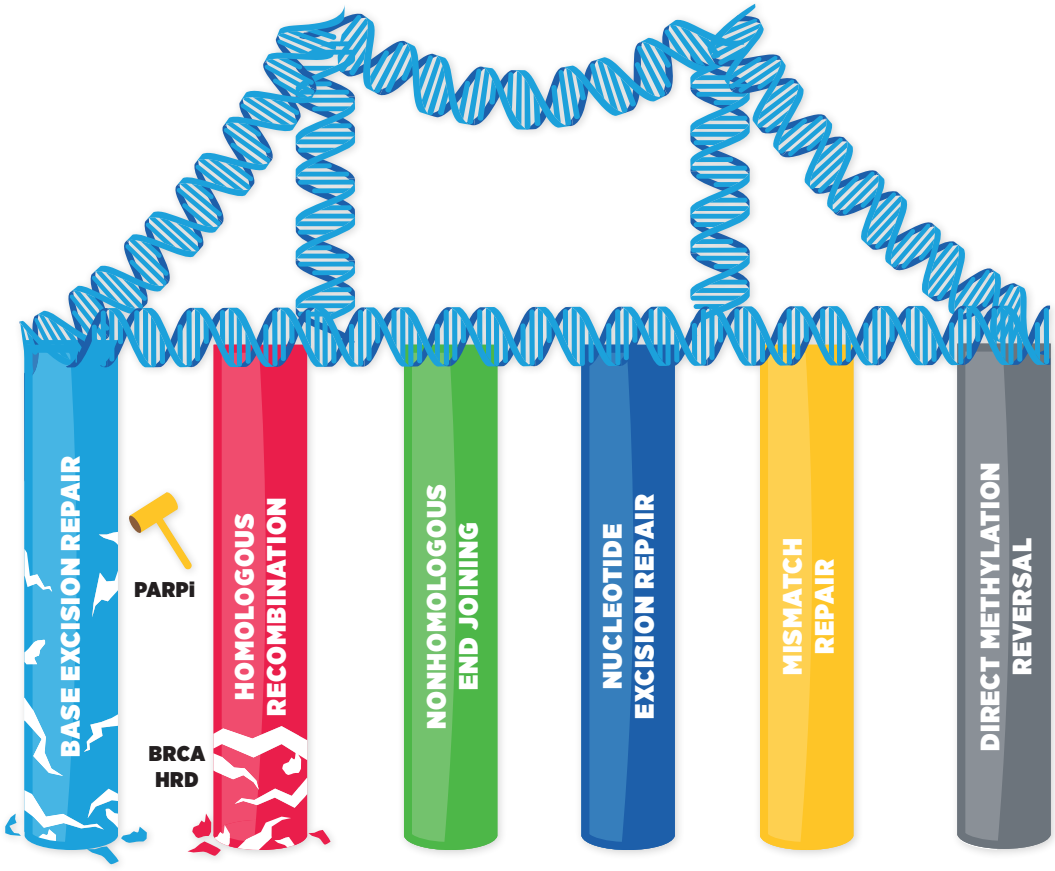
FIGURE 15 DNA INTEGRITY: BRIDGING THE PRECISION GAP



Basic research has shown that maintenance of DNA integrity is essential for a cell to remain healthy and maintain normal function. The integrity of DNA is constantly under threat from errors that occur during multiplication, as well as exposure to chemicals, such as those in cigarette smoke, and ultraviolet radiation from the sun. If DNA is not appropriately repaired, mutations accumulate, increasing the chance that a cell will become cancerous. As a result, cells have several interrelated pathways that they use to repair damaged DNA (360). Individuals with genetic mutations that result in deficiency in the homologous recombination DNA repair pathway (HRD), including mutations in the BRCA1 and BRCA2 genes, have an increased risk of developing certain types of cancer. The PARP proteins are central to the base excision repair pathway (light blue support). Researchers have found that breast, ovarian, pancreatic, and prostate cancers with genetic mutations that lead to homologous recombination deficiency are responsive to PARP-targeted therapeutics because disruption of two DNA repair pathways leads to such pervasive DNA damage that the cancer cells die.