &amp; Structure</b>	Cystic lesion (cystadenoma)	<ul style="list-style-type: none"> <li>★ <b>Multiloculated cystic tumors</b> (mucinous cystadenoma)</li> <li>★ <b>Rupture of the cyst</b> may lead to pseudomyxoma peritonei, in most cases, this disorder is caused by metastatic spread of tumors in the gastrointestinal tract, <b>primarily the appendix</b></li> </ul>
	<b>Surface</b>	<ul style="list-style-type: none"> <li>★ <b>Cystadenomas:</b> Smooth surface</li> <li>★ <b>Cystadenocarcinomas:</b> Outer surface may show nodules and outward papillary projections</li> </ul>	---
	<b>C/S</b>	May reveal inter-cystic papillary projections (papillary cystadenoma)	---
	<b>Contents</b>	Serous fluid	Filled with sticky, gelatinous fluid
	<b>Distribution</b>	<b>Bilaterality</b> is common in serous tumors	Mucinous neoplasms tend more to be <b>unilateral</b> and larger
<b>M/E</b>	<b>Benign</b>	<ul style="list-style-type: none"> <li>★ <b>(serous cystadenoma):</b> Single layer of columnar epithelial cells lining the cyst or cysts; cells are often <b>ciliated</b>, occasionally forming microscopic papillae</li> </ul>	lined by tall columnar <b>non ciliated</b> epithelium with <b>apical mucin</b> similar to intestinal or cervical epithelium.
	<b>Malignant</b>	<ul style="list-style-type: none"> <li>★ Have multilayered epithelium with many papillae, solid areas and <b>stromal invasion</b>.</li> <li>★ <b>Psammoma bodies</b> (concentrically laminated calcified concretions) are commonly present.</li> </ul>	Usually show solid areas, necrosis and <b>stromal invasion</b> .
	<b>Borderline</b>	show some of features of carcinomas but without stromal invasion	



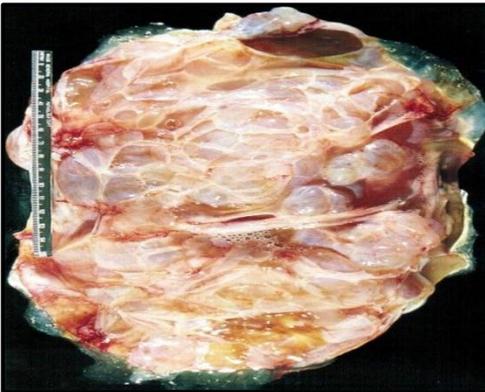
NE of serous cytadenoma



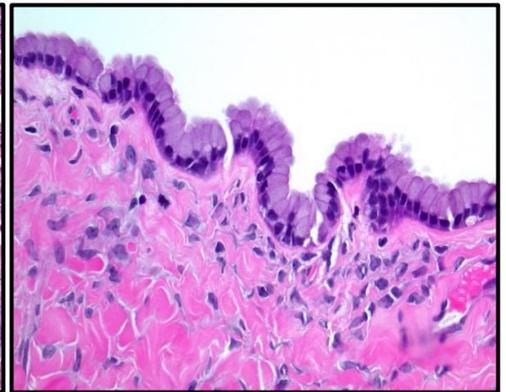
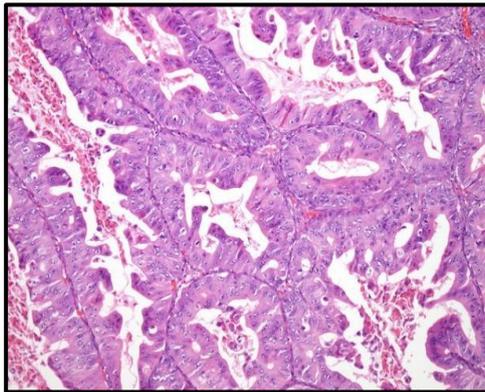
NE of papillary cystadenoma



ME of benign, borderline, malignant serous tumors



NE of mucinous tumors



ME of benign and malignant mucinous tumors

### C. Other tumors:

#### ★ Endometrioid tumors:

- ⊗ Most are malignant.
- ⊗ Many cases occur in the setting of concurrent endometriosis.

#### ★ Clear cell adenocarcinoma:

- ⊗ Uncommon, show cells with clear cytoplasm.

#### ★ Brenner's tumor:

- ⊗ Most are benign.
- ⊗ They consist of rounded islands of transitional epithelium embedded in dense fibrous stroma

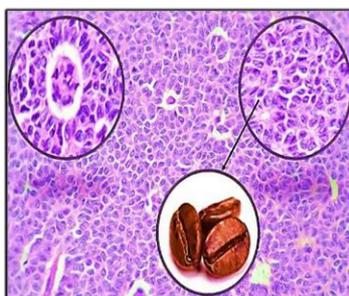


## Sex cord stromal tumors

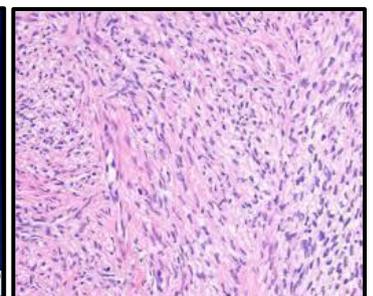
- ✦ **Normally**, the ovarian stroma, which is derived from the sex cords of the embryonic gonad differentiate into Sertoli and Leydig in male and granulosa and theca in female gonads
- ✦ **Tumors resembling** all these cell types can be identified in the ovary.
- ✦ **Clinical picture:**

Cells affected	Hormones secreted	Effect
granulosa and theca cells	Estrogen	feminizing
Leydig cell	androgens	masculinizing

	A) Granulosa cell tumor	B) Thecoma-fibroma
Incidence	<ul style="list-style-type: none"> <li>✦ 90% of all ovarian sex cord stromal tumors of low-grade malignancy.</li> <li>✦ <b>Age:</b> Menopausal women</li> </ul>	---
N/E	<b>C/S:</b> Well-circumscribed mass with solid and cystic areas, hemorrhage and necrosis	<b>Surface:</b> Solid yellow lobulated mass
M/E	Uniform ovoid cells with cleaved nucleus arranged in diffuse, trabecular or microfollicular pattern	Ovoid to spindle cells with cytoplasmic lipid vacuoles
Features	<b>C/P:</b> <ul style="list-style-type: none"> <li>⊗ Hyperestrogenism</li> <li>⊗ Associated endometrial hyperplasia</li> <li>⊗ Bleeding.</li> <li>⊗ Promotes breast cancer</li> </ul>	<ul style="list-style-type: none"> <li>✦ <b>Theca cell tumor (thecoma):</b> <ul style="list-style-type: none"> <li>⊗ Benign tumor, mostly mixed with fibroma (fibrothecoma).</li> <li>⊗ Mostly are hormonally inactive but, may secrete estrogen</li> </ul> </li> <li>✦ <b>Meig's syndrome:</b> Ovarian fibroma with hydrothorax and ascites.</li> </ul>



**NE and ME of granulosa cell tumor**



**NE and ME of thecoma-fibroma**



### C. Other Tumors:

- ★ **Origin:** These may be Sertoli cell tumor (secretes estrogen), Leydig cell tumor (secretes androgen) or a combination of them. The **majority are benign**.
- ★ **Mixed male and female differentiation (Gynandroblastoma):**
  - ⊗ Contain elements of granulosa, theca, Sertoli and Leydig tumors.
  - ⊗ It **produces both hormones**.

## Germ cell tumors

I

### Incidence & Types

- ★ **Incidence:** 30% of all primary ovarian neoplasms.
- ★ **Types:**
  - ⊗ >90% are **mature cystic teratomas** which are benign tumors.
  - ⊗ 5% are malignant.

II

### Classification

teratoma	<b>Mature</b>	It is usually cystic (dermoid cyst) and benign.
	<b>Immature</b>	It is predominantly solid and malignant.
	<b>Monodermal</b>	<ul style="list-style-type: none"> <li>★ <b>Characterized by:</b> one sided development.</li> <li>★ <b>Examples:</b> struma ovarii (only thyroid tissue) and some cases of mucinous cystadenoma (G.I.T. epithelium).</li> </ul>
<b>Dysgerminoma</b>	<ul style="list-style-type: none"> <li>★ <b>Incidence:</b> Uncommon malignant non-functioning neoplasm occurs in children and young adults.</li> <li>★ <b>M/E:</b> it is <b>similar to seminoma of testis</b> (Sheets or cords of large clear cells, Stroma may contain lymphocytes)</li> </ul>	
<b>Choriocarcinoma</b>	Differentiation towards trophoblasts. It <b>secretes HCG hormones</b>	
<b>Yolk sac tumor</b>	occur in children, adolescent and young adult, <b>secretes alpha fetoprotein</b>	
<b>Unclassified tumors</b>	Lymphomas, Hemangiomas, Lipomas, Leiomyomas, etc..	
<b>Metastatic tumors</b>	<ul style="list-style-type: none"> <li>★ <b>Distribution:</b> These tumors are usually <b>bilateral</b>.</li> <li>★ <b>They reach both ovaries by:</b> <b>Trans-coelomic spread</b>, Blood spread, Retrograde lymphatic spread, Direct spread</li> <li>★ <b>Sites of primary tumors include:</b> Uterus, GIT, Gall bladder, Pancreas, Lung</li> <li>★ <b>Krukenberg tumor (Mucinous adenocarcinoma):</b> <ul style="list-style-type: none"> <li>⊗ Bilateral ovarian secondaries</li> <li>⊗ Characterized by signet ring cells scattered in fibrous stroma</li> <li>⊗ Primary tumor is located in the G.I.T, <b>mainly the stomach</b></li> </ul> </li> </ul>	



## Non-Neoplastic Cysts of the Ovary

### Follicular cysts

- ★ **Incidence:** Extremely common finding.
- ★ **Size:** They are <2cm, lined by follicular cells, and filled with clear fluid.
- ★ **Origin:** They commonly originate in **unruptured** graafian follicles.

### Corpus luteum cysts

- ★ **Description:** **Dilatation** of degenerated corpus luteum.
- ★ **Number & content:** Usually single and filled with blood.

### Polycystic ovary (stein-leventhal syndrome)

- ★ **Incidence:** Affects women in reproductive age
- ★ **Distribution:** In the form of bilateral multiple small cystic follicles with cortical fibrosis.
- ★ **Clinical picture:** Oligomenorrhea, hirsutism and infertility.
- ★ **Cause:** The condition is related to disturbance in androgen synthesis

**N.B:** Sometimes these cysts rupture, producing intraperitoneal bleeding and peritoneal symptoms (acute abdomen).

## Diseases of Fallopian tubes

1. Suppurative salpingitis	<ul style="list-style-type: none"> <li>★ <b>Gonococcus</b> accounts for more than 60% of cases.</li> <li>★ These tubal infections are a part of pelvic inflammatory disease.</li> </ul>
2. Tuberculous salpingitis	It is an important cause of <b>infertility</b> .
3. Tumors	<ul style="list-style-type: none"> <li>★ Uncommon.</li> <li>★ Primary adenocarcinoma of the fallopian tubes is rare.</li> </ul>
4. Serous tubal intraepithelial carcinoma	Considered as a precursor lesion to most high grade serous tumors