

A brief review of the development and anatomy of the female genital tract is fundamental to understanding the diseases that affect this complex organ system. Normal development of the female genital tract proceeds through a series of tightly choreographed events involving the primordial germ cells, the müllerian (paramesonephric) ducts, the wolffian (mesonephric) ducts, and the urogenital sinus (Fig. 22-1).

- *Germ cells* arise in the wall of the yolk sac by the fourth week of gestation. By the fifth or sixth week they migrate into the urogenital ridge and induce proliferation of the mesodermal epithelium, which gives rise to the epithelium and stroma of the ovary.
- The lateral *müllerian ducts* form at about the sixth week of development through invagination and fusion of the coelomic lining epithelium. The ducts progressively grow caudally into the pelvis, where they swing medially to fuse with the urogenital sinus at the müllerian tubercle (Fig. 22-1A). Further caudal growth brings these fused ducts into contact with the urogenital sinus. The unfused upper portions of the müllerian ducts mature into the fallopian tubes, while the fused lower portion develops into the uterus, cervix and upper vagina.
- The *urogenital sinus* develops when the cloaca is subdivided by the urorectal septum; it eventually forms the lower part of the vagina and the vestibule of the external genitalia (Fig. 22-1B).
- The *mesonephric ducts* normally regress in the female, but remnants may persist into adult life as epithelial inclusions adjacent to the ovaries, tubes, and uterus. In the cervix and vagina these rests may be cystic and are termed *Gartner duct cysts*.

The epithelial lining of the female genital tract as well as the ovarian surface share a common origin from coelomic epithelium (mesothelium), which may explain why

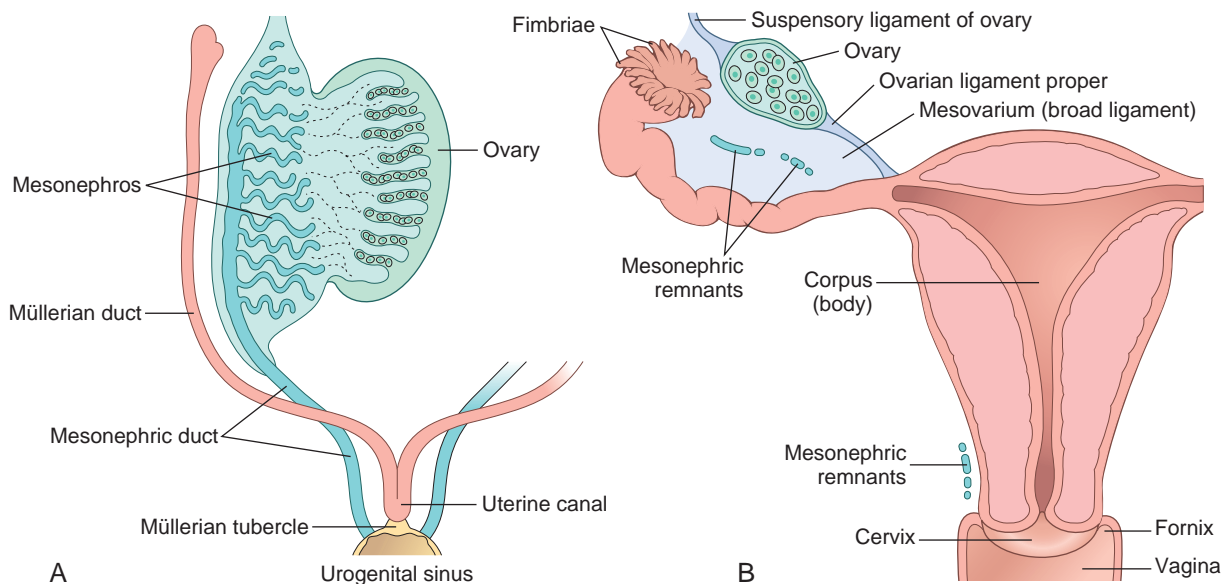
morphologically similar benign and malignant lesions arise in various sites within the female genital tract and the adjacent peritoneal surfaces.

Diseases of the female genital tract are extremely common and include complications of pregnancy, infections, tumors, and hormonally induced abnormalities. The following discussion presents the pathology of the major diseases that result in clinical problems. Additional details can be found in current textbooks of gynecologic pathology and clinical obstetrics and gynecology. We will discuss the pathologic conditions peculiar to each segment of the female genital tract separately, but before doing so will briefly review infections and pelvic inflammatory disease because they can affect many of the various anatomic structures concomitantly.

## Infections

A large variety of organisms can infect the female genital tract. Some infections with microorganisms such as *Candida*, *Trichomonas*, and *Gardnerella* are very common and may cause significant discomfort, but are without serious sequelae. Others, such as *Neisseria gonorrhoeae* and *Chlamydia* infections, are major causes of female infertility, and others still, such as *Ureaplasma urealyticum* and *Mycoplasma hominis* infections, are implicated in preterm deliveries. Viruses, especially herpes simplex viruses (HSVs) and human papillomaviruses (HPVs), also account for considerable morbidity; HSVs cause painful genital ulcerations, whereas HPVs are involved in the pathogenesis of cervical, vaginal, and vulvar cancers.

Many of these infections are sexually transmitted, including trichomoniasis, gonorrhea, chancroid, granuloma inguinale, lymphogranuloma venereum, syphilis, *Mycoplasma*, *Chlamydia*, HSV, and HPV. Most of these conditions are considered in Chapter 8; HPV is also discussed



**Figure 22-1** Embryology and anatomy of the female genital tract. **A**, Early in development, the mesonephric (blue) and müllerian (red) ducts merge at the urogenital sinus to form the müllerian tubercle. **B**, By birth, the müllerian ducts have fused to form the fallopian tubes, uterus, and endocervix (red), merging with the vaginal squamous mucosa. The mesonephric ducts regress, but may be found as a remnant in the ovary, adnexa, and cervix (Gartner duct). (Adapted from Langman J: Medical Embryology. Baltimore, Williams and Wilkins, 1981.)