Ovarian cancer is characterized by complex cellular and molecular processes. Histological subtypes impact prognosis. Several key molecular aberrations have been defined, notably BRCA1/2 mutations. Deficiencies in homologous recombination pathway components are common. High genomic instability and low immunogenicity contribute to tumorigenesis. The tumor microenvironment impacts pathogenesis. Ovarian cancer is both histologically and molecularly heterogeneous. Aberrations in DNA repair pathways are common in ovarian cancer. The tumor microenvironment affects clinical outcomes. Potential effect of intratumoral heterogeneity is being explored. For additional content on this topic, please visit www.GemstoneOncology.com