same neoplasm.
- Nearly all LGSCs arise in a background of ovarian benign or borderline serous tumors.
- Most HGSCs are believed to arise from a precursor lesion, STIC (serous tubal intraepithelial carcinoma), in the tubal fimbriae.
- New criteria for primary site assignment in HGSC include:
  - Fallopian tube: STIC present, or mucosal HGSC present, or part or all of the fallopian tube is inseparable from tubo-ovarian mass.
  - Ovary: both fallopian tubes are separate from ovarian mass, and no STIC or mucosal HGSC present in either fallopian tube.
  - Tubo-ovarian: fallopian tubes and ovaries are unavailable for complete examination, and pathologic findings are consistent with extrauterine HGSC.
  - Peritoneal (exceedingly rare): both fallopian tubes and ovaries are fully examined using a SEE-FIM (Sectioning and Extensively Examining the FIMbriated end) protocol, and no gross or microscopic evidence of STIC or HGSC present in either fallopian tube or ovary.
- These criteria classify approximately 80% of HGSCs as primary tubal.
- Serous borderline tumor is the sole recommended term:
  - Obsolete terminology no longer recommended includes atypical proliferative serous tumor, serous tumor of low malignant potential, semimalignant serous tumor and non-invasive LGSC / micropapillary serous borderline tumor (the latter no longer considered definitionally synonymous with non-invasive LGSC).

SEROMUCINOUS CARCINOMA
- Previously defined as a carcinoma composed predominantly of serous and endocervical-type mucinous epithelium, often with foci showing clear cells, endometrioid or squamous differentiation.
- Now considered a subtype of endometrioid adenocarcinoma with mucinous differentiation (Fig. 1).

NEW VARIANTS OF EPITHELIAL TUMORS
- Mesonephric-like adenocarcinoma:
  - Composed of multiple architectural patterns (tubular, glandular/pseudoendometrioid, ductal, papillary, solid), intraluminal cosinophilic colloid-like material, dense or vesicular chromatin, inconspicuous nucleoli and nuclear crowding, and lacking squamous or mucinous differentiation.
  - Positive for GATA3, TTF1, CD10 (luminal) and PAX8, and negative for hormone receptors and WT1, with wild-type p53 expression.
  - Usually unilateral and diagnosed at stage I in postmenopausal women.
  - May arise from paraovarian mesonephric remnants or Müllerian carcinomas displaying secondary mesonephric transdifferentiation.
  - May be associated with endometriosis, cystadenomas, adenofibromas, borderline tumors and LGSC.

NON-SEROUS EPITHELIAL TUMORS
- The 4th edition divided serous carcinoma into low grade (LGSC) and high grade (HGSC) variants.
- LGSC and HGSC are best considered two fundamentally different tumors based on their distinct biology, rather than variants of the same neoplasm.
- Nearly all LGSCs arise in a background of ovarian benign or borderline serous tumors.
- Most HGSCs are believed to arise from a precursor lesion, STIC (serous tubal intraepithelial carcinoma), in the tubal fimbriae.
- New criteria for primary site assignment in HGSC include:
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ANCILLARY TESTING

• Aberrant p53 expression refers to three immuno-staining patterns associated with TP53 mutation:
  - Overexpression (strong nuclear expression in >80% of tumor cells).
  - Complete absence of nuclear staining (with satisfactory controls).
  - Unequivocal cytoplasmic expression.

SEX CORD-STROMAL TUMORS

• Most (>90%) adult-type granulosa cell tumors (GCTs) exhibit somatic FOXL2 mutations.
• Sertoli-Leydig cell tumors (SLCTs) may harbor DICER1 or FOXL2 mutations and are now classified into three molecular subtypes:
  - DICER1-mutant tumors show somatic (~50%) or germline (69%) hotspot mutations in the RNase IIIb domain of DICER1, an endoribonuclease involved in microRNA processing and gene expression regulation.
  - Occur in younger patients and induce androgenic symptoms.
  - Moderately or poorly differentiated with retiform or heterologous elements (the latter two predict DICER1 mutations) (Fig. 4).
  - FOXL2-mutant tumors show c.A02C>G (p.Cys134Trp) mutations that upregulate CYP19A1 encoding aromatase.
  - Occur in postmenopausal patients and induce estrogenic symptoms.
• Moderately or poorly differentiated lacking retiform or heterologous elements.
• Reported in 0-22% of cases.
• FOXL2 and DICER1 mutations are mutually exclusive.
• DICER1-FOXL2 wild-type tumors:
  - Occur in patients with intermediate age.
  - Well-differentiated lacking retiform or heterologous elements.
• Microcystic stromal tumors exhibit CTNNB1 or, less frequently, APC mutations and may represent an extracolonic manifestation of familial adenomatous polyposis.
• Small cell carcinomas of hypercalcemic type exhibit deleterious germline or somatic mutations in SMARCA4, part of the SWI/SNF complex, resulting in loss of SMARCA4 protein expression.
• Gynandroblastoma has been reintroduced (Fig. 5).
  - Defined as a sex cord-stromal tumor with an admixture of female (adult-type or juvenile GCT) and male (Sertoli cell tumor or SLCT) elements.
  - Most commonly composed of a predominant SLCT component and a smaller component of juvenile GCT, both expressing sex cord-stromal markers, sometimes with shared DICER1 mutations.