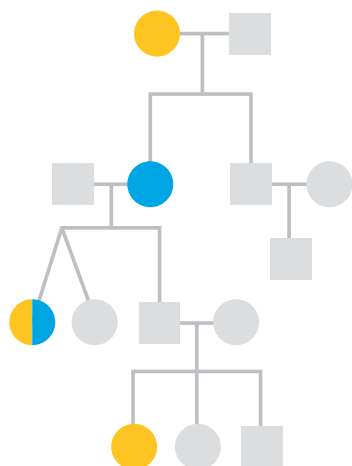


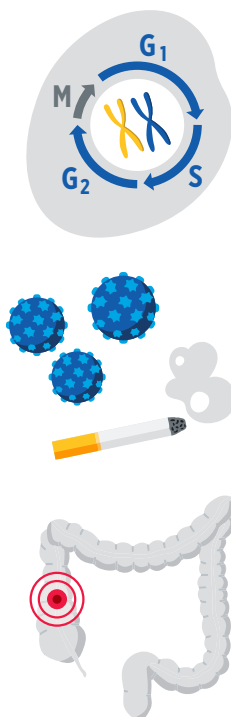
## Sources of Genetic Alterations

Cancer initiation and progression are predominantly caused by the accumulation of alterations, or mutations, in the genetic material of a cell over time. The primary sources of genetic alterations are as follows:

**About 10 percent of all new U.S. cancer cases are linked to inherited or de novo genetic mutations, which are present in each cell of the body from birth.**



**Most alterations, however, are acquired during a person's lifetime.**



- Some occur during normal cell division. Every time a cell divides it must make a full copy of its DNA. As there are 3 billion letters to copy, mistakes can happen during the process, leading to alterations in the DNA sequence. Cells have a specific machinery to fix most of these alterations to restore the DNA to a normal copy. However, sometimes these errors don't get fixed and a daughter cell acquires the mutation which may alter the cell's proteins and ultimately change the cell's control over functions such as growth.
- Many are caused by modifiable cancer risk factors, for instance, persistent exposure to substances that damage genetic material, such as toxicants in tobacco smoke, or to infectious pathogens that alter normal cellular machinery, such as human papillomavirus (HPV) or *Helicobacter pylori* bacteria.
- Others occur as a result of medical conditions that are associated with chronic inflammation such as diabetes or Crohn's disease.

These factors come together to determine the chance that an individual cell has of acquiring mutations over time, which, in turn, determines the overall risk that a person will develop cancer. The prevalence of many cancer-causing factors, such as smoking, HPV infection, and incidence of diabetes, are higher among racial and ethnic minorities, leading to a higher likelihood of cancer development among these populations. It is important to note that not all mutations lead to cancer.