Pathology

Ovary and fallopian tube

Learning Outcomes

By the end of the lecture, you will be able to:

1.Identify pathologic features of ovarian tumors (Pathogenesis, gross, microscopic picture and prognosis).

2.Identify common nonneoplastic cysts of the ovary.

3.Identify inflammatory and neoplastic lesions of the fallopian tubes.

Ovarian Tumors

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).

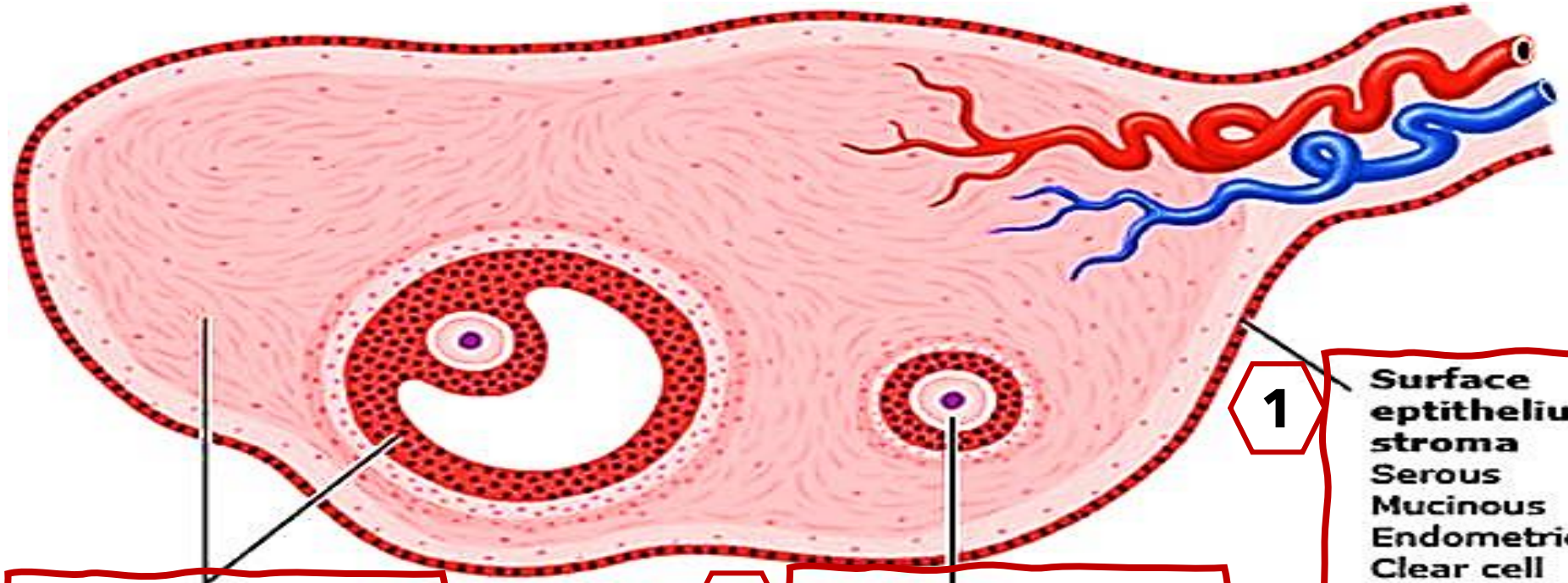
Risk factors:

- Nulliparity
- family history
- Germline mutations in certain tumor suppressor genes.

Ovarian Tumors

Origin:

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



1 **Surface eptithelium-stroma**
Serous
Mucinous
Endometrioid
Clear cell
Transitional cell

2 **Germ cells**
Dysgerminoma
Yolk sac
Embryonal carcinoma
Choriocarcinoma
Teratoma

3 **Sex cord-stroma**
Granulosa cell
Thecoma
Fibroma
Sertoli cell
Sertoli-Leydig
Steroid

Ovarian Tumors

1. Surface epithelial tumors

- **Most common**, accounting for **>90%** of ovarian tumors.
- 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), endometrioid (endometrial), and mucinous (cervical) epithelia present in the normal female genital tract.

Types:

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

Ovarian Tumors

1. Surface epithelial tumors

A. Serous tumors:

- They account for 30% of all ovarian neoplasms.

Age: Benign lesions are usually between 30 and 40 years of age, and malignant serous tumors are more commonly seen between 45 and 65 years of age.

Pathogenesis: The low-grade tumors arising in serous borderline tumors with only rare mutations in p53(tumor suppressor gene). In contrast, the high-grade tumors have a high frequency of mutations in the p53 gene.

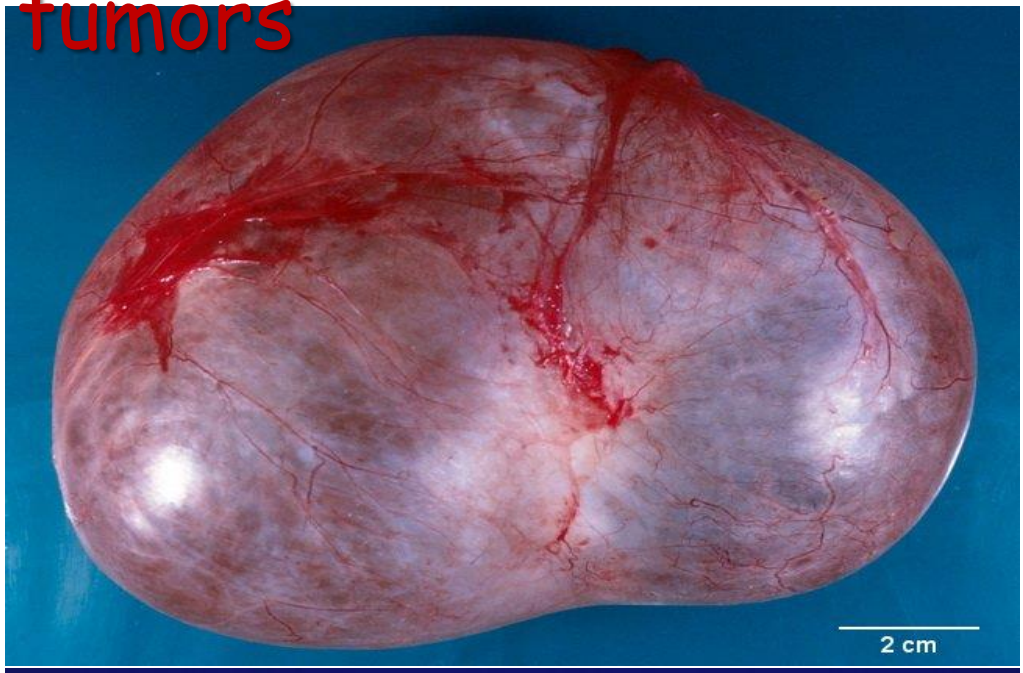
Ovarian Tumors

1. Surface epithelial tumors

A. Serous tumors:

N/E: They are cystic lesion (cystadenoma) with smooth surface and serous fluid contents. Intarcystic papillary projections may be present (papillary cystadenoma). The outer surface of cystadenocarcinomas may show, in addition, nodules and outward papillary projections.

- Bilaterality is common in serous tumors.



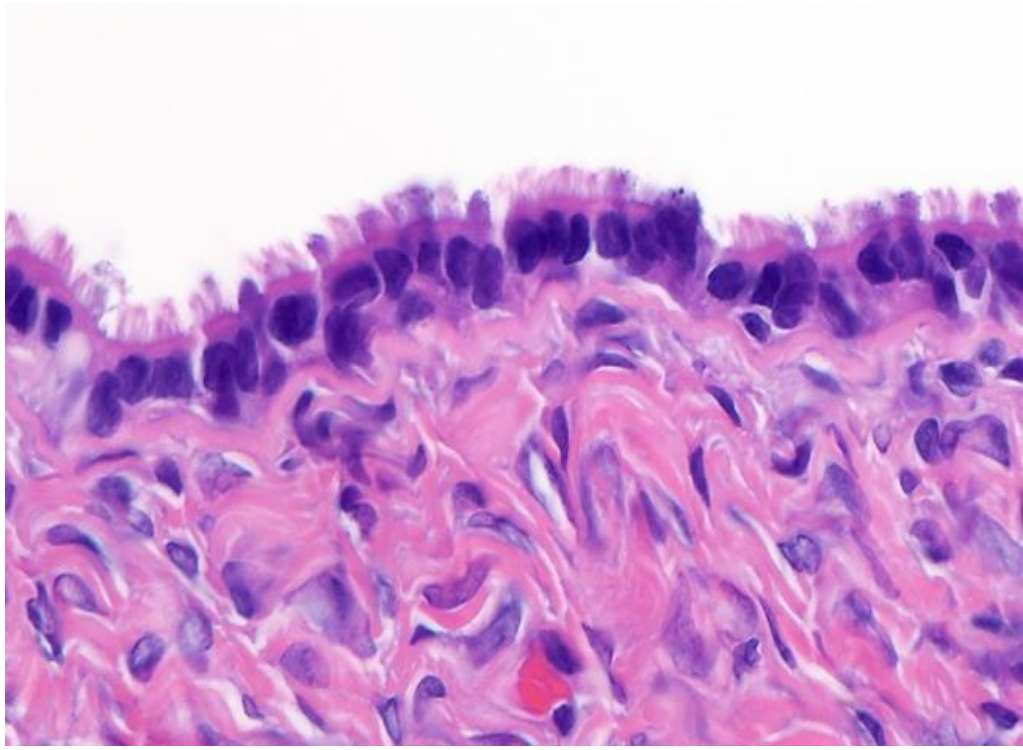
Ovarian Tumors

1. Surface epithelial tumors

A. Serous tumors:

M/E:

Benign tumors (serous cystadenoma) contain a single layer of columnar epithelial cells that line the cyst or cysts. The cells often are ciliated occasionally forming microscopic papillae.



Ovarian Tumors

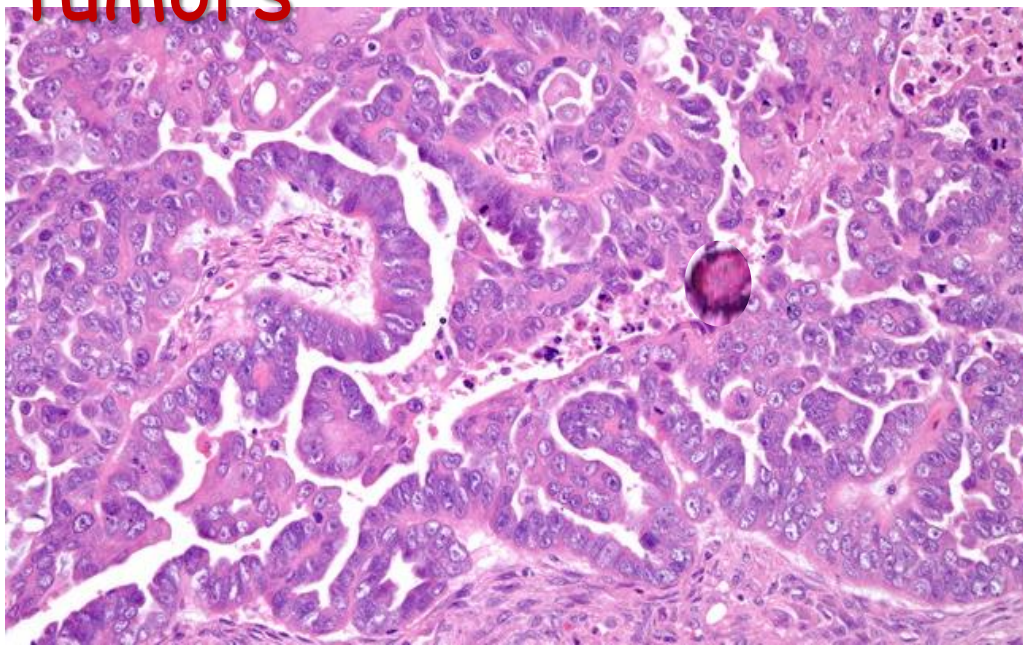
1. Surface epithelial tumors

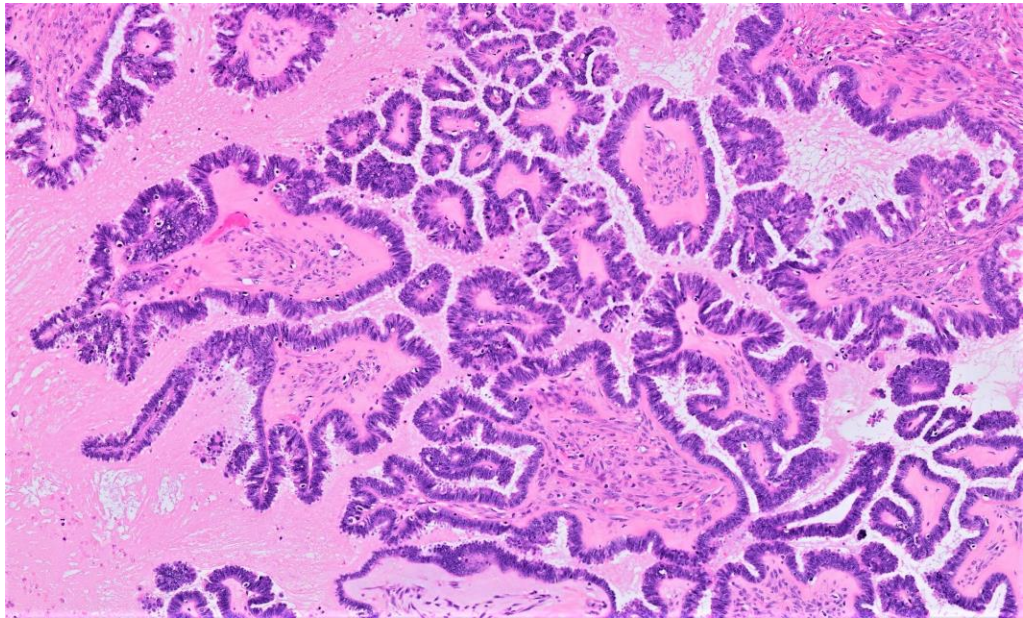
A. Serous tumors:

M/E:

Malignant tumors have multilayered epithelium with many papillae, solid areas and stromal invasion. Psammoma bodies (concentrically laminated calcified concretions) are commonly present.

Borderline tumors show some of features of carcinomas but without stromal invasion.





Ovarian Tumors

1. Surface epithelial tumors

B. Mucinous tumors:

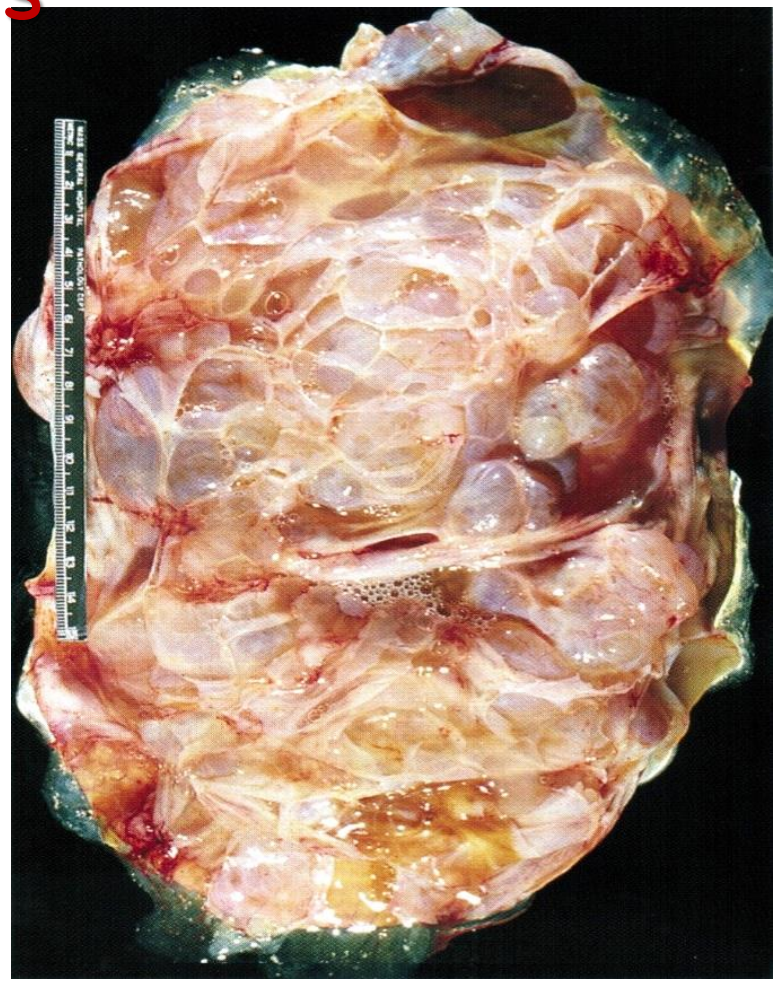
- They account for 25% of all ovarian neoplasms.
- Only 10% of mucinous tumors are malignant; another 10% are borderline, and 80% are benign.
- wide age range with a **mean age** at diagnosis of **50 years**.
- symptoms include **abdominal pain, distension, pelvic mass**.

Ovarian Tumors
1. Surface epithelial tumors

B. Mucinous tumors:

NE:

- Mucinous neplasms tends more to be unilateral and larger. They appear as multiloculated cystic tumors (mucinous cystadenoma) filled with sticky, gelatinous fluid.
- Rupture of the cyst may lead to pseudomyxoma peritonii, in most cases, this disorder is caused by metastatic spread of tumors in the gastrointestinal tract, primarily the appendix



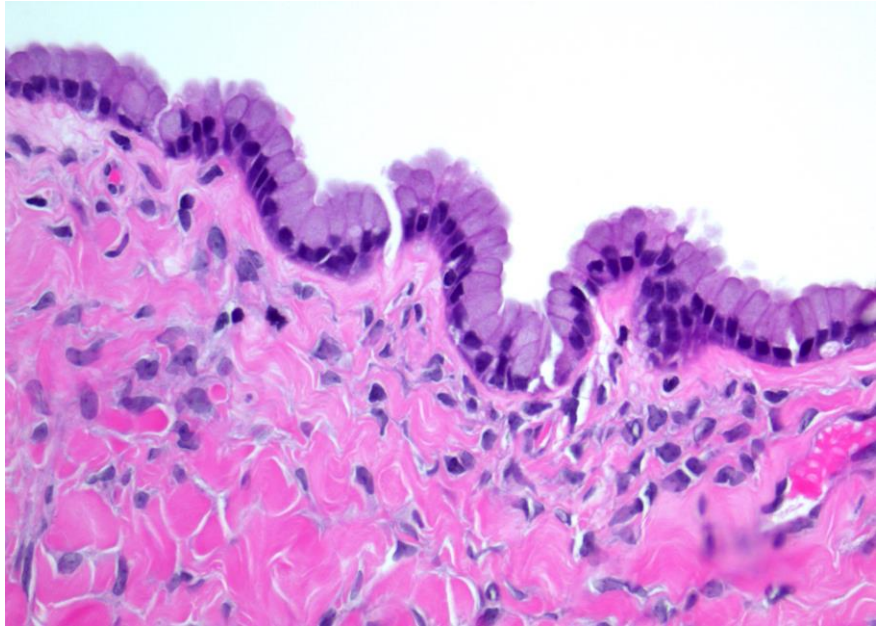
Ovarian Tumors

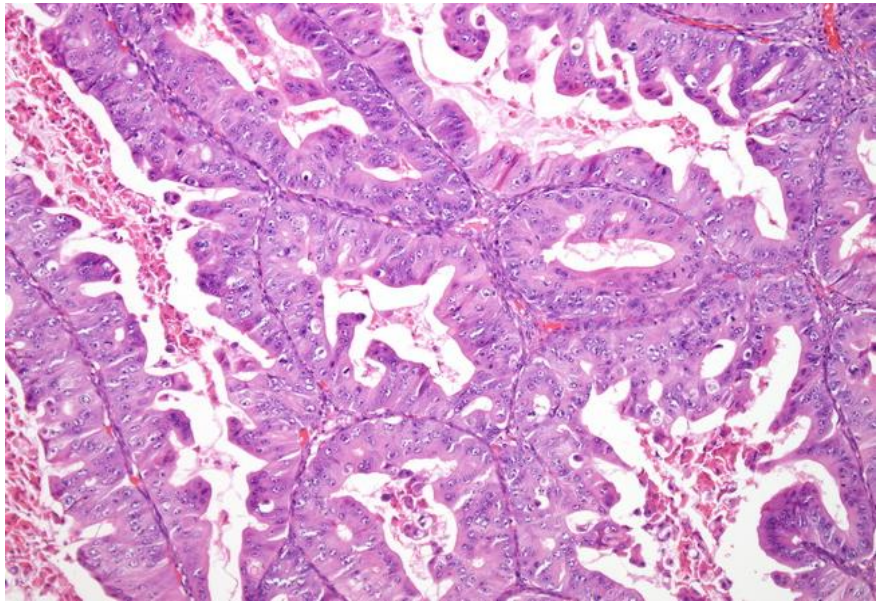
1. Surface epithelial tumors

B. Mucinous tumors:

M/E:

- Benign lesions are lined by tall columnar non ciliated epithelium with apical mucin similar to intestinal or cervical epithelium.
- Malignant tumors usually show solid areas, necrosis and stromal invasion.
- Borderline tumors show some of features of carcinomas but without stromal invasion





Ovarian Tumors
1. Surface epithelial 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

Ovarian Tumors
2. 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 of these cell types can be identified in the ovary.
- Moreover, because some of these cells normally secrete estrogens (granulosa and theca cells) or androgens (Leydig cells), their corresponding tumors may be either feminizing (granulosa–theca cell tumors) or masculinizing (Leydig cell tumors).

Ovarian Tumors
2. Sex cord stromal tumors

A. Granulosa cell tumor:

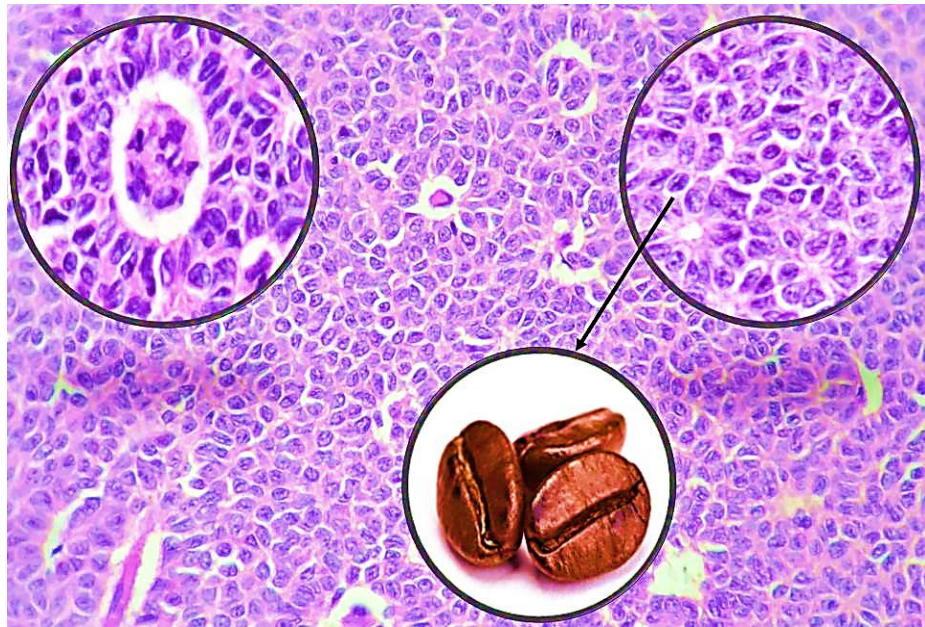
90% of all ovarian sex cord stromal tumors of low grade malignancy.

Age: Menopausal women.

C/P: Hyperestrogenism, associated endometrial hyperplasia and bleeding.

NE: Well circumscribed mass with solid and cystic areas, hemorrhage and necrosis

M/E: Uniform ovoid cells with cleaved nucleus arranged in diffuse, trabecular or microfollicular pattern



Ovarian Tumors
2. Sex cord stromal tumors

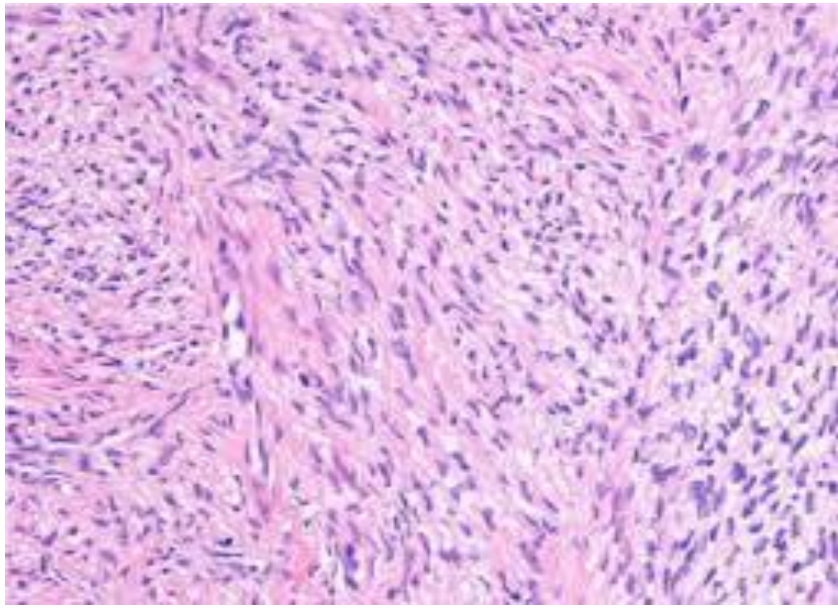
B. Thecoma-fibroma:

Theca cell tumor (thecoma): benign tumor, mostly mixed with fibroma (fibrothecoma). Mostly are hormonally inactive but, may secrete estrogen

NE: Solid yellow lobulated mass.

M/E: Ovoid to spindle cells with cytoplasmic lipid vacuoles.

Meig's syndrome: Ovarian fibroma with hydrothorax and ascitis.



Ovarian Tumors
2. Sex cord stromal tumors

C. Other Tumors:

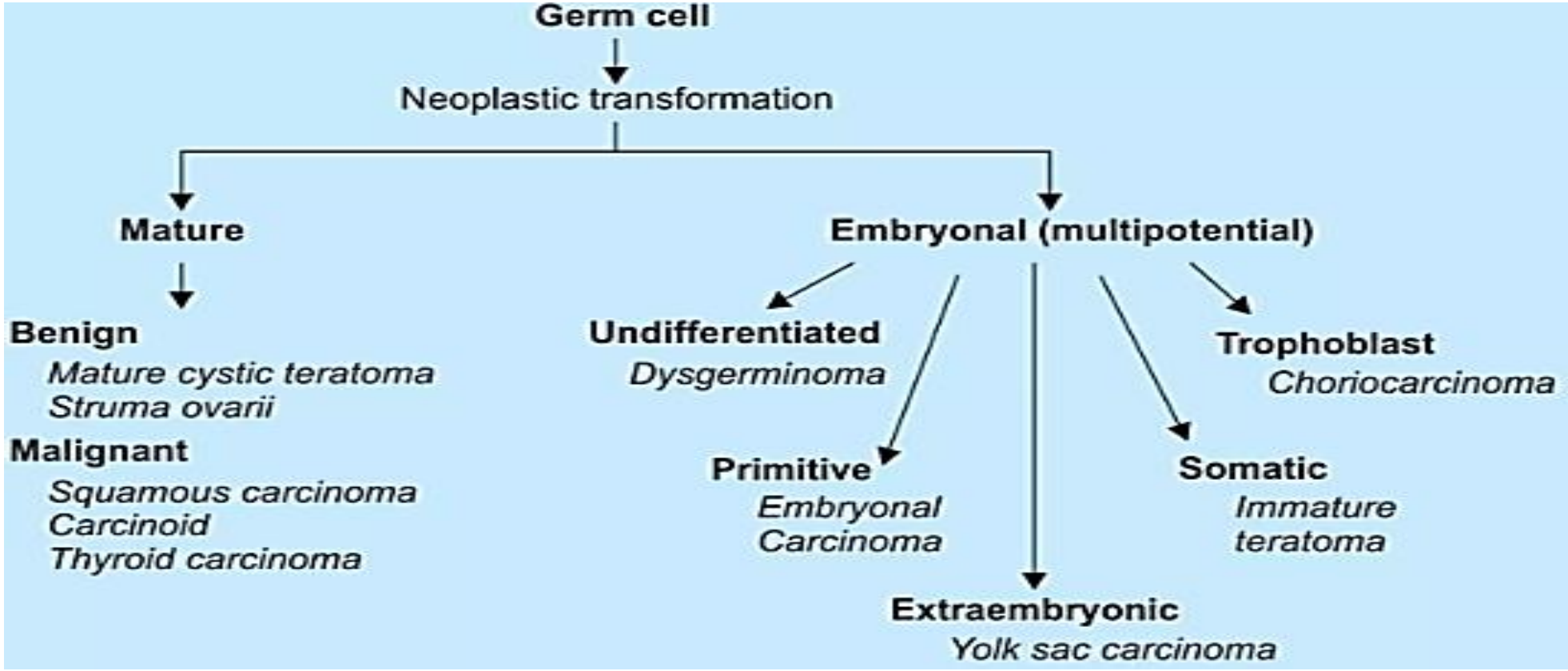
These may be sertoli cell tumor (secretes estrogen), leydig cell tumor (secrets androgen) or combination of them. The majority are benign.

- Mixed male and female differentiation (Gynandroblastoma):

Contain elements of granulosa, theca, sertoli and leydig tumors. It produces both hormones

Ovarian Tumors
3. Germ cell tumors

- 30% of all primary ovarian neoplasms.
- >90% of ovarian GCT are mature cystic teratomas which are benign tumors. Remaining 5% are malignant.



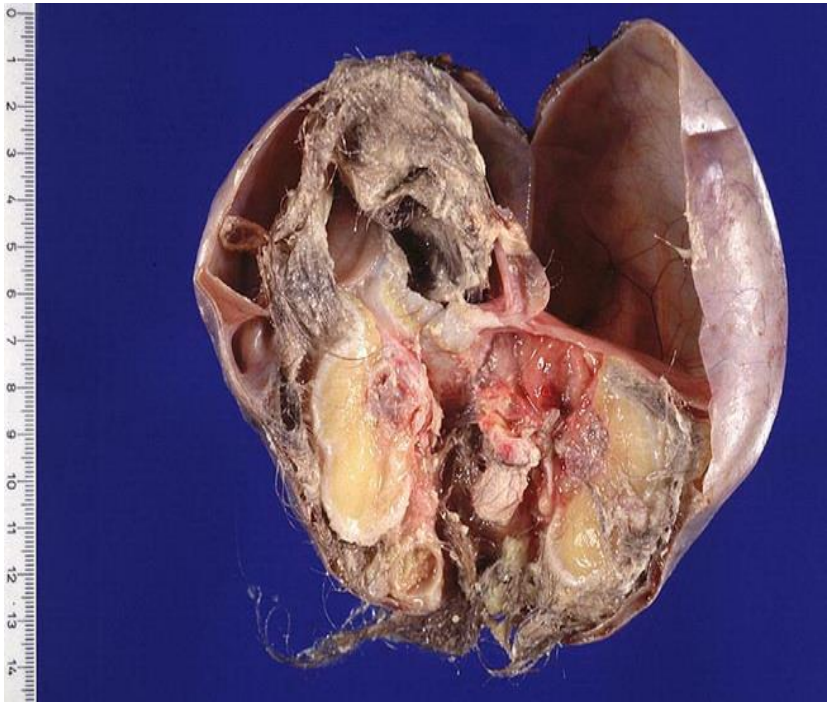
Ovarian Tumors
3. Germ cell tumors

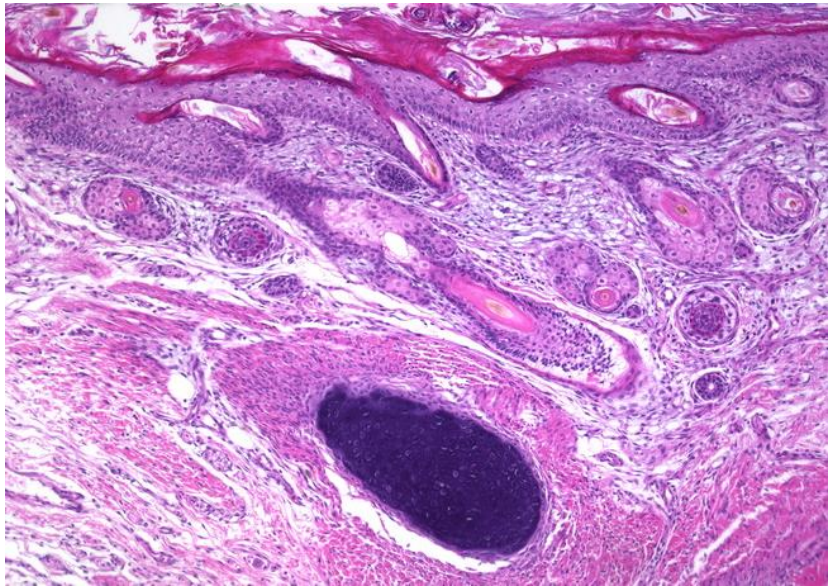
A. Teratoma:

1) Mature teratoma: It is usually cystic (dermoid cyst) and benign.

2) Immature teratoma: It is predominantly solid and malignant.

3) Monodermal teratoma: Characterized by one sided development. Examples are struma ovarii (only thyroid tissue) and some cases of mucinous cystadenoma (G.I.T. epithelium).





Ovarian Tumors
3. Germ cell tumors

B. Other tumors:

- **Dysgerminoma**
- Uncommon malignant non functioning neoplasm occurs in children and young adults. Microscopically, it is similar to seminoma of testis (Sheets or cords of large clear cells, Stroma may contain lymphocytes).
- **Choriocarcinoma:** Differentiation towards trophoblasts. It secretes HCG hormones
- **Yolk sac tumor :**occur in children, adolescent and young adult, secretes alpha fetoprotein

Ovarian Tumors

4. Unclassified tumors

Lymphomas, Hemangiomas, Lipomas, Leiomyomas,...etc...

5. Metastatic tumors

- These tumours are usually bilateral. They reach both ovaries by transcoelomic spread, blood spread, retrograde lymphatic spread or direct spread. Site of primaries include uterus, G.I.T, gall bladder, pancreas, and lung.

- Krukenberg tumor is bilateral ovarian secondaries showing signet ring cells scattered in fibrous stroma. The primary is present in G.I.T, mainly stomach.

Non Neoplastic Cysts of the Ovary

1- Follicular cysts: Extremely common finding. They are <2cm, lined by follicular cells, and filled with clear fluid. They commonly originate in unruptured graafian follicles.

2- Corpus luteum cysts: Dilatation of degenerated corpus luteum. Usually single and filled with blood.

3- Polycystic ovary (stein- leventhal syndrome): Affects women in reproductive age and is in the form of bilateral multiple small cystic follicles with cortical fibrosis.

Oligomenorrhea, hirsutism and infertility are presenting symptoms. The condition is related to disturbance in androgen synthesis

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

Fallopian tubes

- Suppurative salpingitis, gonococcus accounts for more than 60% of cases. These tubal infections are a part of pelvic inflammatory disease.
- Tuberculous salpingitis is an important cause of infertility.
- Tumors of the fallopian tube are uncommon. Primary adenocarcinoma of the fallopian tubes is rare.
- Serous tubal intraepithelial carcinoma considered as a precursor lesion to most of high grade serous tumors.

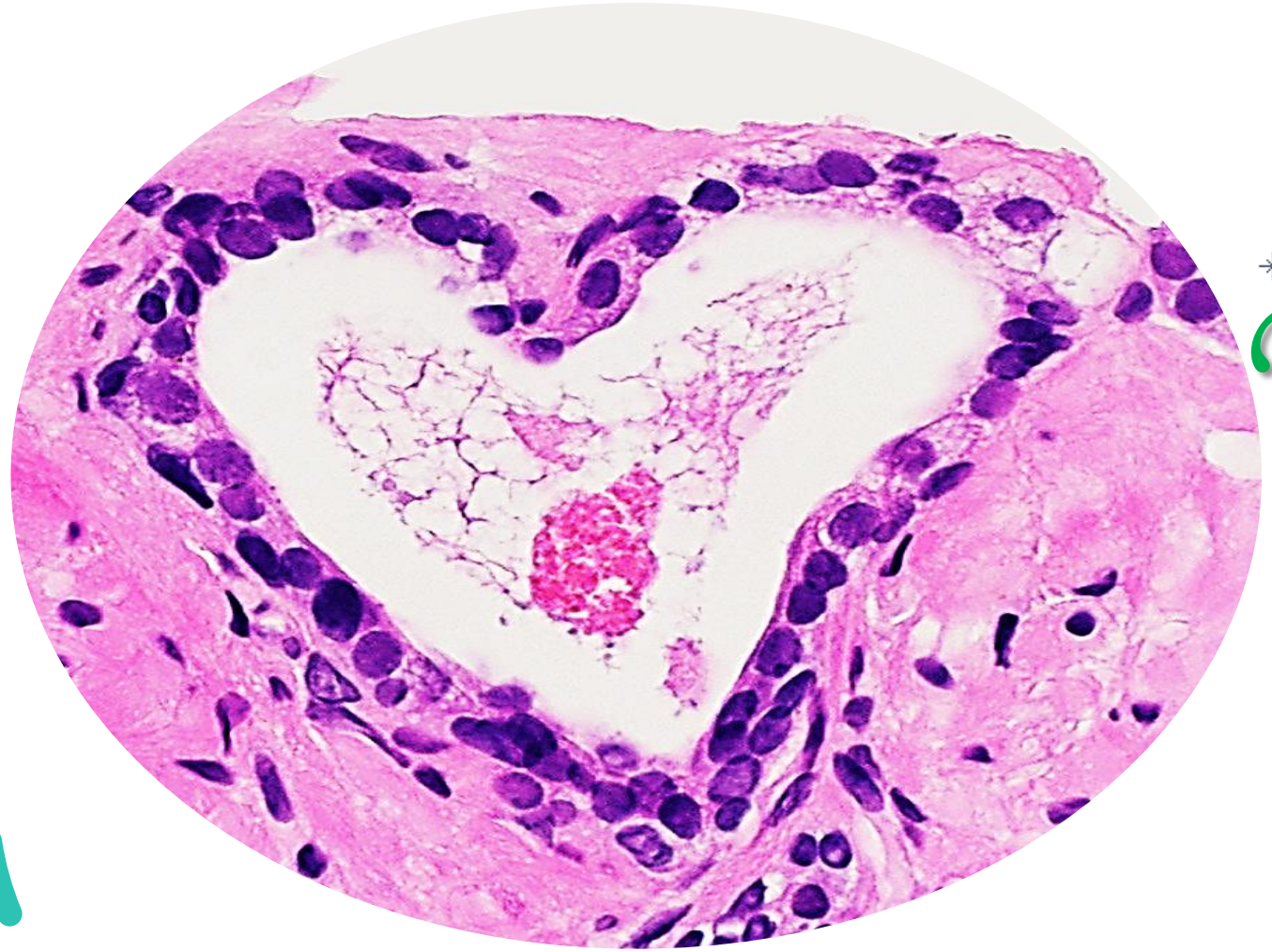
Discussion & Feedback

References & recommended readings

1. Robbins & Cotran Pathologic Basis of Disease, (Robbins Pathology), 2018 ISBN: 978-0-323-35317-5, Edition: 10th
2. Webpath:

   https://webpath.med.utah.edu/webpath.html

   https://www.pathologyatlas.ro/index.php



Thank you